

# TYPE APPROVAL CERTIFICATE

## This is to certify:

That the **Pneumatic Actuator**

with type designation(s)

**P series Rack and Pinion Actuator, P series Scotch Yoke Actuator**

Issued to

**Wuxi Force & Torque Technology Co., Ltd.**  
**Wuxi, China**

is found to comply with

**DNV rules for classification – Ships Pt.4 Ch.6 Piping systems**

**DNV rules for classification – Ships Pt.4 Ch.7 Pressure equipment**

## Application :

**Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

|                                          |                                                                     |
|------------------------------------------|---------------------------------------------------------------------|
| <b>Type</b>                              | <b>Dsgn. press./Torque</b>                                          |
| <b>P series Rack and Pinion Actuator</b> | <b>max.8 bar/ see manufacture's instruction</b>                     |
| <b>P series Scotch Yoke Actuator</b>     | <b>max. 6 bar and max. 7.6 bar / see manufacturer's instruction</b> |

Issued at **Hamburg** on **2022-06-15**

This Certificate is valid until **2027-06-14**.

for **DNV**

DNV local station: **ACC Electrical & Machinery**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

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**Olaf Drews**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.  
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



## Product description

Pneumatic actuator P series scotch yoke actuators and P series rack and pinion actuators to be used for 90° rotary valve, which are equipped with solenoid valve, valve positioner, booster relay, quick exhaust valve, position transmitter and other accessories.

Optional additional mounting parts such as position sensors, solenoid valves, positioners are excluded from this type approval.

### Technical Data

#### **P Series Scotch Yoke Actuator (Modular structure) - Pxxxy- abc (or abx)**

Flange size: F 14 up to F 60

Pressure range: 3 - 6 bar

Working temperature range: -20°C to + 80°C

Stoke: 0 (±6°) ~90° (±6°)

Working medium: The operating medium shall have a dew point equal to – 20 °C or, to be at least, 10 °C below the ambient temperature (ISO 8573-1, Class 3). The maximum particle size shall not exceed 40 µm (ISO 8573-1, Class 5). see manufacturer's technical data sheet.

| Actuator Parts                                                                                     | Materials / Standard                             |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Box, Cover, Cylinder- and Connection cover, piston                                                 | Nodular iron, 450-10 acc. to ISO 1083:2004       |
| Yoke                                                                                               | Nodular iron, 600-3 acc. to ISO 1083:2004        |
| Pin, rod, spring rod                                                                               | Stainless steel, 42 CrMo4 acc. to EN10083-3:2007 |
| Slider, guid bar, side-, cylinder cover, cylinder lever, instruction module, pressure relief valve | Steel, C45E4 acc. to ISO683-1:2004               |
| Cylinder                                                                                           | Steel 1020 acc. to ASTM A29/A29M-05              |
| Spring                                                                                             | Stainless steel, 61SiCr7 acc. to ISO 683-14      |
| Connection Cover (spring)                                                                          | Steel, S235JRG2 acc. to EN10025-2:2004           |

#### **P Series Scotch Yoke Actuator (Monolithic structure) P0040-abc (or aby) ~ P0160-abc (or aby)**

Flange size: F 03 up to F 14

Pressure range: 3.1 – 7.6 bar

Working temperature range: -20°C to + 80°C

Stoke: 0 ~90 (±3°) or (±3°) ~90°

Working medium: The operating medium shall have a dew point equal to – 20 °C or, to be at least, 10 °C below the ambient temperature (ISO 8573-1, Class 3). The maximum particle size shall not exceed 40 µm (ISO 8573-1, Class 5). see manufacturer's technical data sheet.

| Actuator Parts  | Materials / Standard                             |
|-----------------|--------------------------------------------------|
| Cylinder        | Aluminium alloy, 6005-T5 acc. to ISO 209:2007    |
| Piston/ End cap | Cast aluminium, ADC12 acc. to JIS H 5302-2006    |
| Drive shaft     | Stainless steel, 42 CrMo4 acc. to EN10083-3:2007 |

### **P Series Rack and Pinion Actuator (Aluminium) PRaxxx / PRaxxx - byy**

Flange size: F 03 up to F 25

Pressure range: 2 - 8 bar

Working temperature range: -20°C to + 80°C

Stroke: 0 (±6°) ~90° (±6°)

Working medium: The operating medium shall have a dew point equal to – 20 °C or, to be at least, 10 °C below the ambient temperature (ISO 8573-1, Class 3). The maximum particle size shall not exceed 40 µm (ISO 8573-1, Class 5). see manufacturer's technical data sheet.

| <b>Actuator Parts</b> | <b>Materials / Standard</b>                   |
|-----------------------|-----------------------------------------------|
| Pinion                | Steel, C45E4 acc. to ISO683-1                 |
| Cylinder              | Aluminium alloy, 6005-T5 acc. to ISO 209:2007 |
| Piston/ End cap       | Cast aluminium, ADC12 acc. to JIS H 5302-2006 |
| Spring                | Stainless steel, 61SiCr7 acc. to ISO 683-14   |

### **P Series Rack and Pinion Actuator (Stainless Steel) PRaxxx / PRaxxx – byy + Sz**

Flange size: F 03 up to F 12

Pressure range: 2 - 8 bar

Working temperature range: -20°C to + 80°C

Stroke: 0 (±6°) ~90° (±6°)

Working medium: The operating medium shall have a dew point equal to – 20 °C or, to be at least, 10 °C below the ambient temperature (ISO 8573-1, Class 3). The maximum particle size shall not exceed 40 µm (ISO 8573-1, Class 5). see manufacturer's technical data sheet.

| <b>Actuator Parts</b> | <b>Materials / Standard</b>                        |
|-----------------------|----------------------------------------------------|
| Pinion                | Stainless Steel, 304/316/361L, acc. to ASTM959-04  |
| Cylinder              |                                                    |
| Piston/ End cap       | Cast aluminium, ADC12 acc. to JIS H 5302-2006      |
| Spring                | Alloy steel, 61SiCr7 acc. to ISO 683-14            |
| End Cap               | Stainless Steel, 304/316/361L, acc. to ASTM 959-04 |
| Cam                   | Steel, C45E4 acc. to ISO 683-1                     |

## **Application**

Approved for application and mounting on remote operating solenoid valve, valve positioner, booster relay, quick exhaust valve.

The selection of a suitable actuator for a specific valve type including operation and service conditions shall be carried out according to the technical instructions of the manufacturer.

## Limitation

Actuators with housing cap and piston fabricated of aluminium shall not be mounted on valves installed in piping systems and areas subjected to potential hazards caused by fire.  
The materials to be used in piping system shall be suitable for the medium and service intended according to DNV Rules Pt. 4, Ch 6 Piping Systems, Section 2 - Materials.

## Type Approval documentation

### Tests carried out

Test Standards:

DNV Pt. 4 Ch.6 – Piping systems; Pt. 4 Ch.7 – Pressure equipment

- Pressure test witnessed by DNV Surveyor.  
Test pressure in amount of 1,5 times the design pressure
- Functional test

## Marking of product

For traceability to this type approval the pneumatic P actuator series scotch yoke actuators and P series rack and pinion actuators are to be marked with:

- Manufacturer's name or trade mark
- Model number
- S/N number
- MAP (only cylinder): xx bar
- Temp. Range: xx °C
- Weight: xxx Kg
- Cylinder Volume: xx L
- Tested Date:
- Production Date
- Working pressure: xx bar

## Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNV-CP-0338, Sec.4.

- The certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

**END OF CERTIFICATE**