



Qualität von Anfang an.

Original Operating Manual Electric Actuator E2



acc. to annex VI of the Directive 2006/42/EC



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1 Foreword

Dear customer,
Dear assembler / user,

These mounting and operating manual are intended to give you the knowledge which is necessary for you to be able to carry out the mounting and adjustment of an **NE actuator** rapidly and correctly.



Please read these instructions carefully and pay particular attention to the advice and warning notes!

The **actuators NE** are supplied in various versions, depending on

- the actuating time for 90° rotation angle of the output drive shaft
- the operating voltage and
- the max. revolutions of the output drive shaft.

In addition optional extensions are available.

In case of the event of a power failure the output drive shaft of the actuator **NE** can be adjusted by the manual override.

The field of use of these actuators are predominantly

- in industrial fittings
- in chemical installations
- in ventilation and blower construction
- in heating and air-conditioning technology
- in machine and plant construction
- in water treatment, etc.

If you have any question in relation to the **actuator NE** we shall be pleased to answer them. The telephone number will be found on the inside front cover of these mounting and operation manual.

Yours
END-Armaturen GmbH & Co. KG

2 General advice

2.1 Validity

The mounting and operating manual is valid for the standard versions of the **electric actuators NE**.

2.2 Inward monitoring

Please check directly after delivery the actuator for any transport damage and deficiencies with reference to the accompanying delivery note the number of the parts.

Do not leave any parts in the package.

2.3 Complains

Claims for the replacement of goods which relate to transport damage can only be considered valid if the parcel service / forwarder has notified without delay.

In case of returns (because of transport damage / repairs), please make a damage protocol and send the parts back, please only on consultation with the sales department, to the manufacturer, if possible in the original packaging.

In case of a return, please mention the following:

- Name and address of the consignee
- Ordering- / Article- number
- Description of the defect.

2.4 Guarantee

For our actuators **NE** we give a guarantee period in accordance with the sales contract. The end of the normal duration of life of the wearing parts represents no defect.

The warranty and guarantee rules of **END-Armaturen GmbH & Co. KG** are applicable.

2.5 Symbols and their signification



Paragraphs which are identified with this symbol contain very important advices, this also includes advices for everything health risks. Observe this paragraphs without fail!



Paragraphs which are identified with this symbol contain important advices, this also includes how to avoid damage to property. Observe these paragraphs without fail!



This symbols indicates paragraphs which contain comments / advices or tips.



This spanner identifies the description of actions which you should carry out.

3 Safety advice

Depending on the technical circumstances and the time under and at which the electric actuator is mounted, adjusted and commissioned, in each case you have to take into account particular safety aspects

If, for example, the actuator actuates a slide in an operational chemical plant, the potential hazards of commissioning have another dimension from that when this is only being carried out for test purposes on a „dry“ part of the plant in the assembly room.

Since we do not know the circumstances at the time of mounting / adjusting / commissioning you may find advice on hazards in the following description which are not relevant to you. Please observe (only) the advice which applies to your situation!



The actuators must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC on machinery, where appropriate.

3.1 Personal protection

3.1.1 Safety advice for mounting



We wish to point out expressly that the mounting, the electrical installation and the adjustment of the actuator NE and the accessories must be carried out only by trained specialised personnel having mechanical and electrical knowledge.



**Switch off all the devices / machines / plant affected by mounting or repair.
If appropriate, isolate the devices / machines / plant from the mains.**



Check (for example in chemical plants) whether switching off the devices / machines / plant will cause potential danger.



If appropriate, in the event of a fault in the actuator (in a plant which is in operation), inform the shift foreman / safety engineer or the works manager without delay about the fault, in order, for example, to avoid an outflow / overflow of chemicals or the discharge of gases in good time by means of suitable measures.



Before mounting or repair, remove the pressure from the pneumatic / hydraulic devices / machines / plant.



If necessary, set up warning signs in order to prevent the inadvertant starting up of the devices / machines / plant.



Observe the respective relevant professional safety and accident prevention regulations when carrying out the mounting / repair work.



Check the correct functioning of the safety equipment (for example the emergency push off buttons / safety valves, etc).



Before electrical installation of the actuator, check the voltage-free state of all lines to be connected.

3.1.2 Safety advice for adjustment and starting



As a result of the starting (electrically or by hand) of the actuator, the position of a slide / valve / flap or the like on which it is flange-mounted - referred to below as the actuating element - will be changed!

As a result, the flow of gases, steam, liquid, etc. may be enabled or interrupted.



Satisfy yourself that, as a result of the starting or the test adjustments on the actuator, no potential hazards will be produced for personnel or the environment!



If necessary set up warning signs in order to prevent the inadvertent starting up or shutting down of the devices / machines / plant!



After completing the adjustment, check the correct function and, if appropriate, compliance with the intended angular position of the actuator and the function of the switches of the adjusted to the angular positions!



Check the function of the end position switches.



Check whether the actuating element is actually 100 per cent closed when the controller signals the corresponding end stop.



Through suitable measures, prevent that limbs being trapped by moving actuating elements!



Check the correct function of the safety devices (for example emergency push off buttons / safety valves, etc.



Carry out the starting or the adjustment only in accordance with the instructions described in this documentation!



In case of adjustments on an actuator which is open and switched on (ready to use), there is a risk that live parts can be touched.



The adjustments must therefore be carried out only by an electrician or a person having adequate training, who is aware of the potential hazard.

3.2 Device safety



The electric actuator **NE**

- is a quality product which is produced in accordance with the recognized industrial regulations
- and which has left the manufactures work in a perfect safety condition.



In order to maintain this condition, as installer / user you must carry out your task in accordance with the descriptions of these instructions, technically correctly and with the greatest possible precision.

We assume that you have, as a trained specialist, sound mechanical and electrical knowledge!



The actuator must be used only for the purpose corresponding to its construction.

The actuator must be used only within the values specified in the technical data.



Satisfy yourself that, as a result of the mounting, the starting or as the result of the test adjustments on the actuator, no potential hazards will be produced for devices / machines / plant!



Open the actuator only to such an extent as described in this documentation!



Do not mount the actuator, start the actuator or carry out any adjustments on it, if the actuator, the supply lines or the part of the plant on which the it is flange-mounted is damaged!



Before mounting the actuator, check the free running of the actuating element.



Before the electrical installation of the actuator, check that all the lines to connected are voltage-free.



After completing the mounting or the adjustments, check the correct function and, if appropriate, compliance with the intended angular position of the actuator and also the function of the switches adjusted to the angular positions.



If the actuator is used in the open air, check, on an approximately six monthly cycle, that the device is dry on the inside.



After fitting the housing cover, tighten the cross-point screws for fixing the housing cover with a torque screwdriver.

On this regard, observe the torque specified in chapter 8.3.

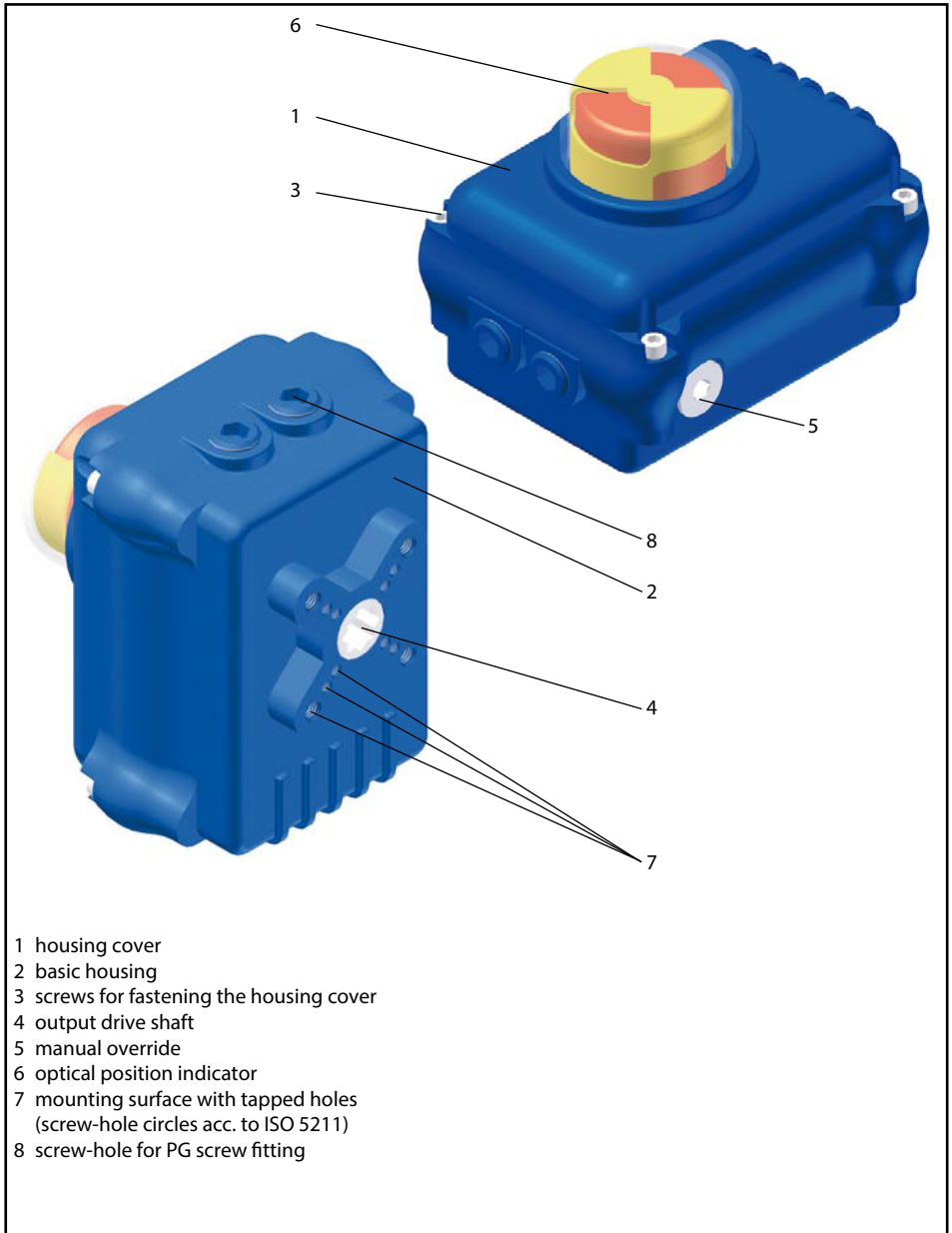


Do not use any abrasive, caustic or flammable cleaning aids for cleaning the housing, or any high-pressure cleaning devices.

4 Device description

4.1 Device description

4.1.1 Device description NE05/E2



- 1 housing cover
- 2 basic housing
- 3 screws for fastening the housing cover
- 4 output drive shaft
- 5 manual override
- 6 optical position indicator
- 7 mounting surface with tapped holes
(screw-hole circles acc. to ISO 5211)
- 8 screw-hole for PG screw fitting

Fig. 4.1 - actuator NE05 front-/ rear

Device description

4.1.2 Device description NE06...NE100

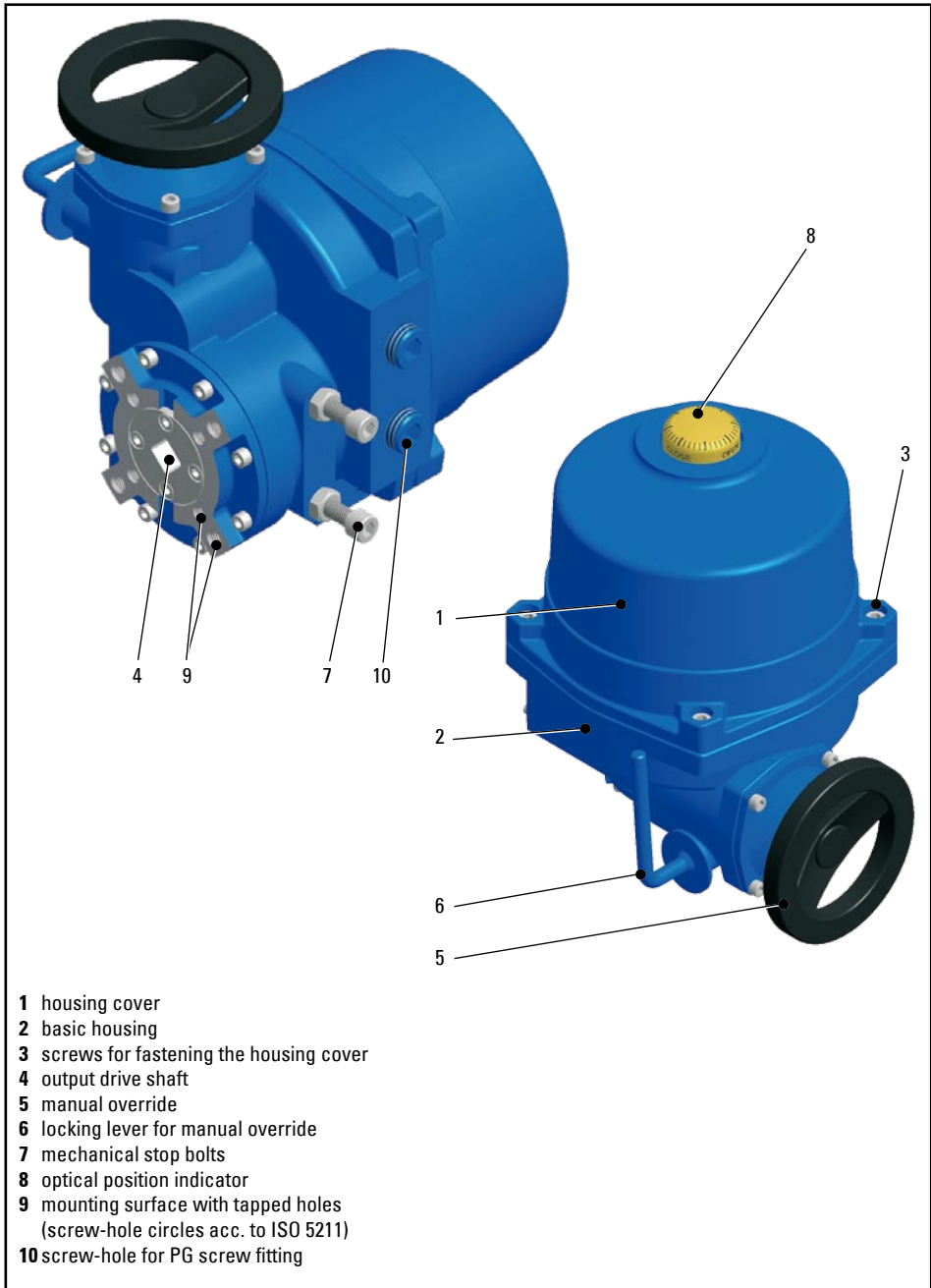
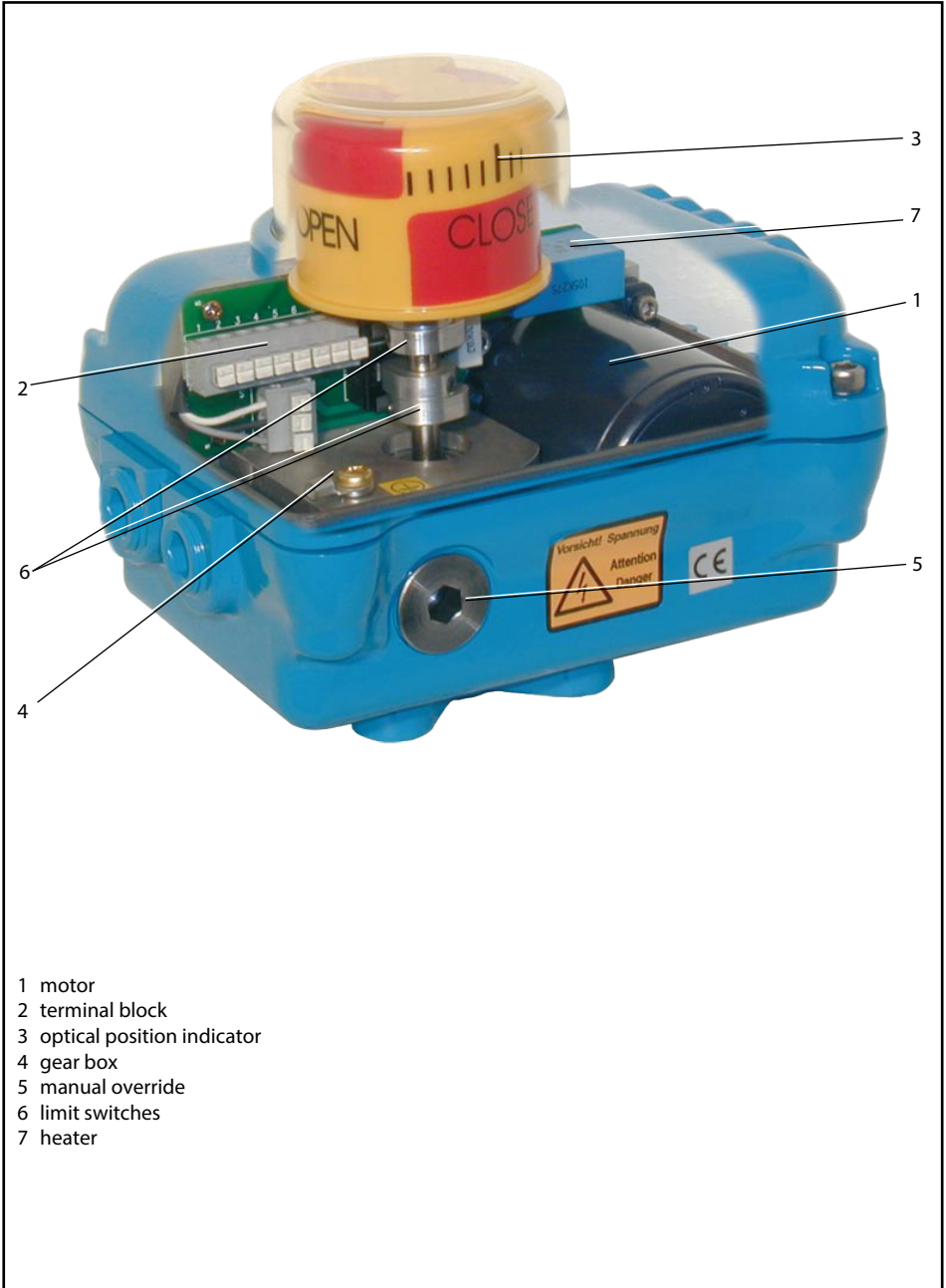


Fig. 4.2 - actuators NE06...NE100 front-/ rear

4.2 Internal parts
 4.2.1 Internal parts NE05/E2



- 1 motor
- 2 terminal block
- 3 optical position indicator
- 4 gear box
- 5 manual override
- 6 limit switches
- 7 heater

Fig. 4.3 - Internal parts NE05

Device description

4.2.2 Internal parts NE06...NE100

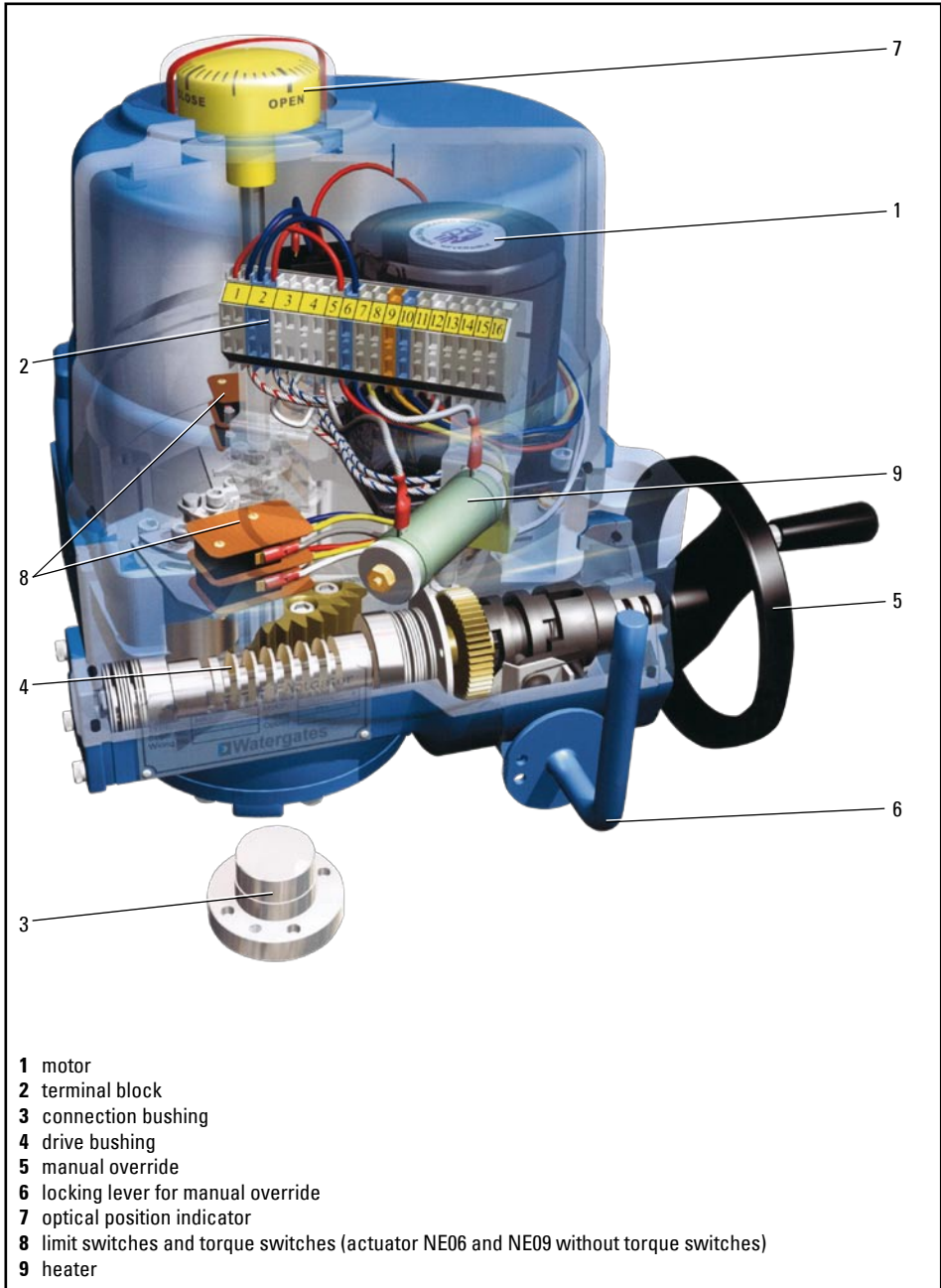


Fig. 4.3 - Internal parts NE06...NE100

4.3 Device variants

4.3.1 Ordering example

Ordering example: e.g. NE154100

= electric actuator, 150 Nm torque, 17 s operating time at 90° angle, 230V 50/90Hz, with 2 additional limit switches

1.+ 2. Digit Product	3.+ 4. Digit Actuator type	5. Digit Voltage	6. Digit Options	7.+8. Digit
NE = Electric actuator	05 = NE05 06 = NE06 09 = NE09 15 = NE15 19 = NE19 28 = NE28 38 = NE38 50 = NE50 60 = NE60 80 = NE80 100 = NE100 150 = NE150 200 = NE200 250 = NE250	2 = 24V DC 4 = 230V AC 5 = 400V 3AC 6 = 24V DC Ⓢ 8 = 230V AC Ⓢ 9 = 400V 3AC Ⓢ	1 = 2 additional limit switches (Standard)	00 = reserved for mounting on valves

4.3.2 Performance

Type	Torque [Nm]	24 V		230 V		Motor class 24/230V [W]	Manual override turns [n]	Weight [kg]
		Operating time 90° 60/50Hz [s]	Current [A]	Operating time 90° 60/50Hz [s]	Current [A]			
NE05	50	8	0,6 ... 1,8 (7,9)	8	0,18 (0,24)	15 / 6	6	2,8
NE06	60	14 ... 17	0,4 ... 2,5 (4,1)	14 / 17	0,45 (0,63)	15	8,5	11
NE09	90	14 ... 17	0,6 ... 3,5 (4,1)	14 / 17	0,58 (0,89)	25	8,5	11
NE15	150	17 ... 20	0,8 ... 4,5 (6,6)	17 / 20	0,95 (1,12)	40	10	12
NE19	190	17 ... 20	0,8 ... 5,0 (9,8)	17 / 20	0,95 (1,12)	40	10	13
NE28	280	24 ... 24	0,6 ... 6,5 (13,8)	20 / 24	0,95 (1,37)	40	12,5	17
NE38	380	-	-	20 / 24	1,30 (1,85)	60	12,5	18
NE50	500	-	-	20 / 24	1,50 (2,34)	90	12,5	19
NE60	600	-	-	24 / 29	1,50 (2,34)	90	14,5	22
NE80	800	-	-	24 / 29	2,15 (3,4)	180	14,5	23
NE100	1000	-	-	24 / 29	2,15 (3,4)	180	14,5	25
NE150	1500	-	-	72 / 87	1,50 (2,5)	90	43,5	68
NE200	2000	-	-	72 / 87	2,15 (3,5)	180	43,5	70
NE250	2500	-	-	72 / 87	2,15 (3,5)	180	43,5	70

Please notice: The performance is dependent of the necessary torque, all stated data regarded under best conditions. Tolerance ±20%! Value in brackets = break-away current. Please take notice to the technical informations in the data sheet. Weight without Options.

4.4 Name-plate

The actuators will be provided with a name-plate, which permits a definite identification of the actuator and shows the most important technical data to you. The name-plate should not be displaced or changed

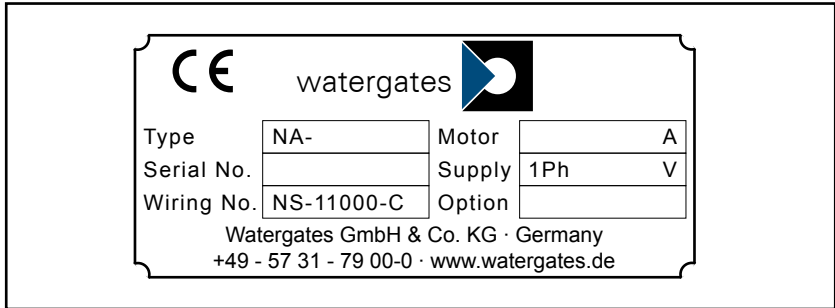


Fig. 4.5 - name-plate

Type	type of actuator (NA is the same type as NE)
Serial No.:	serial number of the actuator
Wiring No.:	number of the nominal wiring diagram
Motor:	nominal power supply [A]
Supply:	nominal voltage [V]
Options:	mounted additional options

4.5 Ambient conditions

The electric actuators NE are designed suitable for following conditions

Ambient temperature:	-20°C up to max. +70°C
Max. medium temperature:	max. 80°C
Relative humidity:	< 90%

The use of the actuators NE outside the specified characteristic values can have a negative influence on the functional reliability of the actuator.



Mounting outdoors only after request. The actuators must be protected from environmental influences (e.g. UV radiation, frost, humidity).

5 Ambient conditions

The actuators NE are designed for rough operating conditions. However, some special conditions are to be observed for its mounting and subsequent operation.

Take care that



- the actuator will be mounted in accordance with the mounting advice listed below.
- the actuator is used in accordance with the characteristic values specified on the name-plate or in the separate data sheet.
- mounting of the outdoors only after request.
- the actuators must be protected from environmental influences (e.g. UV radiation, frost, humidity).

The non-observance of the mounting advice or use outside the specified characteristic values can have a negative influence on the functional reliability of the actuator.



The use of the actuator under the influence of radioactive radiation may take place only after discussions with the manufacturer

6 Assembly instructions

The mounting of the actuator NE is restricted to

- the mechanical mounting of the actuator on the part of the devices / machines / plant which contains the actuating element, and
- the connection of the actuator to the motor drive and control lines.

The actuator may be mounted in any desired position.



In the following description, we assume that you have carefully read the previous chapters and that you will observe the safety advice and the warning notes in chapter 3 „safety advice“ during the mounting / disassembly work.

If you have not yet read chapter 3 „safety advice“ please do so now and then return to this point!

The mounting and the electrical installation may be carried out only by trained specialist personnel with sound mechanical and electrical knowledge.

The **mechanical mounting** is identical in all variants.



The **electrical installation** is different, depending on the type of drive an equipment. Therefore, for the electrical installation, observe the wiring diagrams at the end of these mounting and operating manual

6.1 Mechanical mounting

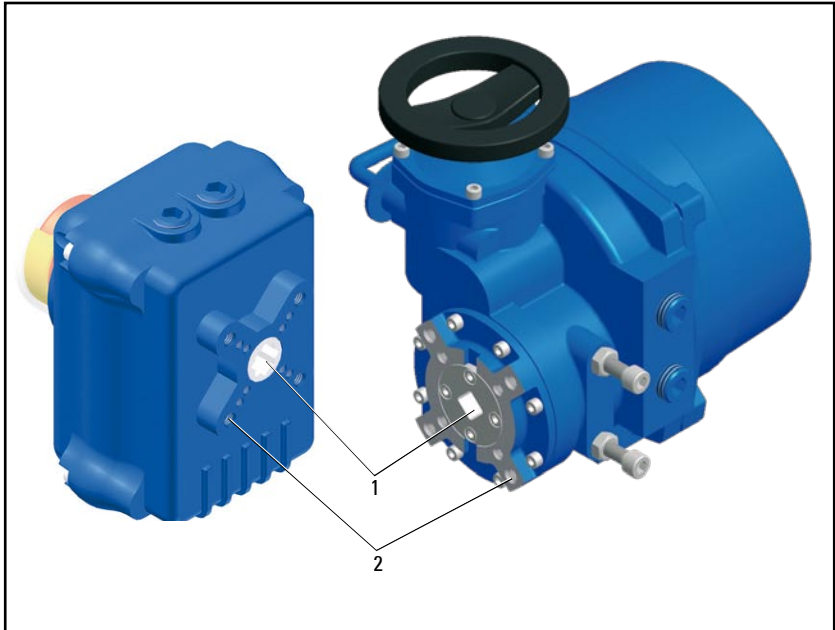


Fig. 6.1 - Mechanical mounting



Before mounting the actuator on the actuating element check the right position of the actuator and the actuating element. It means that both have to be in an open or close position.



Guide the actuator with the mounting surface against the part of the devices / machines in such a way that the fitting of the actuating element penetrates into the opening output drive shaft (1).



Take care, that all mechanical stops of for both ends of travel limits of the actuating element are displaced.



Push the actuator so far towards the mounting position that it rests flat on the fastening surface .



Fasten the actuator with fit screws.



Notice! The measurement of the threaded holes (2) and of the screw-hole circles are according to ISO5211. (See also chapter 11 "Technical data")



In addition to the direct mounting of the actuator, it can also be mounted on the part of the devices / machines with the aid of an adapter.

6.2 Electrical Installation

6.2.1 Removing of the housing cover

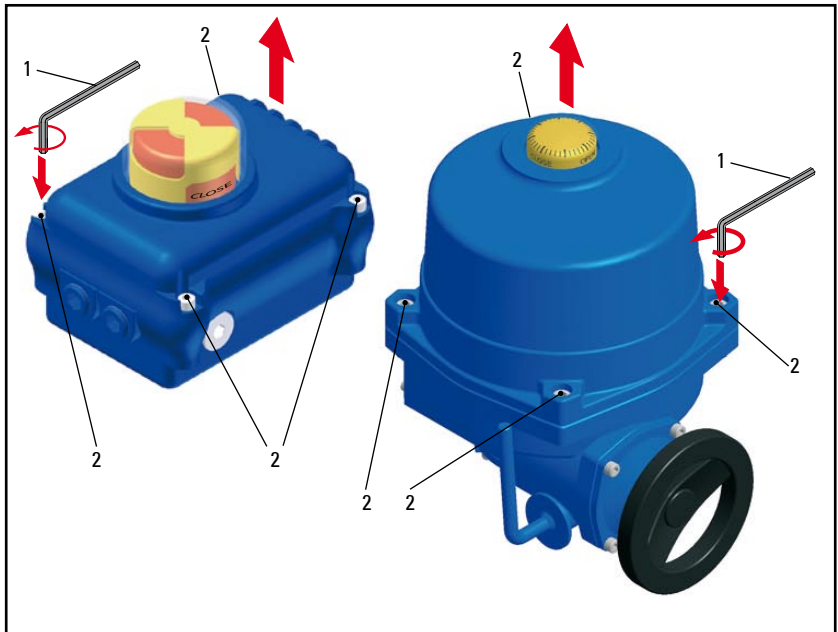


Fig. 6.2 -electrical installation - removing of the housing cover



Loosen the four screws (2) with an Allen key (1) and pull the housing cover hard to remove it!



For assistance, you can insert a screwdriver a few millimetres between housing cover and housing and lever the cover open..



Do not damage the cover and/or the sealing rubber in the process. In this case, the degree of protection IP 67 would no longer be ensured!

6.2.2 Stripping and connecting the cables / leads



Take care that all leads which have to be stripped and connected during the installation work have all their poles isolated from the power supply.



When stripping leads which are live, there is a risk of a life-threatening shock..



Remove the sheaths of the motor drive cable and the control cable and the insulation from the leads in accordance with figure 6.3.



In the case of leads with stranded conductors, provide the ends in each case with a wire end sleeve.

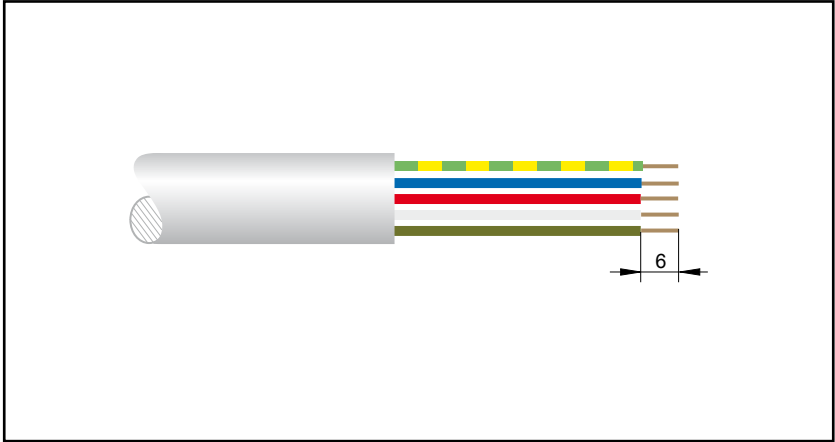


Fig. 6.3 -electrical installation - stripping of the cables / leads



Lead the cable for the motor and the cable for the limit switches through the PG screw fittings.



Feed the stripped ends of the leads into the terminals as far as the stop and then tighten them. The assignment of the connections can be seen from the wiring diagrams at the end of these mounting and operation manual.

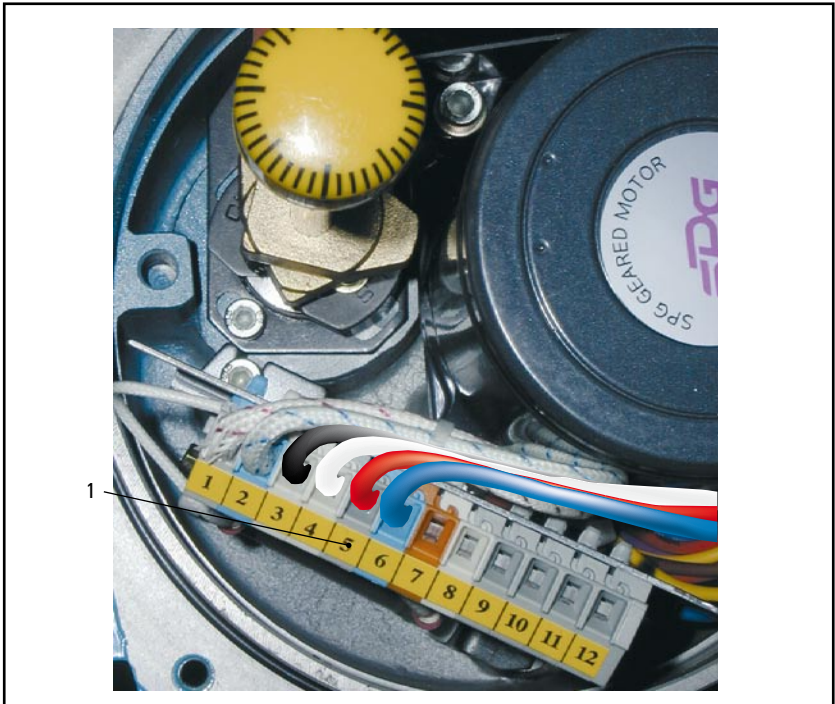


Fig. 6.4 -electrical installation



Please be sure that the voltage of the power supply must be in accordance with the specification of the name-plate (see chapter 4.4) . Connect cables with the terminal according to the wiring diagram and do not miss to connect two ground earth (Internal one marked by sticker, outer is between the mechanical bolt stops (see figure 7.5).



Ensure that no bare wires protrude from the terminals and thus produce the risk of a shock or of a short circuit.



Tighten the PG screw fittings so firmly that the strain relief becomes effective and the cable lead through corresponds to the predefined degree of protection (IP67).



Bend the leads in the actuator such that they are not trapped when the housing cover is fitted.



Lay the cables to their starting positions (as appropriate, in conduits or cable ducts).



Ensure that the cables are not crushed or sheared and that they are not under pressure or tension..



Do not lay the control cable parallel to other cables which lead to high-power loads. Powerful electromagnetic fields could induce currents in the control lines which may possibly lead to malfunctions.



Connect the control lines to the deactivated controller first and then the motor drive lines (power supply) to the power supply, with all poles switched off.



Finally, carry out the adjustments to the actuator, for this please observe chapter 7.



Close the actuator again.



Ensure that the circumferential rubber sealing ring in the housing is not damaged and correctly seated in the groove.



Fit the housing cover and screw it tight using the 4 screws. For this, observe chapter 8.5 "Fitting the housing cover".



Fig. 6.5 -electrical installation - protective earth

6.3 Disassembly



Although the disassembly of an actuator in principle proceeds in the reverse sequence to the mounting, some essential points should be clarified before.

Will the actuator to be disassembled replaced immediately by another?
If not, in which position should the actuating element be following the disassembly?



Must the actuating element be fixed in its intended position?

If appropriate, does the production process of the plant need to be stopped?

Is it necessary to inform specific personnel about the disassembly?

6.3.1 Electrical disassembly



Using the actuator, rotate the actuating element into the intended position!

Switch off all the poles of the power supply and the controller of the actuator.



If necessary, set up warning signs in order to prevent
- the inadvertent starting up of the part of the devices / machines / plant which is affected by the disassembly, or
- the switching on of the power supply / the controller of the actuator.



Open the housing cover by loosening the screws and pulling the housing cover hard to remove it. On this point, see 6.2.1 "Removing the housing cover".



Loosen the screws of the terminals and pull the leads out of the terminals.



Loosen the PG screw fittings and pull the cables out of the device.



Insulate the bare lead ends if the cables are not also being disassembled or are not to be immediately reconnected to another actuator.

6.3.2 Mechanical disassembly



Loosen the four screws of the actuator and pull the actuator from the mounting position. Please refer to the figure 6.1



If appropriate, screw the housing cover back on. On this point, observe chapter 7.5 "Fitting the housing cover".

This completes the disassembly of the actuator

7 Adjustment / Starting

Before you open the actuator, make adjustments by hand or start operating it you must have read chapter :



➔ 3 "Safety advice"

If you have not yet done this, read this important advice now and then return to this point.



Ensure that no liquid, moisture or any foreign bodies (sand, dust or the like) get into the open actuator

The following descriptions are based on the assumption that

- the actuator is installed on the device or the part of the plant which contains the actuating element,
- the housing cover is fastened to the actuator.



If appropriate, please observe chapter

➔ 6 "Mounting / disassembly"

on this point.

In order to carry out the adjustments

- you must remove the housing cover. On this point, see

➔ 6.2.1 "Removing the housing cover"

- it is necessary to move the output drive shaft and , as a result, the actuating element and the cam disc. This can be done both via the electric drive and via the hand adjustment. In the following text, we will describe the electric method. The manual adjustment of the actuating element is explained under

➔ 8 "Emergency operation"

7.1 Adjustments



Please turn to the wiring diagram at the end of these instructions. There you will find the components and terminals listed in the description.



Before you make adjustments to or changes to the settings on actuators which are installed in plants that are ready to operate, please find out whether (for example applying the motor drive voltage (power supply) for left / right operation) will influence further actuators or whether closing / opening microswitches will trigger (mal-)functions of other devices.



Ensure that no (mal-)functions of further parts of the plant will be triggered by these adjustments or changes (for example by disconnecting lines or by changes to cabling).



For the adjustments described below, in each case apply the motor drive voltage (power supply) to the terminals of the actuator only until the intended rotational movement has been carried out, and then isolate all the poles of the power supply from the terminals again.

By using the name-plate determine the voltage level and type of motor drive voltage. For this, see

➔ 4.3 „Device variants“

7.2 Check of the rotating direction of the actuator



When the electric actuator NE is operated for the first time, most important thing is to check the correct rotating direction of the motor. Otherwise, it may cause big damages to actuator



Put the position of the actuating element at 45 degree by using the actuator or the handwheel. By using the handwheel, please see chapter: 8 "Manual override".



Push the Open or Close switch for approx. 3 seconds and check the rotating direction of the actuating element.



If the rotating direction of the actuating element is reverse, stop the actuator immediately and check the wiring. (see chapter 11: "Technical data")

7.3 Adjustment of the limit switches

7.3.1 Adjustment of the limit switches at actuator NE05

7.3.1.1 Adjustment of the limit switch "CLOSE"

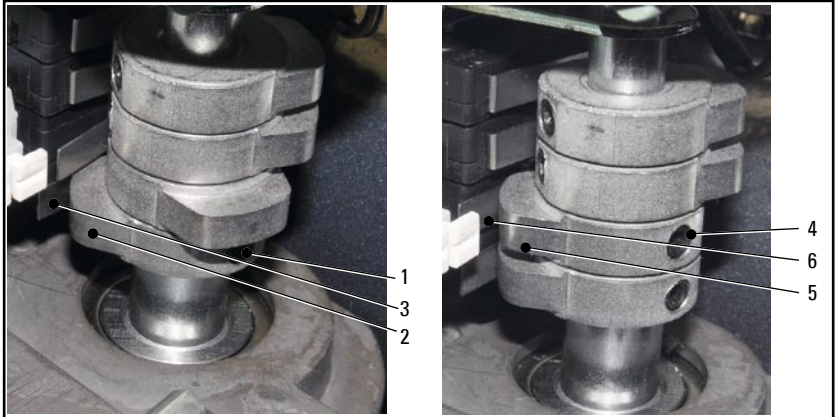


Fig. 7.1 -Adjustment of the limit switch "CLOSE"



In case of an actuator which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.) there is the risk that you may touch live parts (up to 230V AC) and thus receive a shock.



Close the actuating element. Loosen the screw (1) of the lower switch cam (2). Adjust the switch cam to contact the lower micro switch (3). If the mechanical stop bolt interrupt the setting of the close limit switch, turn the mechanical stop bolt 2 turns counter clockwise from the close position and tighten it. Please see also: **7.3.3 Adjustment of the mechanical stop bolts.**



After adjusting the switch cam (2), fix the cam with the screw(1).



After the adjustment of the limit switch "CLOSE", fully open the actuating element.



Now the adjustment of the limit switch "OPEN" could effect. (How to do you will find in chapter: **7.3.2 Adjustment of the limit switch "OPEN"** at page 26.)



After the adjustment of the limit switch "OPEN", close the actuating element again. Now you can adjust the additional limit switch "CLOSE".



Loosen the screw (4) of the switch cam (5). Adjust the switch cam to contact the micro switch(6).



After adjusting the switch cam, fix the cam with the screw (4).



Open the actuating element to carry out the work, described at chapter: **7.3.2 Adjustment of the limit switch "OPEN"**, on page 26, to adjust the additional limit switch "OPEN".

7.3.1.2 Adjustment of the limit switch "OPEN"

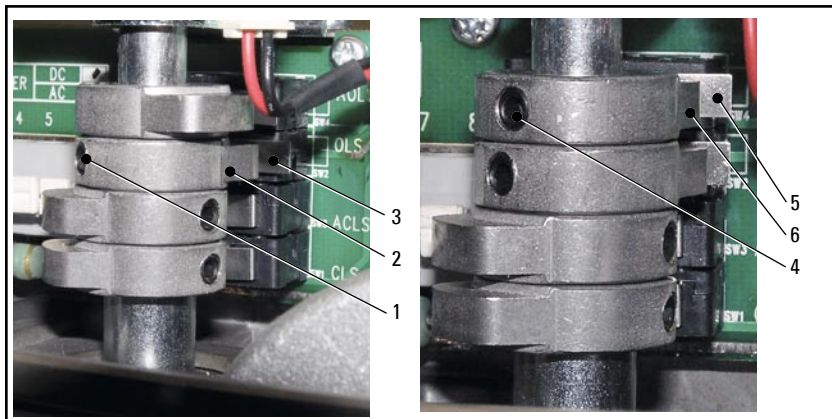


Fig. 7.2 - Adjustment of the limit switch "AUF"



In case of an actuator which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.) there is the risk that you may touch live parts (up to 230V AC) and thus receive a shock.



Open the actuating element. Loosen the screw (1) of the upper switch cam (2). Adjust the upper switch cam (3) to contact the upper micro switch. If the mechanical stop bolt interrupt the setting of the open limit switch, turn the mechanical stop bolt 2 turns counter clockwise from the open position and tighten it. Please see also chapter: **7.3.3 Adjustment of the mechanical stop bolt.**



After adjusting the switch cam (2), fix the cam with the screw (1).



After the adjustment of the limit switch "OPEN" close the actuating element.



Now the adjustment of the additional limit switch "CLOSE" could effect. (How to do you will find in chapter: **7.3.1 Adjustment of the limit switch "CLOSE"** on page 25.)



After the adjustment of the additional limit switch "CLOSE", open the actuating element again. Now you can adjust the additional limit switch "OPEN".



Loosen the screw (4) of the switch cam (5). Adjust the switch cam to contact the micro switch (6).



After adjusting the switch cam, fix the cam with the screw (4).



Now after the adjustment of the electrical limit switches you could carry out the work described at chapter: **7.3.3 Adjustment of the mechanical stop**, on page 29.

7.3.2 Adjustment of the limit switches at actuator NE06 ... NE1000

7.3.2.1 Adjustment of the limit switch "CLOSE"

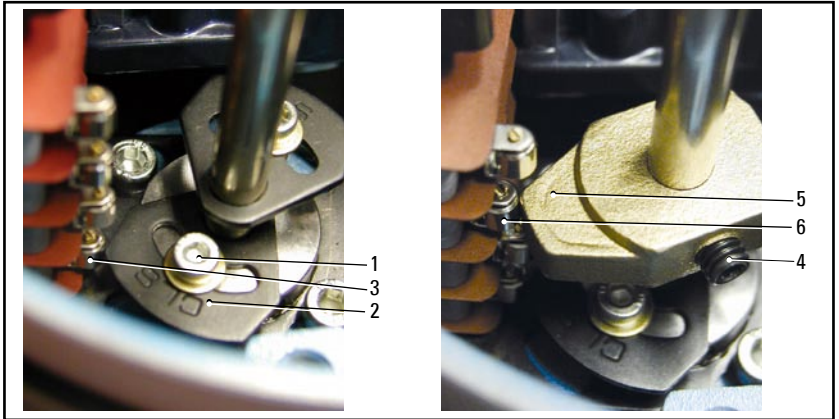


Fig. 7.3 -Adjustment of the limit switch "CLOSE"



In case of an actuator which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.) there is the risk that you may touch live parts (up to 230V AC) and thus receive a shock.



Close the actuating element. Loosen the screw (1) of the lower switch cam (2). Adjust the switch cam to contact the lower micro switch (3). If the mechanical stop bolt interrupt the setting of the close limit switch, turn the mechanical stop bolt 2 turns counter clockwise from the close position and tighten it . Please see also: **7.3.3 Adjustment of the mechanical stop bolts.**



After adjusting the switch cam (2), fix the cam with the screw (1).



After the adjustment of the limit switch "CLOSE", fully open the actuating element.



Now the adjustment of the limit switch "OPEN" could effect. (How to do you will find in chapter: **7.3.2 Adjustment of the limit switch "OPEN"** at page 28.)



After the adjustment of the limit switch "OPEN", close the actuating element again. Now you can adjust the additional limit switch "CLOSE".



Loosen the screw (4) of the switch cam (5). Adjust the switch cam to contact the micro switch (6).



After adjusting the switch cam, fix the cam with the screw (4).



Open the actuating element to carry out the work, described at chapter: **7.3.2 Adjustment of the limit switch "OPEN"**, on page 28, to adjust the additional limit switch "OPEN".

7.3.2.2 Adjustment of the limit switch "OPEN"

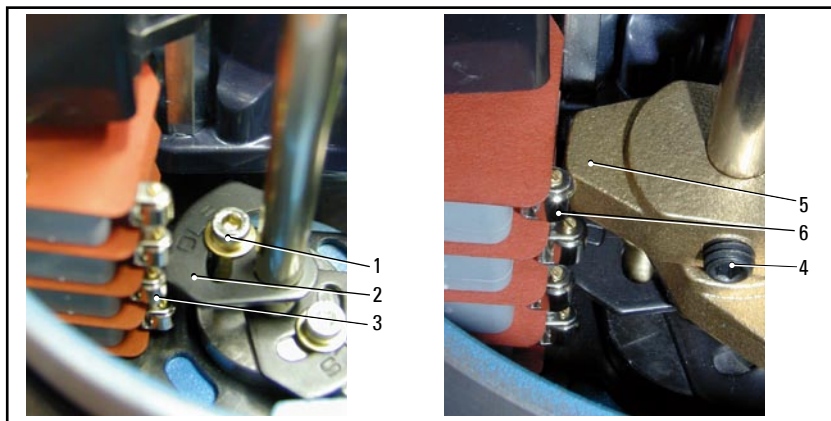


Fig. 87.4 - Adjustment of the limit switch "OPEN"



In case of an actuator which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.) there is the risk that you may touch live parts (up to 230V AC) and thus receive a shock.



Open the actuating element. Loosen the screw (1) of the upper switch cam (2). Adjust the upper switch cam (3) to contact the upper micro switch. If the mechanical stop bolt interrupt the setting of the open limit switch, turn the mechanical stop bolt 2 turns counter clockwise from the open position and tighten it. Please see also chapter: **7.3.3 Adjustment of the mechanical stop bolt.**



After adjusting the switch cam (2), fix the cam with the screw (1).



After the adjustment of the limit switch "OPEN" close the actuating element.



Now the adjustment of the additional limit switch "CLOSE" could effect. (How to do you will find in chapter: **7.3.1 Adjustment of the limit switch "CLOSE"** on page 27.)



After the adjustment of the additional limit switch "CLOSE", open the actuating element again. Now you can adjust the additional limit switch "OPEN".



Loosen the screw (4) of the switch cam (5). Adjust the switch cam to contact the micro switch (6).



After adjusting the switch cam, fix the cam with the screw (4).



Now after the adjustment of the electrical limit switches you could carry out the work described at chapter: **7.3.3 Adjustment of the mechanical stop** ,on page 29.

7.3.3 Adjustment of the mechanical stop bolts



Fig. 7.3 - Adjustment of the mechanical stop bolts



Both bolts (1+2) are only be used as mechanical limit switches in the position "OPEN" (bolt 2) and the position "CLOSE" (bolt 1). To guarantee a safe operation of the electrical actuator NE the totally removal of the mechanical stop bolts is not allowed.



The adjustment of the mechanical stop bolts takes place after the adjustment of the electrical limit switches. If the setting of the electrical limit switches is interrupted by the mechanical limit switches loosen the counter nuts (3) of the stop bolts (1+2) and turn them 2 turns counter clockwise from their position.



Bring the electric actuator with the mounted actuating element to the limit position "OPEN" and turn the stop bolt (2) clockwise until you reach the end stop. Then you have to turn the stop bolt (2) counter clockwise for a 1/2 turn. Tighten the stop bolt by turning the counter nut. Now the adjustment of the mechanical stop bolt "OPEN" is finished.



To adjust the end stop of the position "CLOSE" bring the electric actuator with the mounted actuating element to the limit position "CLOSE" and turn the stop bolt (1) clockwise until you reach the end stop. Then you have to turn the stop bolt (1) counter clockwise for a 1/2 turn. Tighten the stop bolt by turning the counter nut. Now the adjustment of the mechanical stop bolt "CLOSE" is finished.

7.4 Adjustment of the torque switch



Generally speaking, it is not necessary to adjust the torque switches because the switches are already set by the factory before delivery.



If necessary to reset the torque switches, please contact the manufacturer for the actuator before doing so.



The torque switches are set by special precision measuring devices to protect the actuator and the actuating element. If the reset is done without any consulting with the manufacturer the quality can not be guaranteed any longer. The wrench bolts fastening the torque switches are marked by red paint.

7.5 Mounting of the housing cover

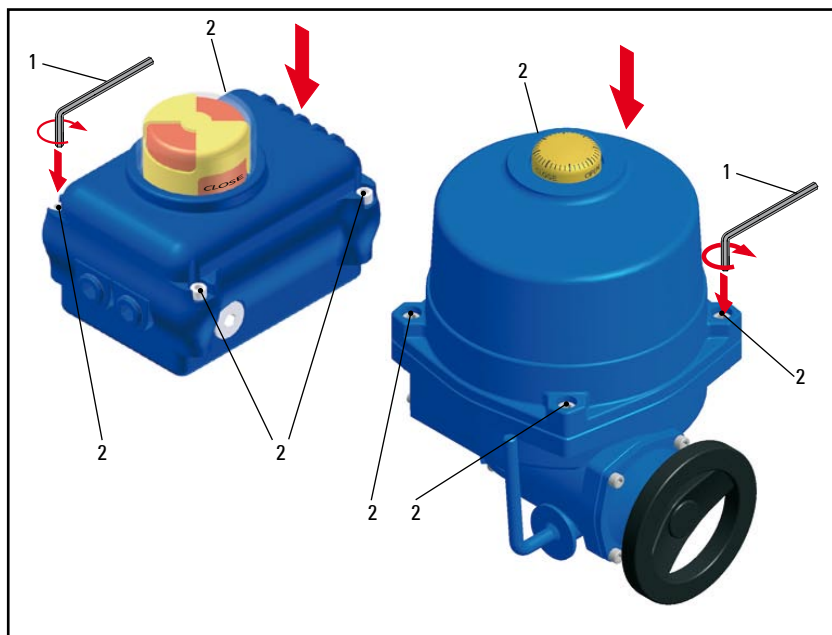


Fig. 7.4 -Mounting of the housing cover



Before you mount the housing cover onto the actuator, check whether

- the switching cams of the microswitches for the end stops,
- the switching cams of the auxiliary switches for angular positions between the end stops are set correctly.



- the actuating element is actually 100 percent closed when the controller indicates the corresponding end stop.



- the position indicator is correctly adjusted.
- the connecting leads are correctly screwed tightly in the terminals.



Ensure that

- the leads are not trapped between the housing and the housing cover and
- the circumferential rubber sealing ring in the housing is not damaged and correctly seated in the groove.



Place the housing cover onto the actuator. Tighten the screws (2) of the housing cover by using an allen key.



Attention! The maximum torque of the body screws are 0,5 Nm!

7.6 Starting



Before you start the actuator you must have read the chapter

➔ **3 „Safety advice“**

If you have not yet done so, read this important advice now and then return to this point.

The starting of an actuator which is mounted on a plant that is ready to operate (for example in a refinery or in a plant in the chemical industry) must be carried out

- only in compliance with the plant-specific regulations
- only after the adjustments / operation described in sections



➔ **7.2.1 to 7.3**

have been carried out.



Drive the actuator via the controller or by hand and check the correct functioning of the actuator, the microswitches and the actuating element.

8 Emergency Operation (Manual override)

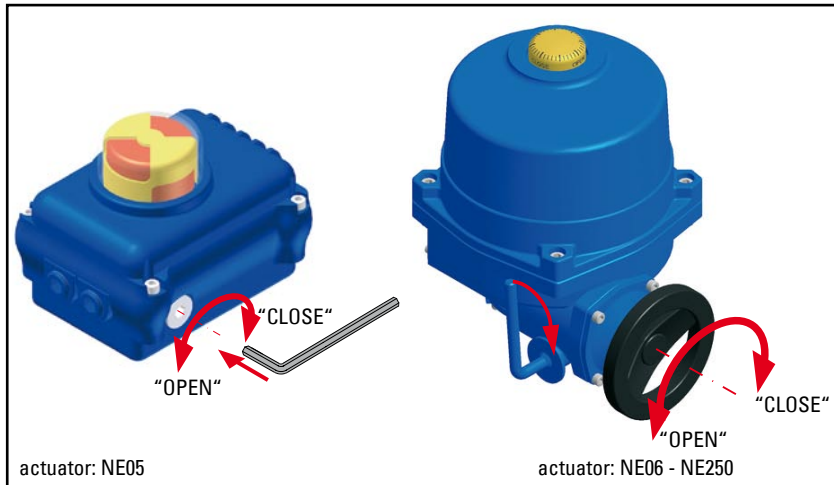


Fig. 8.1 -Manual override

In the case of power or controller failure or a fault in the actuator, in order to be able to adjust the actuating element in an emergency, the actuator has the capability for manual adjustment.



At actuators with long acting time (e.g. 100s at 90° rotation angle) a high manual torque will be necessary.



If necessary, inform the shift foreman / safety engineer or the works manager about the disturbance without delay in order, for example, to avoid an outflow / overflow of chemicals or a discharge of gases in good time by means of suitable measures.



Take care about the turning direction of manual override.



At actuator **Type NE05** put a fit allen key in the end of the gear shaft. If you want to close the actuating element, you have to turn the allen key clockwise. To open the actuating element you have to turn the allen key counter clockwise .



By ending the manual operation you have to remove the allen key from the gear shaft to prevent the injury of persons or the damage of the actuator by normal operation of the electric actuator.



At the actuators **Type NE06 - NE250** you have to turn the declutching lever clockwise for quarter turn first. After being locked with the clutch, turn the handwheel to direction of either "OPEN" or "CLOSE". To open the actuating element you have to turn the handwheel counter clockwise. To close the actuating element you have to turn the handwheel clockwise.



By ending the manual operation of the actuator and supplying electricity the actuator automatically returns from manual to electrical operation modus.

9 Faults



If, during the test run or during operation, a functional fault of the actuator should occur, you are requested to carry out the adjustment to the actuating element (in an emergency) by hand.
For this observe

➔ 8 „Emergency operation“



If necessary inform the shift foremen / safety engineer or the works manger about the disturbance without delay in order, for example , to avoid an outflow / overflow of chemicals or a discharge of gases in good time by means of suitable measures.

Next using the following list, attempt to find the reason for the causes of the fault and if it lies within your capabilities, to correct this.

Do not, however, carry out any repairs on the actuator!



Isolate the defective actuator from the power supply!

**In the event of a defect in the actuator, make contact with the manufacturer.
The telephone number will be found on the inside front cover of these mounting and operation manual.**

9.1 Fault causes

- Is the power supply to the actuator and to the controller switched on?
- Is the controller supplying the necessary signals?
- Are the leads from the controller to the actuator undamaged ?
- Is the actuator correctly flange-mounted to the actuating element ?
- Does the actuating element move freely?
- Are the end stop switching cams set correctly?
- Are the other switching cams set correctly?
- Are the leads in the terminal connected correctly and screwed tight?
- Can the actuating element be rotated into the end positions by means of the manual adjusment of the actuator?

10 Maintenance / Cleaning

10.1 Maintenance

The actuators of the series **NE** are maintenance free.

Check on an approximately sixmonthly cycle, that the device is dry inside, at least after 1/2 year.



In the case of an actuator which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.) there is the risk that you may touch live parts (up to 230V AC) and thus receive a shock.

In the event of a defect in the actuator, make contact with the manufacturer. The telephone number will be found on the inside front cover of these mounting and operating instructions.

Open the housing cover by loosening the 4 screws and pulling the housing cover hard to remove it. In this context, see:

➔ **6.2.1 „Removing the housing cover“**



If you find moisture in the interior of the device, attempt to find the cause for this and eliminate it.

- Is the moisture condensation?
- Is the circumferential rubber sealing ring damaged?
- Do the metric screw fittings leak?
- Are there cracks in the housing or the housing cover?



If you determine that there is damage to the actuator, isolate the device from the power supply. However, before doing this, it is essential to refer to chapter:

➔ **3 „Safety advice“**

10.2 Cleaning



Clean the housing of the actuator as required using a slightly moistened, soft cloth and a normal household cleaner.

Do not use any abrasive, corrosive or flammable cleaning agents.



Do not use any high-pressure cleaning devices.

Prevent moisture or liquid penetrating into the interior of the device.

11 Technical data

11.1 Dimensional drawing NE05/E2

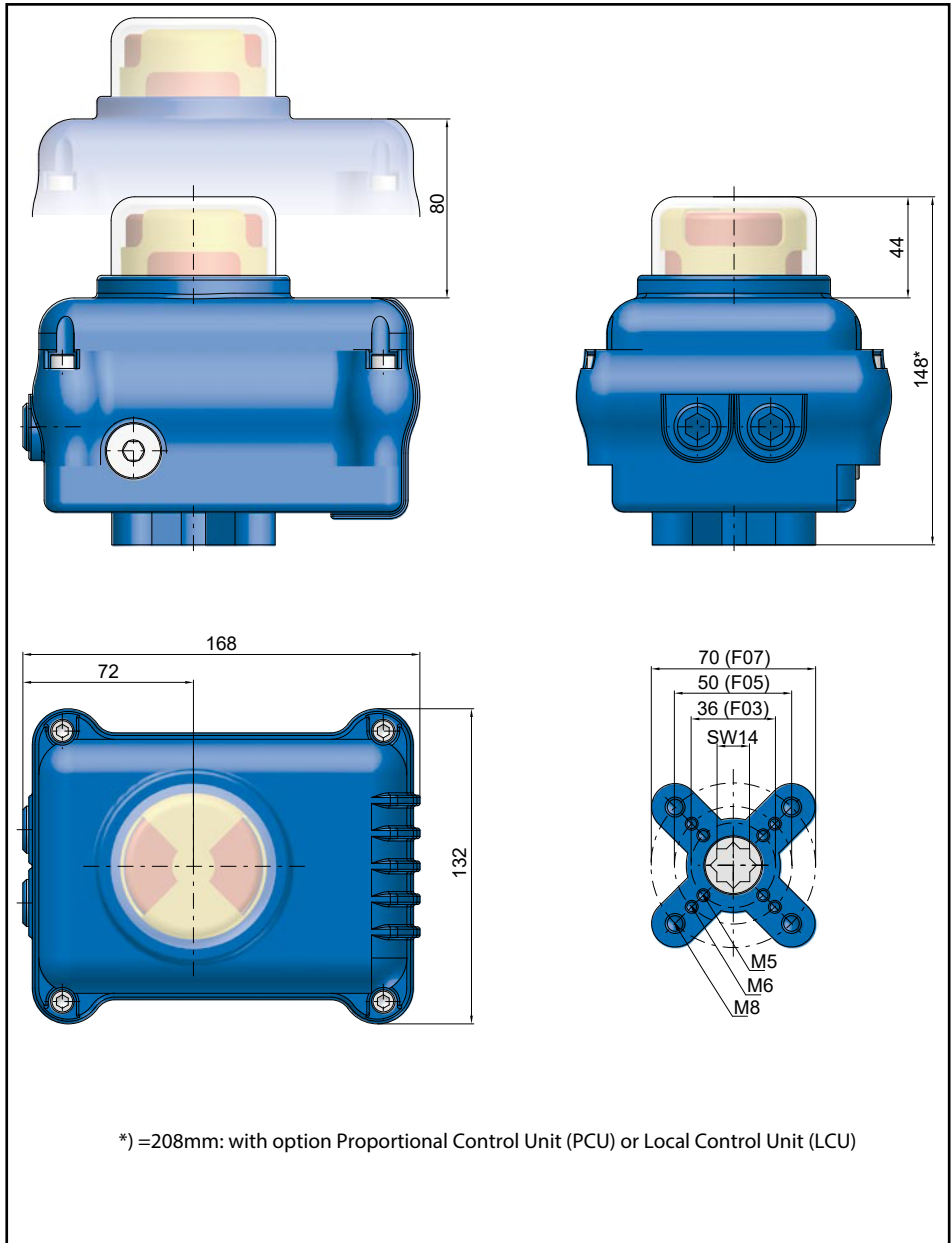


Fig. 11.1 - Dimensional drawing NE05

Technical data

11.2 Dimensional drawing NE06...NE100

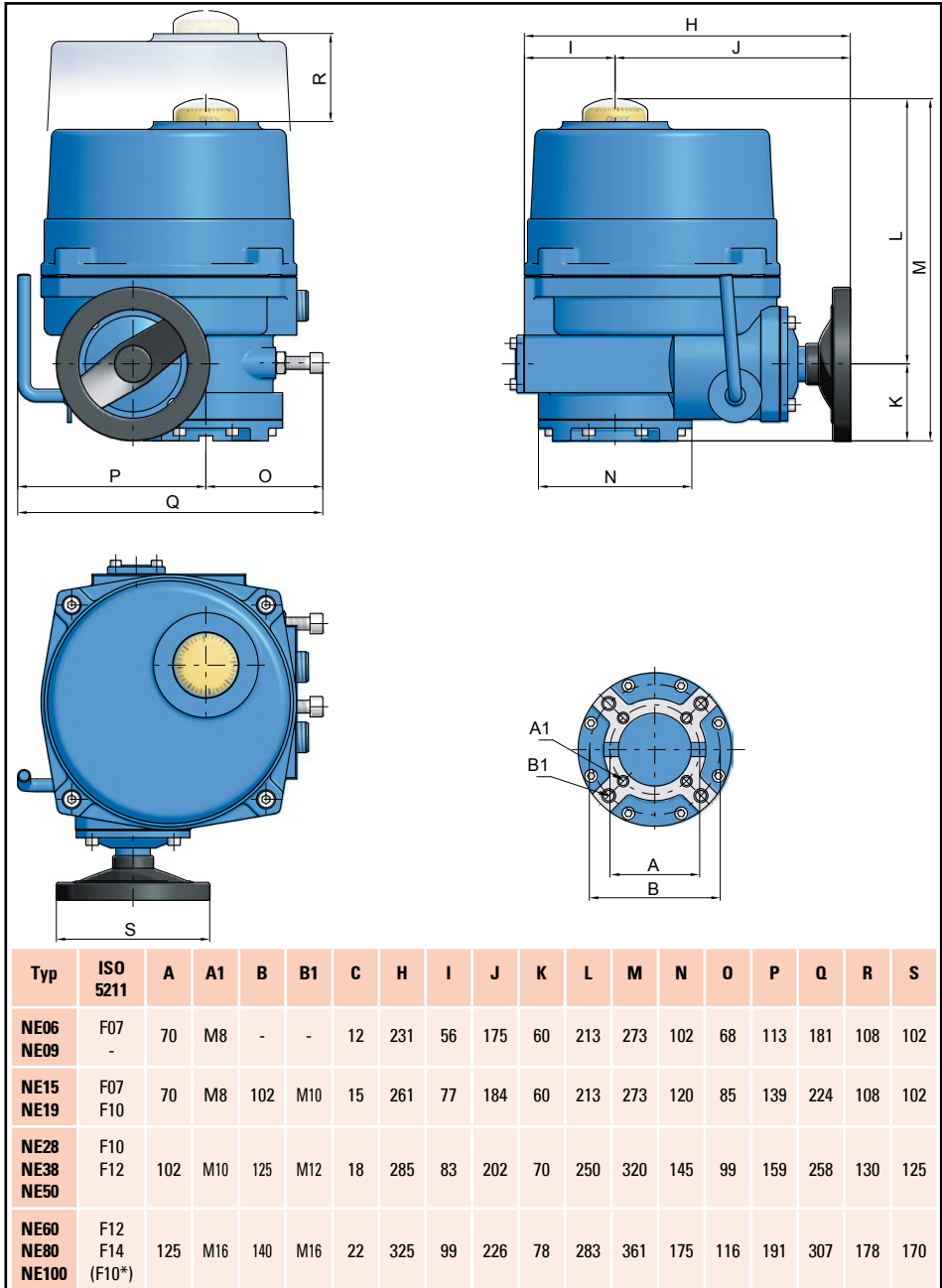


Fig. 11.2 - Dimensional drawing NE06...NE100

*) = Option

11.3 Dimensional drawing NE150...NE250

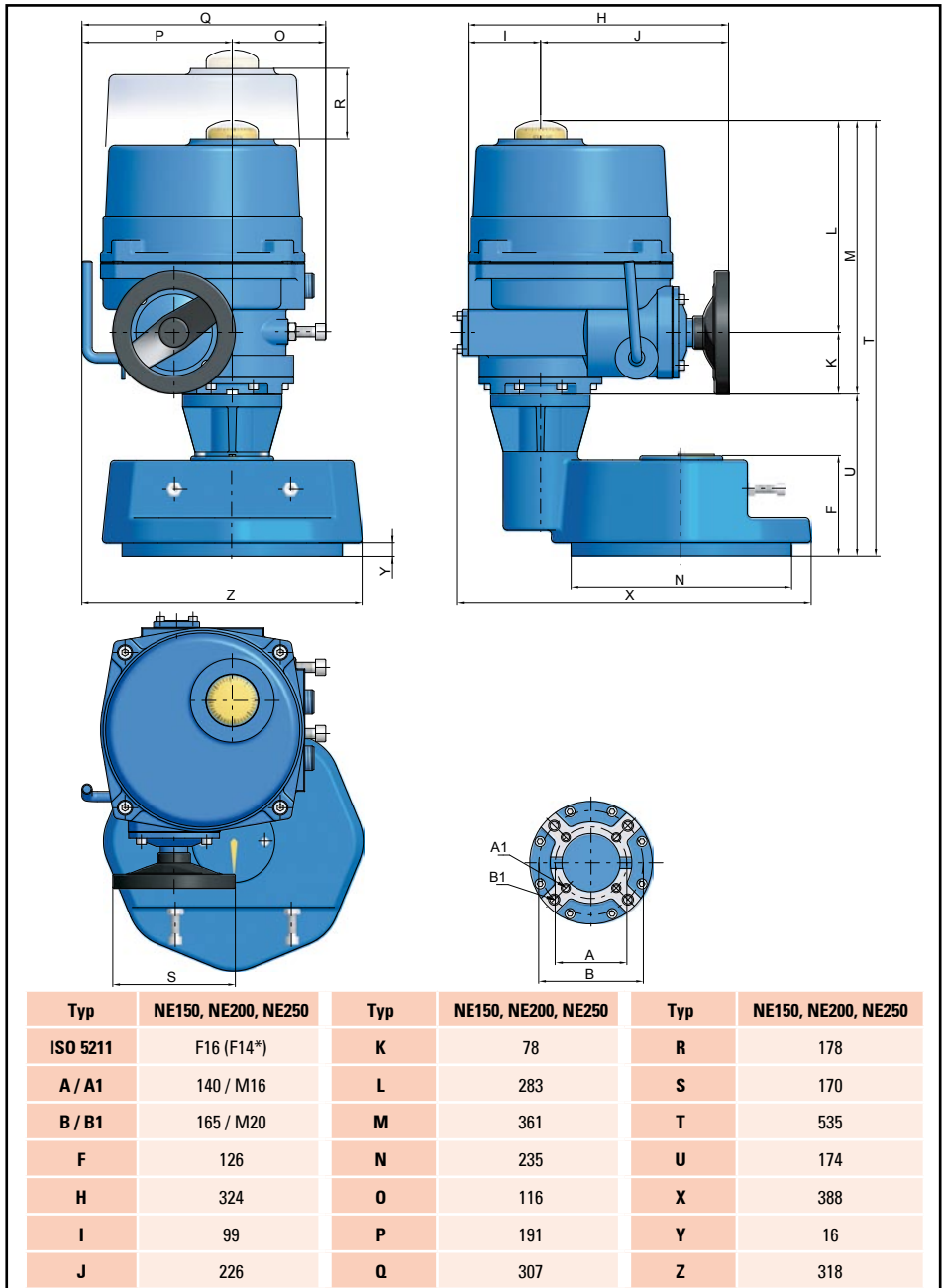


Fig. 11.3 - Dimensional drawing NE150...NE250

11.5 Wiring diagram for actuator NE05/E2 - 24V AC/DC

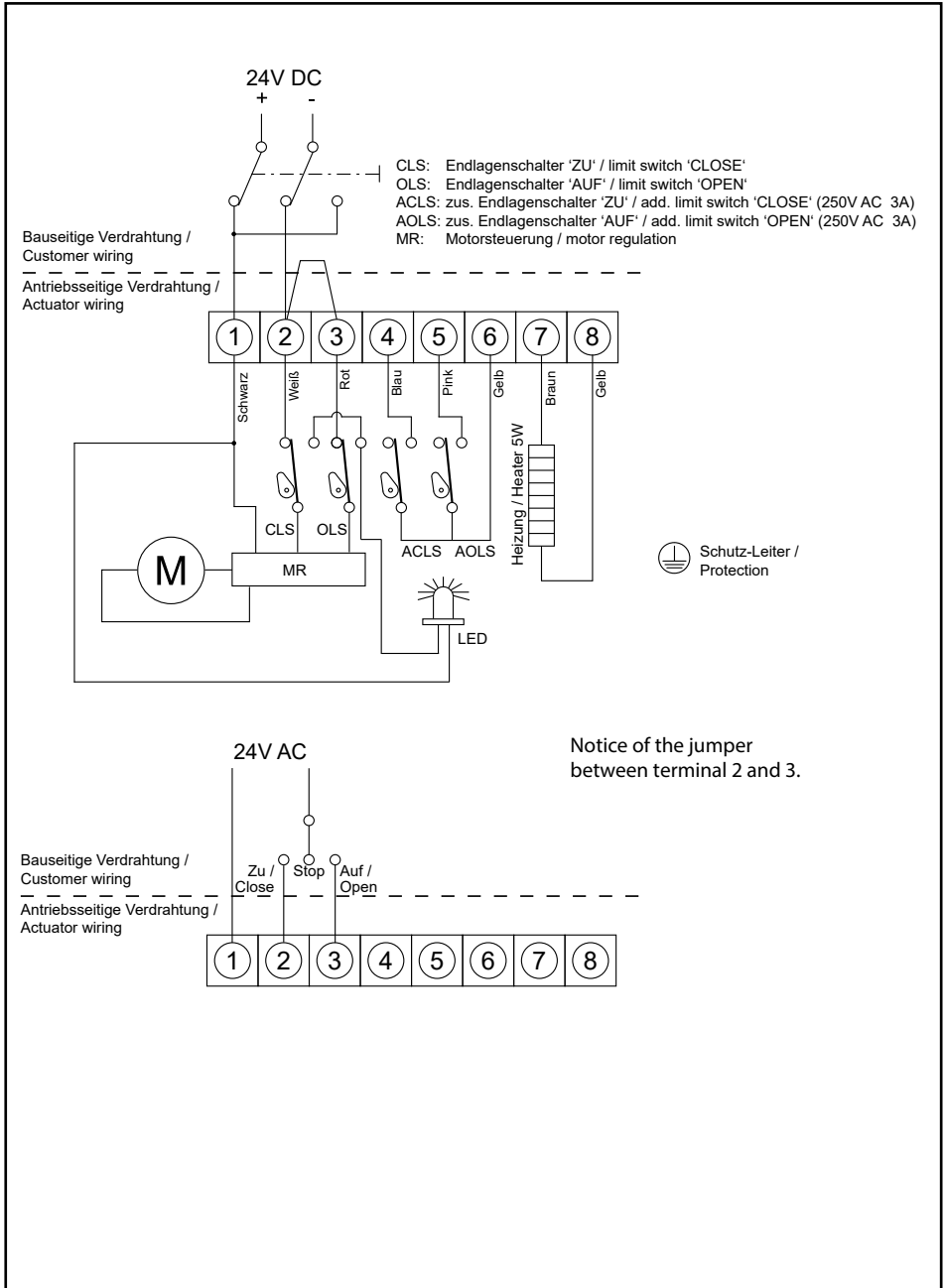


Fig. 11.5 - Wiring diagram for actuator NE05 - 24V AC/DC

11.4 Wiring diagram for actuator NE05/E2 230V AC

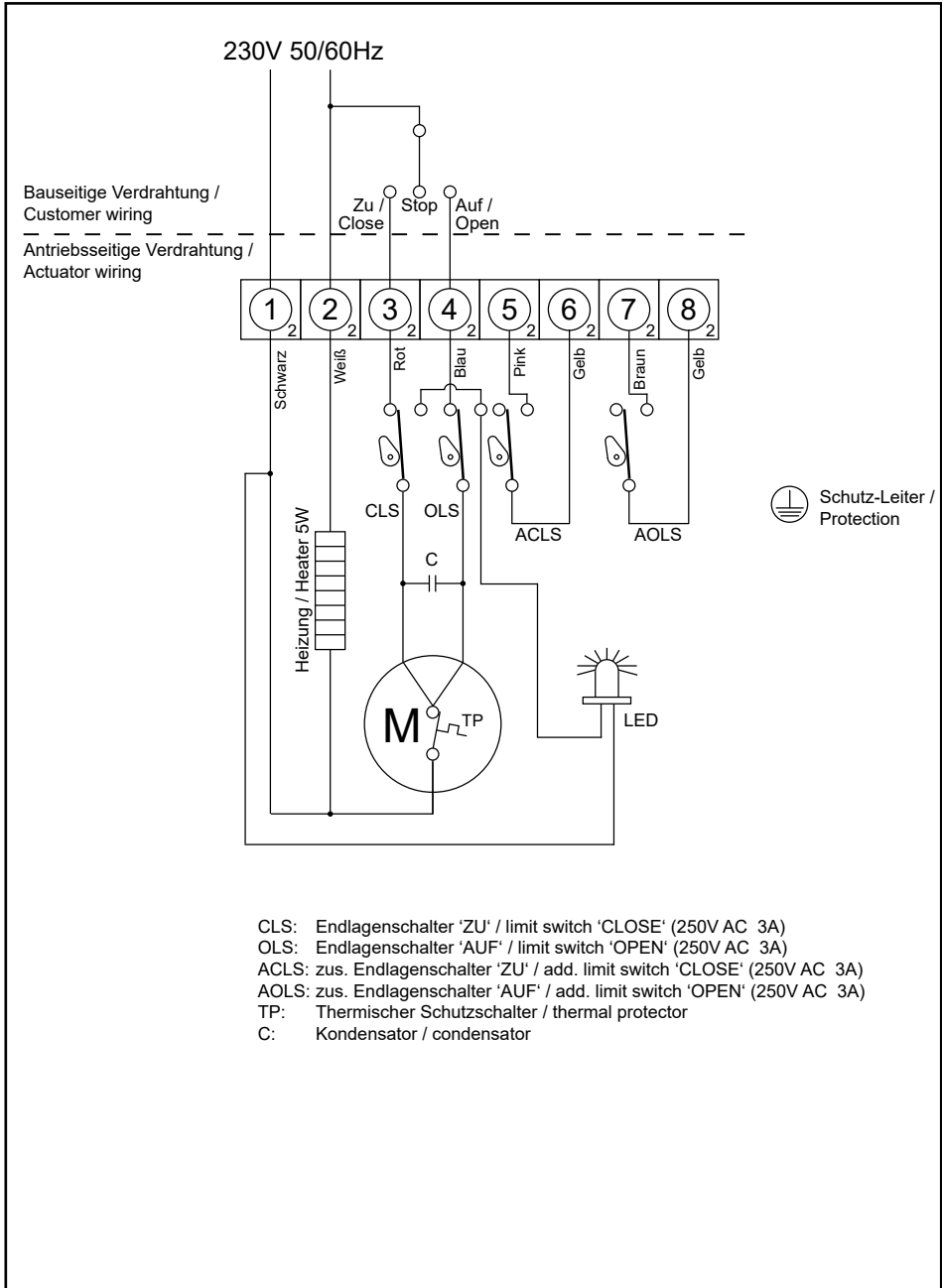


Fig. 11.4 - Wiring diagram for actuator NE05 230V AC

1.6 Wiring diagram for actuator NE06...NE09 - 230V AC

CLS: Endlagenschalter 'ZU' / limit switch 'CLOSE' (250V AC 6A)
 OLS: Endlagenschalter 'AUF' / limit switch 'OPEN' (250V AC 6A)
 ACLS: Zus. Endlagenschalter 'ZU' / aux. limit switch 'CLOSE' (250V AC 6A)
 AOLS: Zus. Endlagenschalter 'AUF' / aux. limit switch 'OPEN' (250V AC 6A)
 TP: Thermischer Schutzschalter / thermal protector (250V AC 15A)

C: Kontrolleuchte 'Zu' / Close lamp
 O: Kontrolleuchte 'Auf' / Open lamp

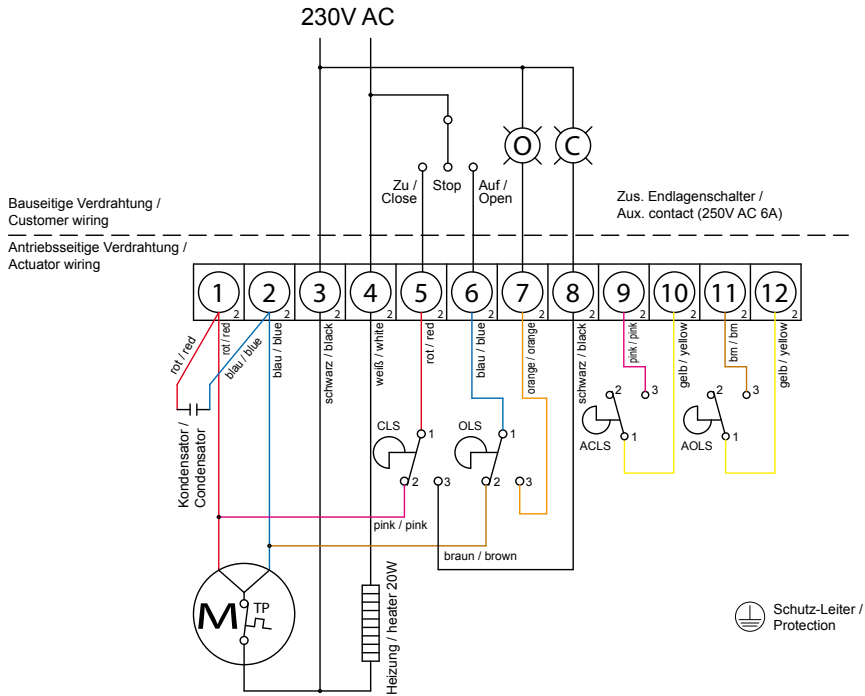


Fig. 11.6 - Wiring diagram for actuator NE06...NE09

11.7 Wiring diagram for actuator NE15...NE250 - 230V AC

- CLS: Endlagenschalter 'ZU' / limit switch 'CLOSE' (250V AC 6A)
- OLS: Endlagenschalter 'AUF' / limit switch 'OPEN' (250V AC 6A)
- CTS: Drehmomentschalter 'ZU' / torque switch 'CLOSE' (250V AC 6A)
- OTS: Drehmomentschalter 'AUF' / torque switch 'OPEN' (250V AC 6A)
- ACLs: Zus. Endlagenschalter 'ZU' / aux. limit switch 'CLOSE' (250V AC 6A)
- AOLS: Zus. Endlagenschalter 'AUF' / aux. limit switch 'OPEN' (250V AC 6A)
- TP: Thermischer Schutzschalter / thermal protector (250V AC 15A)

- OT: Kontrollleuchte 'Überlastung' / Over torque lamp
- C: Kontrollleuchte 'Auf' / Close lamp
- O: Kontrollleuchte 'Zu' / Open lamp

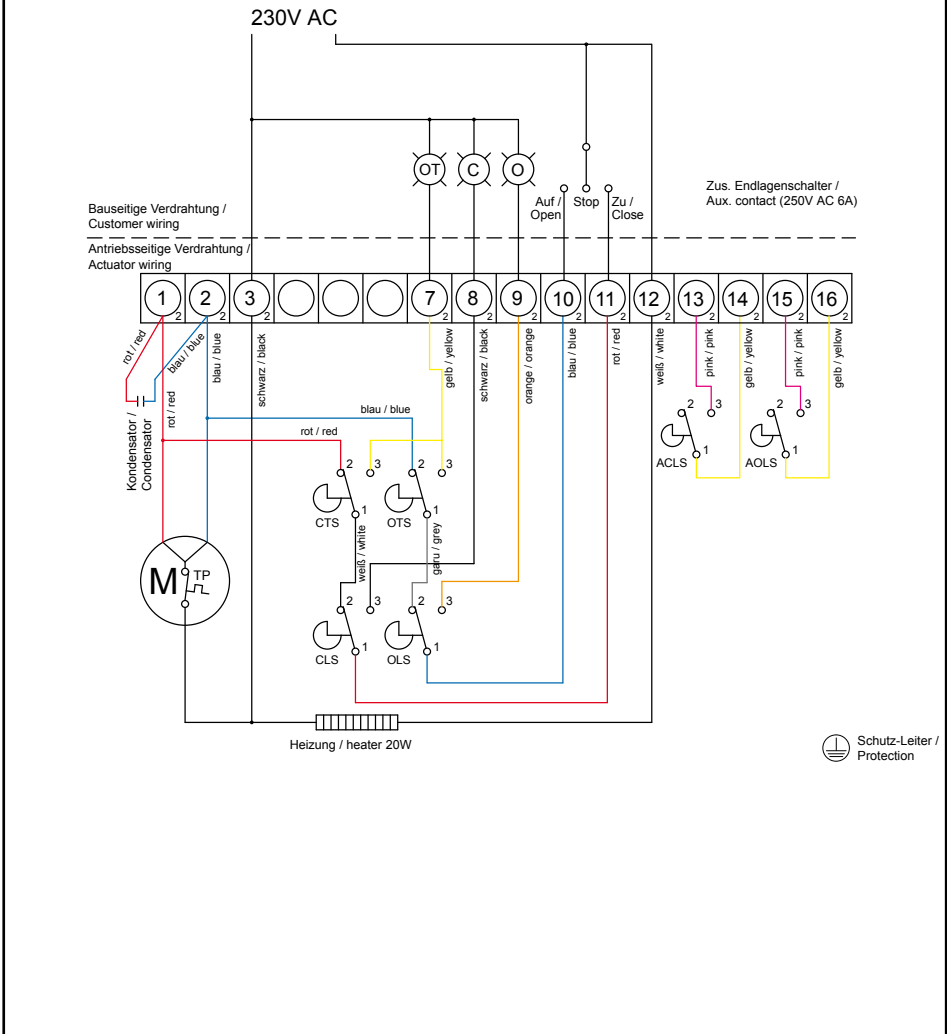


Fig. 11.7 - Wiring diagram for actuator NE15...NE250

11.8 Wiring diagram for actuator NE06...NE09 - 24V DC

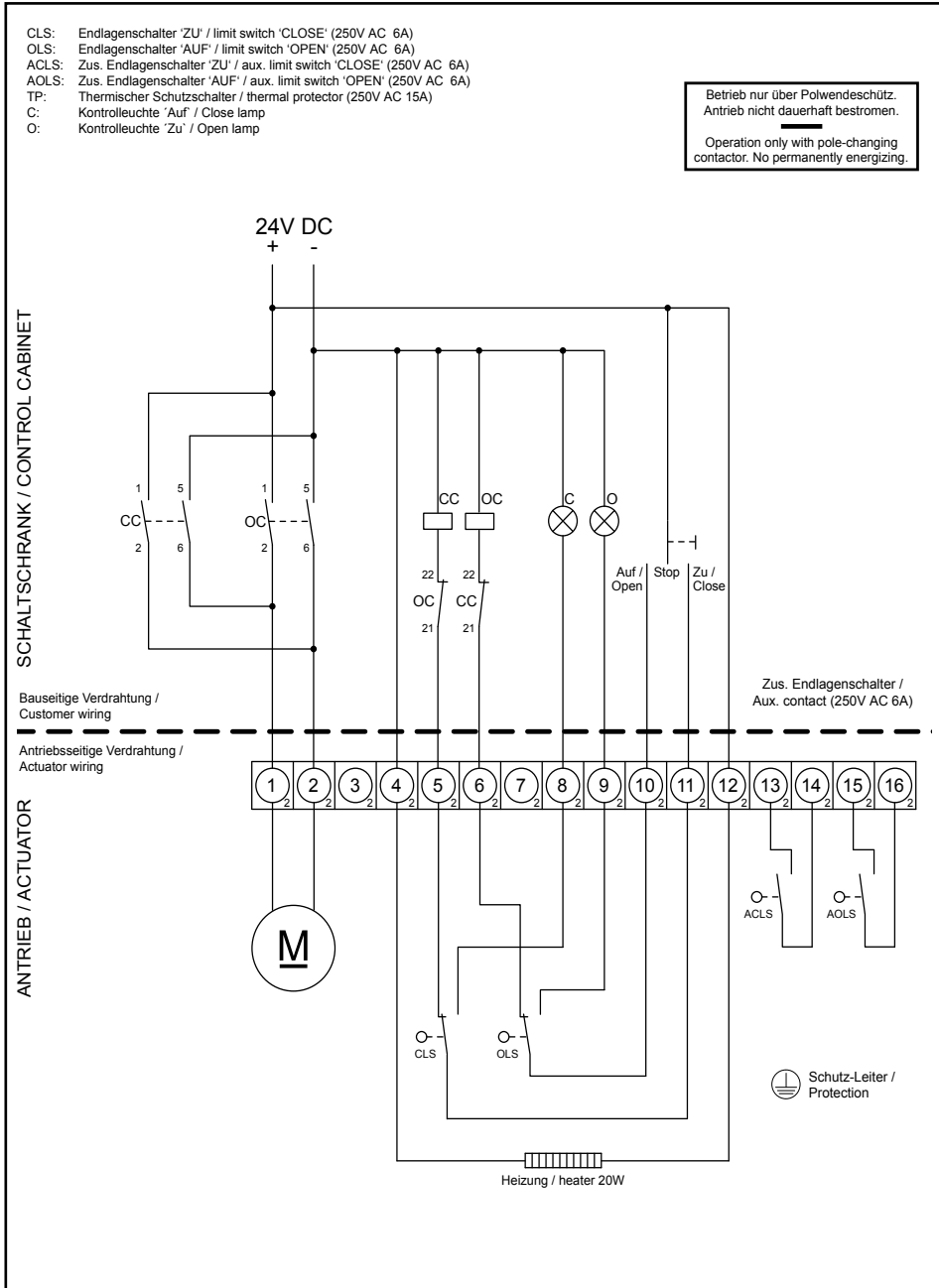


Fig. 11.8 - Wiring diagram for actuator NE06...NE09

11.9 Wiring diagram for actuator NE15...NE28 - 24V DC

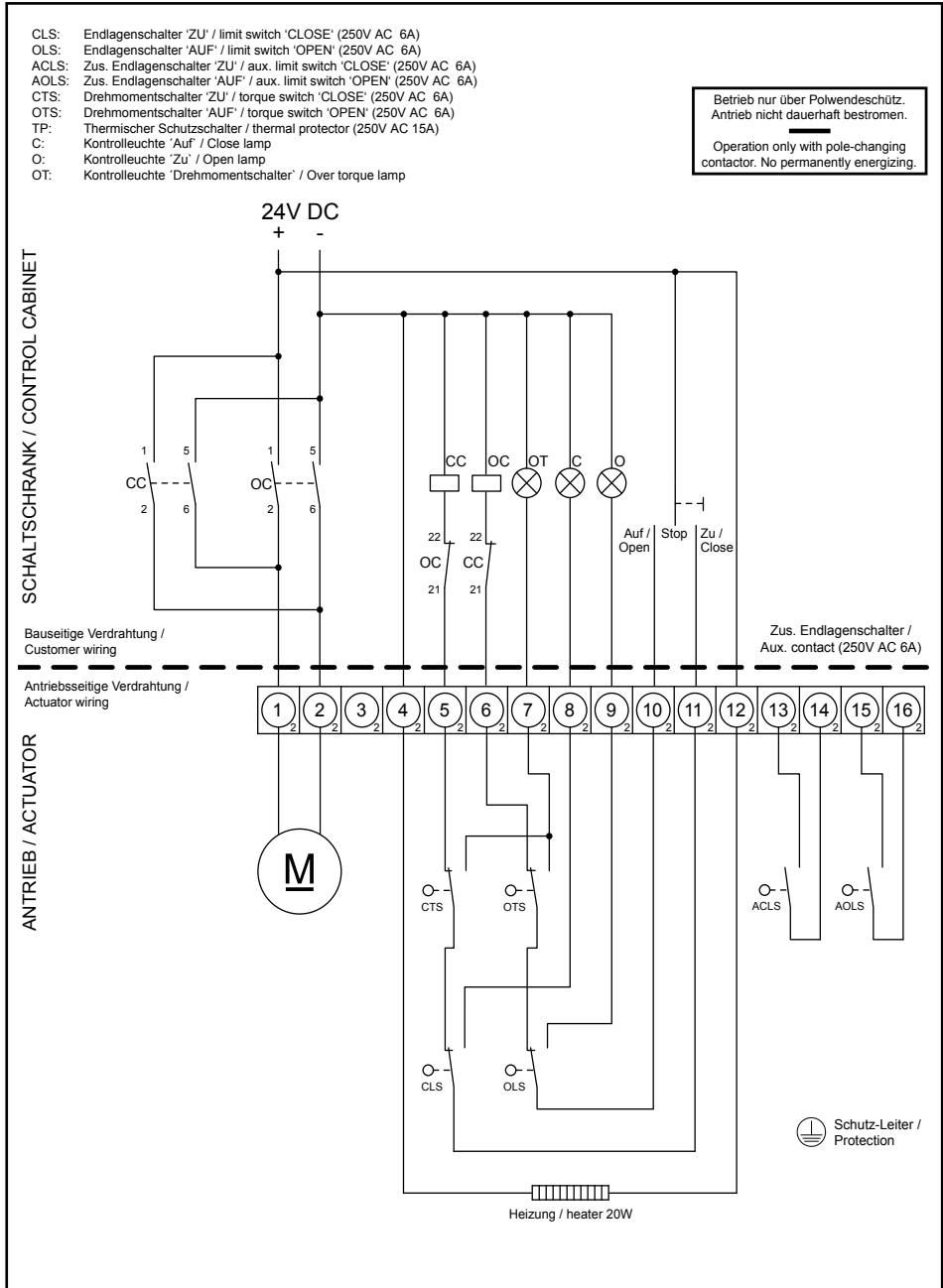


Fig. 11.9 - Wiring diagram for actuator NE15...NE28

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Qualität von Anfang an.

(1) **Declaration of incorporation**
(2) **according to annex II of the Directive 2006/42/EC on machinery**

(3) This declaration apply to the article groups:

Article	Description
NE03	Electric actuator, 30Nm
NE05	Electric actuator, 50Nm
NE06	Electric actuator, 60Nm
NE09	Electric actuator, 80Nm
NE15	Electric actuator, 150Nm
NE28	Electric actuator, 280Nm

Article	Description
NE38	Electric actuator, 380Nm
NE50	Electric actuator, 500Nm
NE60	Electric actuator, 600Nm
NE80	Electric actuator, 800Nm
NE10	Electric actuator, 1.000Nm

and all variations of these articles

(4) of the company: **END-Armaturen GmbH & Co. KG** Documentation authorized: **Lars-Michael Rolfmeier**
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D-32547 Bad Oeynhausen D-32547 Bad Oeynhausen

(5) Herewith we declare that the above mentioned actuators in the conditions of our delivery are partly completed machinery according to annex 2 paragraph g of the directive 2006/42/EC on machinery. These products have no CE marking because of this directive.

The relevant technical documentation is compiled in accordance with part B of annex VII.

The actuators are further in conformity with the regulations of the following directives:

Low Voltage Directive 2006/95/EC

Directive on Electromagnetic Compatibility (EMC) 2004/108/EC

Applied harmonized standards, in particular:

EN ISO 12100-1: 2004 Safety of machinery - Basic concepts, general principles for design - Part 1
EN ISO 12100-2: 2004 Safety of machinery - Basic concepts, general principles for design - Part 2
DIN EN ISO 14121-1:2007 Safety of machinery - Risk assessment - Part 1
DIN EN 60204-1:2006 Safety of machinery - Electrical equipment of machines - Part 1
DIN EN 15714-2:2009 Industrial valves - Actuators - Part 2: Electric actuators for industrial valves

(6) In response to a reasoned request the national authorities can demand the relevant information on the partly completed machinery. The transmission takes place by post or e-mail.

(7) The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC on machinery, where appropriate.

(8) Bad Oeynhausen, 20. Mai 2011, on behalf:



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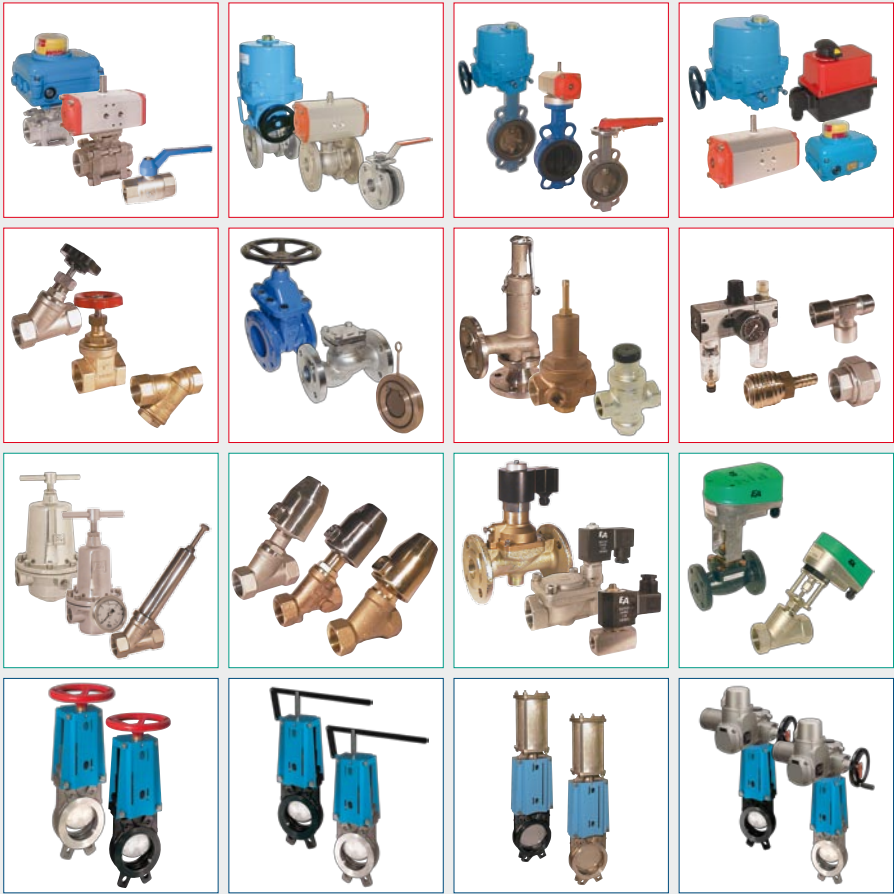
Karl-Hendrik Storch

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