



# USER MANUAL

**Installation, Maintenance and Operation  
for  
Electro Hydraulic Actuator  
Type: PA-HX und PA-HX...X  
„Part turn Actuator“**

Actuators for Industrial Valves

Actuator without power pack in order to be connected to external pressure supply

Double acting (D) / single acting (E) type

Special version: ATEX suitable Zone 1 and 2 (Type PA.....EX)

# Operating Manual Installation Manual



Hydraulic Part Turn Actuator Typ: KTC-PA-HX...

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## 1 Safety Instructions

### 1.1 Basics





From development to assembly of our KTC actuators, we are conform to international norms and directives. A confirmation according to directive 2006/95/EG is part of our delivery.

All personnel, working with this device must be familiar with the safety and warning instructions mentioned in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or material damage.

### 1.2 Concept of Warnings

To avoid personnel injury and material damage, it is necessary to observe the indications mentioned in this manual.

Please see detailed table of indications below.

	Indicates an imminently hazardous situation with a high level of risk. Failure to observe this warning could result in death or serious injury.
	Indicates a potentially hazardous situation with a medium level of risk. Failure to observe this warning could result in death or serious injury.
	Indicates a potentially hazardous situation with a low level of risk. Failure to observe this warning may result in minor or moderate injury. May also be used with property damage.
	Potentially hazardous situation. Failure to observe this warning may result in property damage. Is not used for personal injury.

### 1.3 Personal requirements

Maintenance and user personal has to be qualified as follows:

- Skills and experience in hydraulic.
- Understanding of the complete system of the electro hydraulic actuator electrically and hydraulically as well as knowledge in reading schematic hydraulic and electric diagrams.
- Maintenance works on electric system and components by qualified staff only.

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### 1.4 Intended use

The Actuator shall be used for purposes as described in this manual only.

The Actuator is designed for use on industrial valves only.

The intended use includes the observance of this operating manual, as well as other relevant documents (schematic diagrams, additional manuals of components of actuator)

Utilization beside the described intended use, may induce critical situations and personnel injury or material damage.



#### Danger on incorrect use

Misuse of Actuators may induce personnel injury or material damage.

Please take care to avoid following miss use:

- Operation of Actuator beside the described intended use
- Operation of non Ex proof Actuators in potential explosive atmosphere. Please observe name late of actuator to check suitability.

#### 1.4.1 Predictable misuse

Persons which are not conform to the requested requirements in knowledge and experience, are not allowed to use or work on the actuator. Also observe following misdemeanor

- Use of non-approved spare parts (please see applicable part list)
- Change of adjustment of pressure relieve valves
- Change of power supply voltage or signals
- Non-observance of operating manual and attendant documents.
- Non-observance of appropriate safety instructions
- Installation, operation, maintenance and repair of actuator of personnel without the requested technical competence.
- Removing or dis connection of safety equipment.

Any claims of personnel injury or material damages, due to incorrect use, are excluded.

The end user is responsible and liable for all damages, happen due to incorrect use.

## 2 Description of Application

The KTC Actuator is used for the adjustment of control and safety valves. High control precision, high control force and speed are the properties of KTC Actuators. The fields of application at electric power stations, chemical industry and pipelines.

We differentiate between PA **actuator** and PA-HX **actuator** as well as HSRC.

The PA is a **actuator** with compact hydraulic unit. The PA-HX and HSRC are supplied without a power unit and can be connected to an external hydraulic supply.

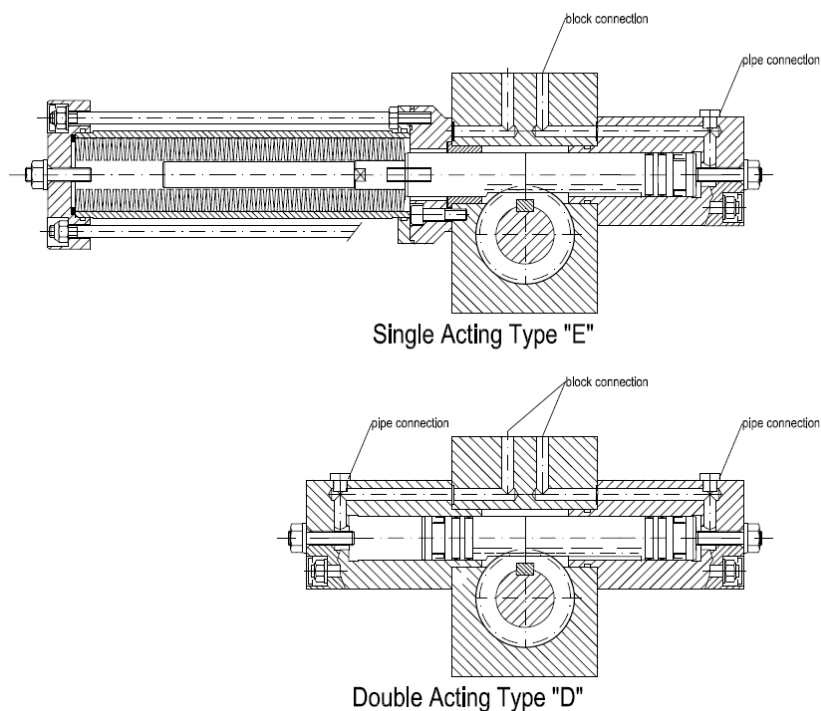
The PA-HX actuator (PA = Part turn Actuator /HX Hydraulik eXternal) was developed for the operation/automation of **1/4 turn valves**. With a relatively low power requirement, the hydraulics ensure a high speed and at the same time high output forces with very precise positioning behaviour. In addition, the hydraulic power transmission is very resistant to vibrations.

We manufacture our swivel drives with rack and pinion drive for forces **from** 20Nm to > 10.000Nm  
For applications from approx. 12,000Nm we use drives with Scotch Yoke principle.

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All variants are available with double-acting type D, or single-acting with spring package type E (spring opening or spring closing).

### 3 Labelling

The name plate of every actuator as below.

KTC Systemtechnik GmbH – Krähenweg 11 - 22459 Hamburg	
Bezeichnung / Description	Schwenkantrieb / Part Turn Actuator
Typ / Type	PA-HX-O-D20-DS-EB
Ident.Nr.	10234-1622-001
Baujahr/Year	2018
Pmax / max. pressure:	150bar
Arbeitsdruck / Working pressure	120 bar
Drehmoment / Torque	550Nm

Tabel 1: sample of type and name plate actuator

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### 3.1 Identification number

Every actuator is marked with its own identification number.

### 3.2 CE marking

The KTC actuators is an incomplete machine (according to the European directive 2006/42/EG).

In this case, a CE marking is prohibited.

Except for actuators, suitable for use in potentially explosive atmosphere. For those actuators, the CE marking is mandatory.

## 4 Transportation and storage

KTC Actuators are packed according to transportation requirements. Please unpack and repack with care.

### DANGER

- Never stay under hovering weights.
- Never raise the actuator on its lifting points together adapted valve.
- Use correct and soft belts only.
- Do not fix the belts on actuator components

### 4.1 Storage

To avoid material damage, please follow the recommended list below.

### NOTICE

- The actuator shall be clean and dry prior to placement in storage
- Protect the actuator against humidity, high or low temperature dust and dirt.
- Protect the actuator of mechanical damages.

### 4.2 Long term storage

For storage above the period of 6 months, the coupling parts, screws and nuts as well as non-varnished parts of actuator shall be protected with suitable, non-corrosive grease.

Please check the conditions of the actuator and its protection every 6 months. We recommend to operate the actuator, full open and full close several times.

## 5 Installation

Installation shall be carried out as described in this manual. This manual does not cover all KTC hydraulic actuators in detail, always refer to the job specific documents also. These documents are always indicated with a project number which is also mentioned on actuator name plate.

Installation works shall be carried out by experienced persons only.

It is recommended, before installation, to read the job specific hydraulic and electric diagrams. Please observe the job specific control requirements.

### 5.1 Installation in potential explosive areas

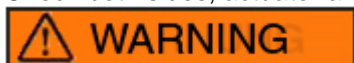


Please read following instruction before installation in potential explosive areas.

- Only experts and experienced personnel shall be in charge with the installation of an actuator.
- The actuator must be suitable for potential explosive areas. Please check type plate.
- Temperature range and gas group has to be in accordance with the conditions on site.
- The job specific control devices (if applicable: motor control, temperature- and pressure control, limit switches) are connected and in function.
- Please make sure the proper grounding of the actuator.

### 5.2 Mechanical connection onto valve.

Check both sides, actuator and valve flange dimension, before lifting onto valve.



Carefully connect the actuator onto valve, it may a risk of injury.

If an adjustment of the piston necessary, please use hand pump if exist.

Make sure, that after installation onto valve, there is no risk of injury from moving parts. Protect with solid mechanical provision.

- Pay attention to correct position of actuator onto valve (open and close)
- Raising of actuator at defined positions only. Never raise valve via actuator.
- Watch correct position of piston rod.
- Make sure that the flange is clean.
- Use non corrosive grease at mechanical parts (flange, screws, rod, threat) as antirust protection.
- Pay attention to correct torque of screws
- If possible, start with a manual test of actuator after mounting onto valve.

### 5.3 Adjustment of the rotating angle

Usually, the angle adjustment is factory made. A change of the angle is possible with modulating actuators only. Please keep in mind to re-adjust position transmitter accordingly. Please contact KTC Systemtechnik for further queries.

### 5.4 Adjustment of closed position

The mechanical stop can be adjusted with the screw at the end of the cylinder. Proceed as follows

- Removing the cap nut and loosening the counter nut (in the case of drives with flood protection, protective covers are placed over the adjustment screws)
- Adjust the screw to the desired value.
- ATTENTION: Oil may leak out of the thread of the screw.
- Tighten the counter nut, securing the adjustment screw against twisting.
- Check the of oil leakage

### 5.5 Adjustment of open position

The mechanical left stop is adjusted with the adjustment screw on the spring housing. To this end, they proceed as follows

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- Loosening the counter nut
- Check the current open position by full drive through the hydraulic cylinder
- Drive and armature back in the direction of "Zu"
- Adjust the adjustment screw to the desired value
- Return the cylinder and check the new position. Proceed in this way until the desired position has been reached.
- Tight the counter nut, secure the adjustment screw.



Make sure there is no oil leakage after adjustment.

### 5.6 Hydraulic connection

We recommend that, any hydraulic tube works of external hydraulic pressure supply shall be carried out by experienced persons only. Locally safety instructions shall be observed.

#### 5.6.1 Flushing

Before connection of pilot pipes to the actuator these pipes have to be flushed to remove the installation dirt (especially metal chips). If installation dirt enters the actuators this may cause major damage and misbehaviour of valve operation.

The actuators have been flushed and plugged at the work shop and are not allowed to be included in the flushing procedure. Each customer is free to choose the flushing method as long as an internationally recognized flushing method is used and the fluid cleanliness will be NAS 1638 Class 7-9 after flushing

#### 5.6.2 Bleeding

Air in the hydraulic system may cause malfunctions and therefore should be avoided.

Especially during initial start-up, oil change or in the event of an oil line or valve change, the system must be carefully bled. Bleeding should be done from the upper most point in the pipe network and at the actuator.

#### 5.6.3 Closing speed adjustment

During start-up special attention should be paid to the closing speed of each actuator. It should be adjustable by the external system.



A high closing speed may cause water hammer effects and has to be avoided under all circumstances. Otherwise valves and pipelines may be severely damaged.

### 5.7 Hydraulic System Precautions



- Release hydraulic pressure before working on hydraulic system.
- Always wear appropriate safety clothing and safety glasses
- Read hydraulic schematic diagrams of actuator or hydraulic system.
- Read hydraulic oil safety instructions
- Tighten the hydraulic connections to avoid leakage





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- If hydraulic oil is pressurized, it can pierce the skin and may go into blood stream.

### 5.8 Electrical Connection

Always refer to actuator specific wiring diagram which is part of the actuators documentation. The electrical connection shall be executed by professionals only. Locally safety instructions and standards of practice shall be observed. Make sure that power supply is switched off and protect against accidental activation while connection works.



Incorrect connection may cause injury or damage.

### 5.9 Electric Precautions

- Observe voltage and current limits
- Ensure the correct distance between signal cable and power cable.
- Close all cable glands which are not in use

### 5.10 Checklist Commissioning / 1st start of actuator

Please ensure the following list can be confirmed:

- No persons stay in area of risk.
- A steady position of actuator. Due to high force the actuator masses may move.
- Correct hydraulic connection according to KTC hydraulic schematic.
- Correct hydraulic oil filling
- Correct position of actuator and valve.
- Control and safety functions by external process control are realized

### 5.11 Manual Operation

The manual operation shall be realized by the external pressure supply system. Actuators might be able for manual operation in case of power failure. Every actuator can be ordered incl. manual hand pump. If the actuator is not equipped with hand pump, we may supply a special hydraulic connection in order to connect an external hand pump.



Make sure there is no person in area of risk while operating manually.

## 6 Spare Parts

Service works shall be carried out by experienced persons only.

In case of spare parts requirements, please observe part list and supply the identification number of the actuator.

Please note: Utilize only original KTC spare parts

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## 7 Maintenance

The actuators should be checked regularly for leakage and proper pipe connection with the same short time intervals as the hydraulic system.

### 7.1 Maintenance plan

Inspection	Recommendation	
	Modulating Actuator	On/Off Actuator
Visually check leakage	1x/Month	1x/Month
Visually check oil conditions	1x/ half-year	1x/ half-year
Exchange of flexible hydraulic tube	6 years after year of manufacturing	
Check for unusual sounds	1x/Month	

**For operation under harsh conditions, the period has to change accordingly**

### 7.2 Technical Problems

Please contact KTC Systemtechnik in case of uncertainties and technical problems to avoid material damage.

### 7.3 General instruction for maintenance

KTC Systemtechnik recommend to consult qualified staff for any maintenance work at KTC Actuators only.



- Before start working on hydraulic system, the oil pressure of the actuator has to be released completely. Please observe pressure gauge.
- Protect the actuator for unintended activation.
- Before opening of case of spring refer to related KTC instructions. The spring has to be in released position. Please note that the spring is preloaded.
- Non-observance of above instructions may lead to injuries.

### 7.4 Maintenance works at KTC Actuator during guarantee period

In case of needful maintenance work at KTC actuators during the period of guarantee, please contact and inform KTC Systemtechnik in advance. The guarantee period may end or set out.

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## **8 Certificates and declaration of incorporation**

According to the European directive 2006/42/EG, Actuators for valves are incomplete machines. Part of the documentation of any KTC Actuator is the declaration of incorporation. A CE marking for incomplete machines are prohibited.

All Actuators suitable for installation and operation in potentially explosive atmosphere are in conformance to the European directive 94/9/EG. Part of documentation is the relevant declaration of conformity. These actuators are CE marked.

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