

## Electric Actuator Type EA 20



**Instruction Manual** - Provided by KTH Sales, Inc. - <http://www.KTHSales.com>

**GEORGE FISCHER +GF+**

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## **1. Introduction**

This instruction manual contains the description, specification, installation instructions, start-up and maintenance for the electric actuator Type EA 20.

### **1.1 Description**

The EA 20 is a compact, sturdy, electric actuator designed for a long service life. It is specially suitable for industrial applications.

Also available is an ISO interconnecting plate allowing the actuator to be mounted on almost any valve.

Due to its reliability, compact construction and high corrosion resistance, the actuator can be used on 2-way or 3-way ball valves, butterfly valves or any other rotary mechanical element.

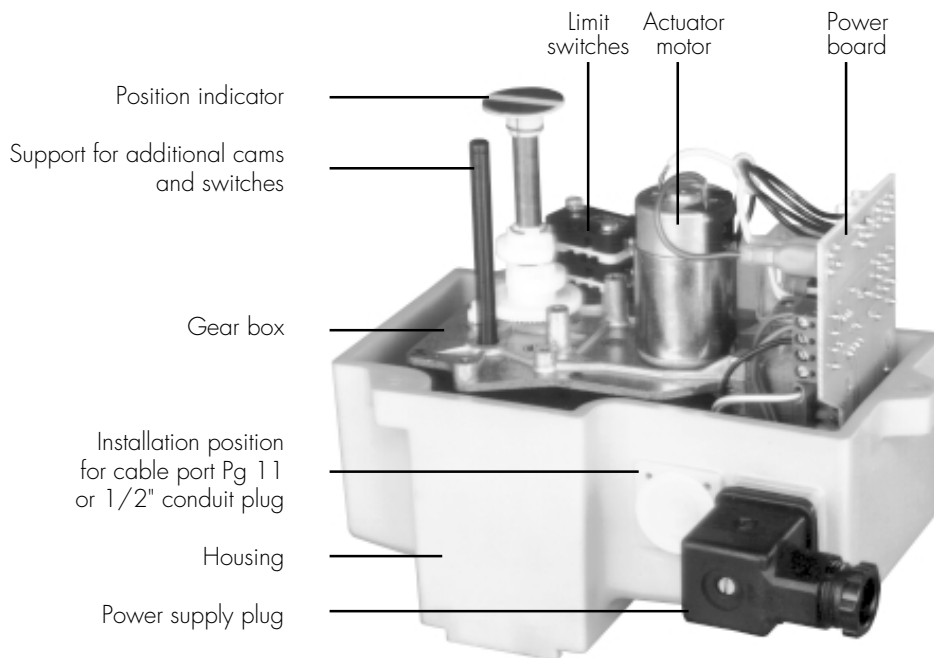
## 1.2 Specifications

|                              |  |
|------------------------------|--|
| Duty cycle:                  | 100% at 77°F (25°C)<br>70% at 122°F (50°C)   |
| Nominal voltage:             | 100 – 120 V/200 – 240 V<br>±10%, 50 – 60 Hz (selectable)<br>24 VAC/DC<br>other voltages on request   |
| Rated performance:           | 12 VA (AC); 7 W (DC)   |
| Protection class:            | NEMA 4x, IP 65 as per DIN 40050<br>weatherproof and corrosion resistant  |
| Overload protection:         | Current-time dependent (self resetting)<br>The overload protection is designed to protect both motor and power supply board. If the overload protection device has triggered, it will reset automatically when the unit has cooled down and the actuator will operate again. |
| Electrical connection:       | unit plug 3 P+E according to DIN 43650<br>additional cable port Pg 11 or 1/2" conduit plug   |
| Operating time:              | approx. 6 sec/90° †  |
| Operating angle:             | max. 270° (adjustable), set at 90° with 2 limit switches   |
| Nominal torque:              | 106 inch pounds/12 Nm  |
| Peak torque:                 | 221 inch pounds/25 Nm  |
| Ambient temperature:         | 14°F – 122°F/-10°C – 50°C<br>(for temperatures below 14°F (-10°C) the heating element 198 190 142/...143 should be installed)  |
| Allowable humidity:          | 0 – 98%, non-condensing  |
| Housing material:            | PP GF (polypropylene glass-fiber reinforced)<br>external screws corrosion free   |
| Position indicator:          | Visual, integrated   |
| Interconnecting plate:       | To ISO 5211/1 F 05 available   |
| Auxiliary equipment:         | 2 additional switches incl. cams<br>4 additional switches incl. cams<br>Speed controller 10 to 80 s<br>Potentiometer (1000 Ω for 2-way ball valves, 2000 Ω for 3-way ball valves)  |
| Weight:                      | 4.4 pounds/2 kg  |
| Safety tested by SEV         |  |
| Performance according to VDE |  |

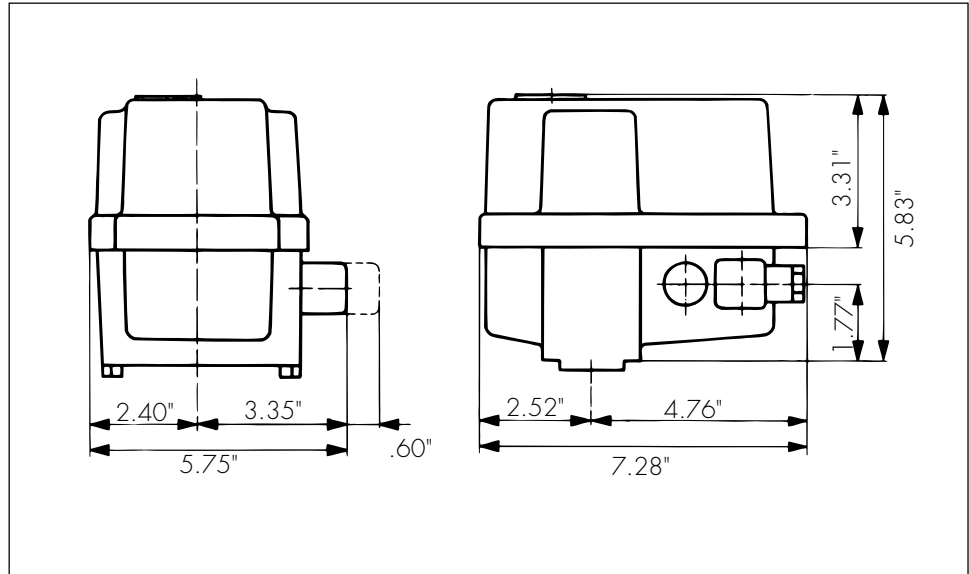
## 2. Design

The electric actuator Type EA 20 consists of the following:

- Cover with integrated seals and clear position indicator cover
- DC actuator motor
- Permanently lubricated, ball bearings and gears
- Power board for voltage selection, motor control and overload protection
- Stroke limiter by means of 2 micro switches with adjustable cams
- Support for auxiliary equipment (up to 4 extra micro switches)
- Housing with plug and additional cable port for Pg 11 (1/2" conduit available on request)



## Dimensions



## 3. Installation

### 3.1 Unpacking and inspection

Prior to shipment, the unit was carefully assembled and checked for proper operation.

Stroke limiting switches and cams were adjusted together with George Fischer ball valves. Additional adjustment is not normally required for start-up.

Individually shipped, the actuator EA 20 is delivered pre-adjusted in "Open"-position (A-B).

Please check that the unit is complete and for possible transport damage.

Check that the actuator voltage is the same as the supply or control voltage (factory set for 200-240 VAC/50-60 Hz on voltage selectable model).

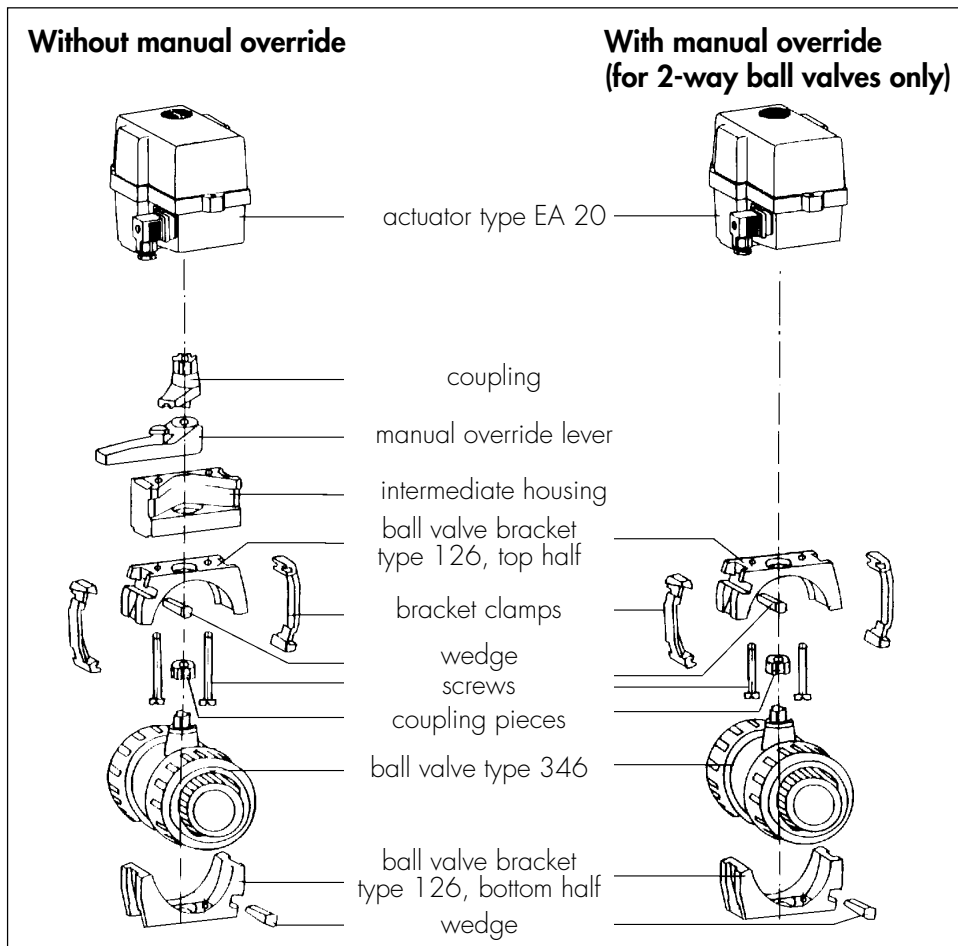
### 3.2 Mechanical connection

(Example George Fischer ball valve type 346)

Please note:

- Each actuator is supplied in "Open" position
- When mounting the valve, it must be in "Open" position
- The stroke limiting switches and cams have been pre-adjusted at the factory. After mounting the actuator onto the valve, an additional fine adjustment must be performed (see 3.6 Adjustments).

### Assembly of Type EA 20 Actuator and Type 346 Ball Valve



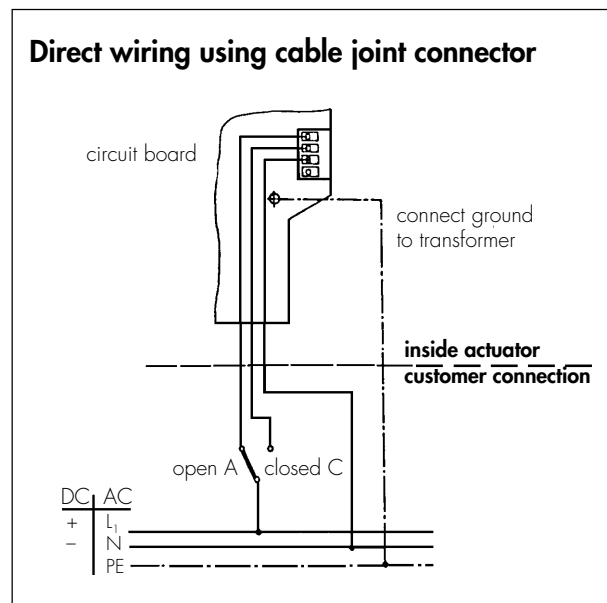
### 3.3 Electrical connection

The standard version of the electric actuator Type EA 20 is equipped with a 4-pole plug to connect the incoming electric power.

For outdoor installations, we recommend that the external wiring be either run inside a conduit using a 1/2" conduit plug or that cable is run through a Pg 11 cable joint connector.

A 1/2" conduit plug is available as a direct replacement for the standard cable plug.

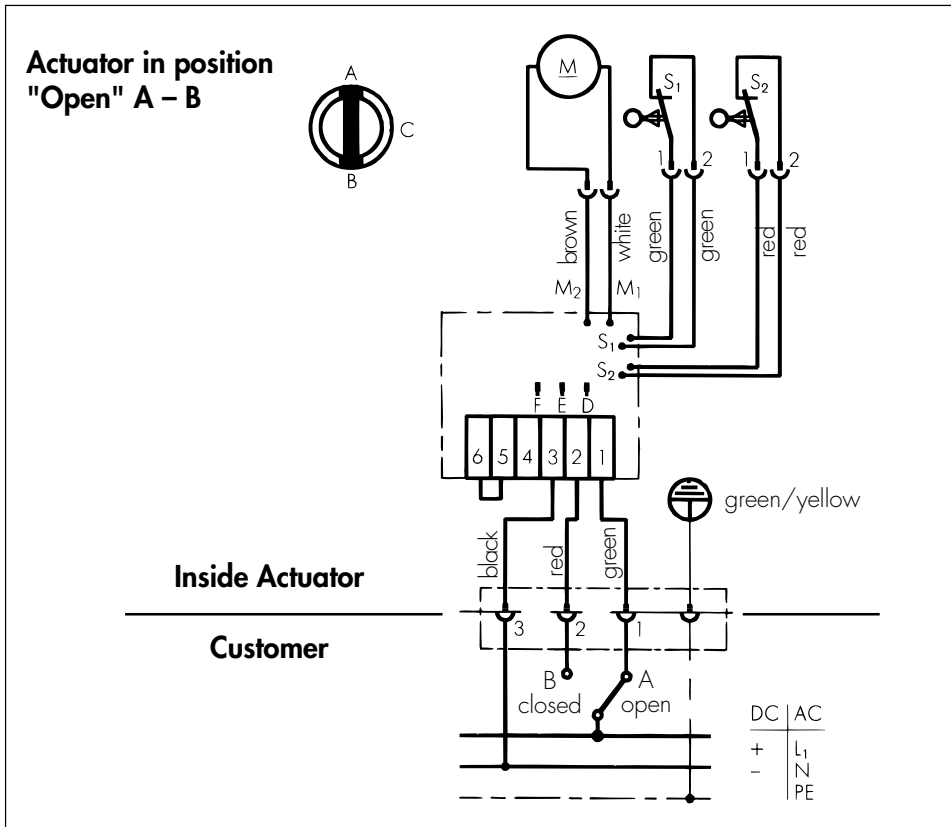
If the Pg 11 cable joint connector is required, the standard cable plug and internal wiring must be removed and the Pg 11 installed into the existing hole.



#### **Caution:**

Before removing the cover, switch off the power supply. Internal components are under supply voltage! (AC)

## Wiring Diagram Type EA 20 Actuator – AC Voltage



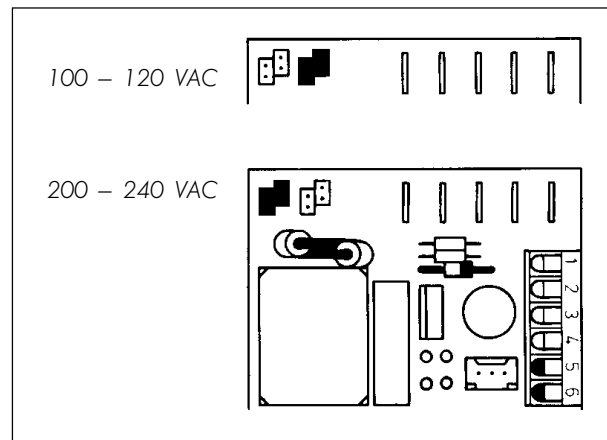
- M = Motor
- S<sub>1</sub> = Limit switch open
- S<sub>2</sub> = Limit switch closed
- L<sub>1</sub> = Phase
- N = Neutral
- PE = Ground



### 3.4 Voltage Selection

This actuator is supplied as 200–240 VAC.  
100–120 VAC may be selected by changing the jumper connections on the power board as shown below.

**Do not change while under voltage!**



### 3.5 Installation and connection of accessories

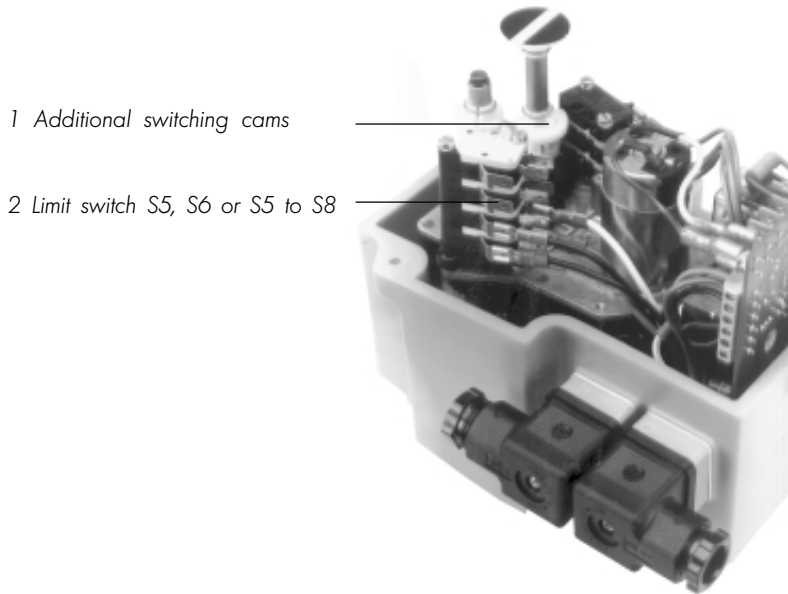
The electrical actuator Type EA 20 is equipped with fastening points which allow for modular accessories to be mounted. The configuration of these points is described in section 2. The electrical connection is made by means of a second cable plug or a threaded cable joint (depending on the number of connecting wires). The respective kits are prepared for installation, the electric cables are cut to size and packaged accordingly. In the following sections, the corresponding assembly points and the wiring are illustrated.

### 3.5.1 Additional limit switches $S_5$ and $S_6$

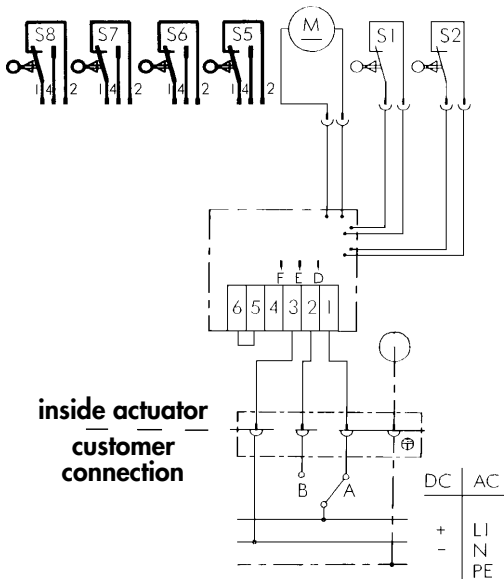
The cams for the additional switches can be adjusted as required.

**Please note:**

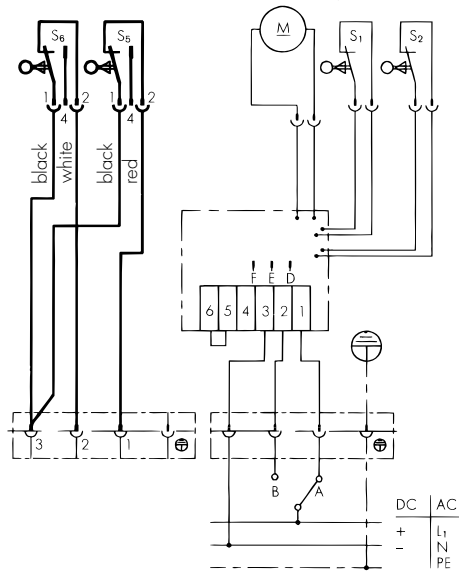
The cams for the limit positions  $S_1$  and  $S_2$  should not have to be adjusted.



Part number 199 190 139

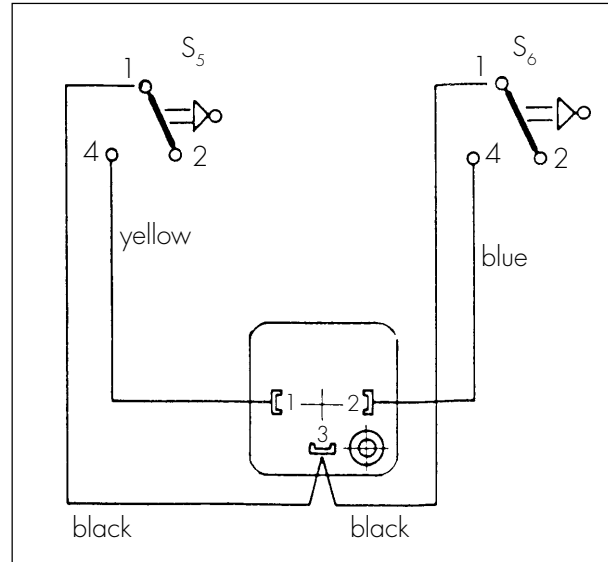


Part number 199 190 138/...149



## Diagram

(2 additional switches)



### Electrical connection

When two additional limit switches are installed, the electrical connection is via a second cable plug which is provided as part of the kit.

### Please note:

Both switches are used as "closed" switches.

"Open" function by replugging the flat-pin terminals from position (4) to (2).

## Procedure

- Remove second cable plug
- Install a 1/2" conduit plug or a Pg 11 joint connector
- Cable entry: be careful that no movable parts are disturbed
- Press flat-pin terminals .19"x.02"/4.8x0.5 mm onto the ends of the wires
- Connect to the appropriate switches

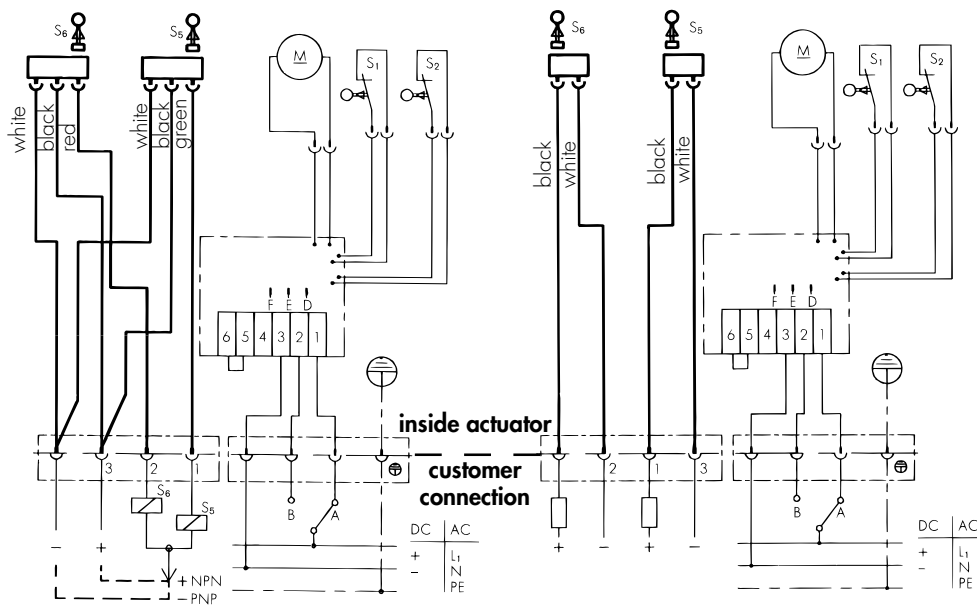
### 3.5.2 Inductive limit switches

The mechanical installation of these switches is identical to those under 3.5.1.

An additional metal part must be mounted so that the active surface of the inductive switch can be activated.

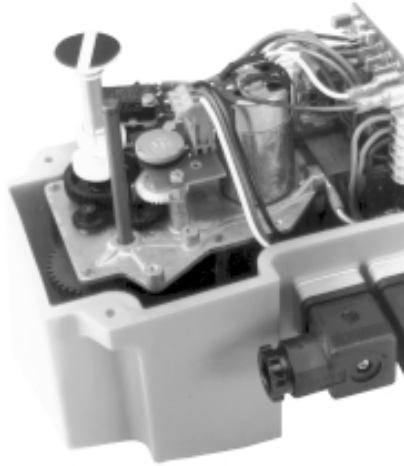
Part number 199 190 146 NPN  
Part number 199 190 147 PNP

Part number 199 190 148

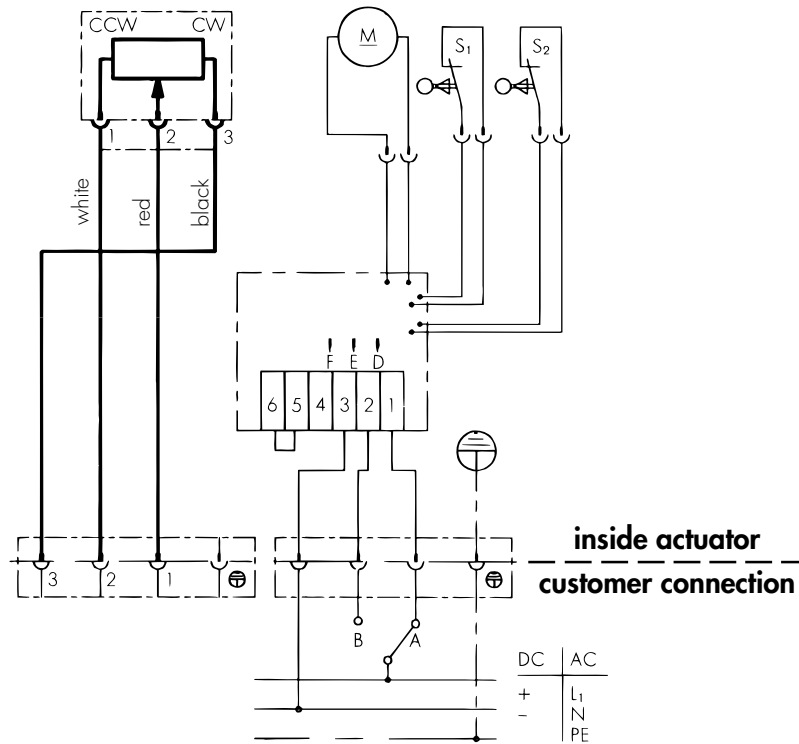


### 3.5.3 Potentiometer

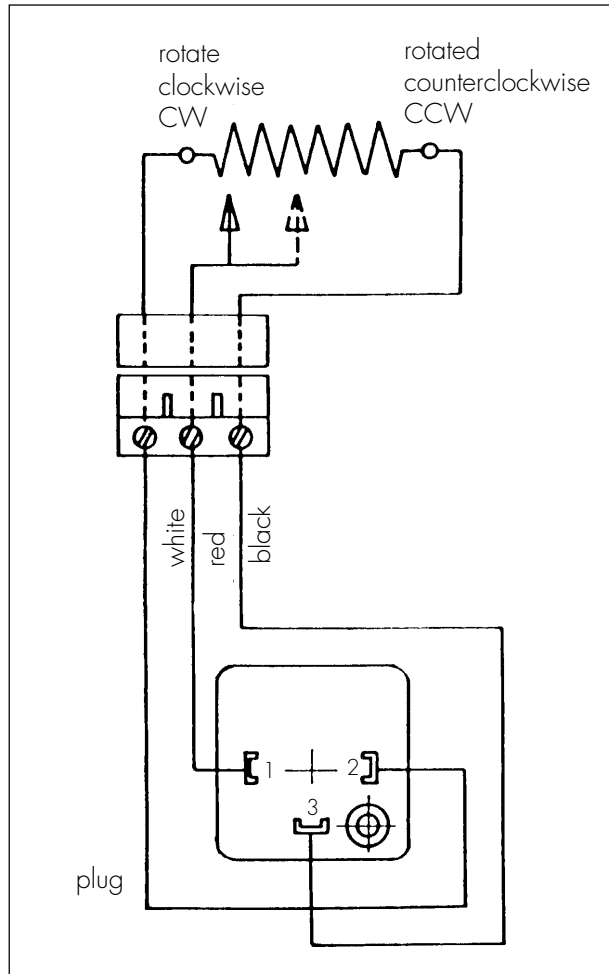
The potentiometer must be mounted on **closed** valves. Before mounting, the potentiometer must be turned to the end position, so that  $0\text{-}\Omega$  is measured between the red and the white connecting wires.



Part number 199 190 140



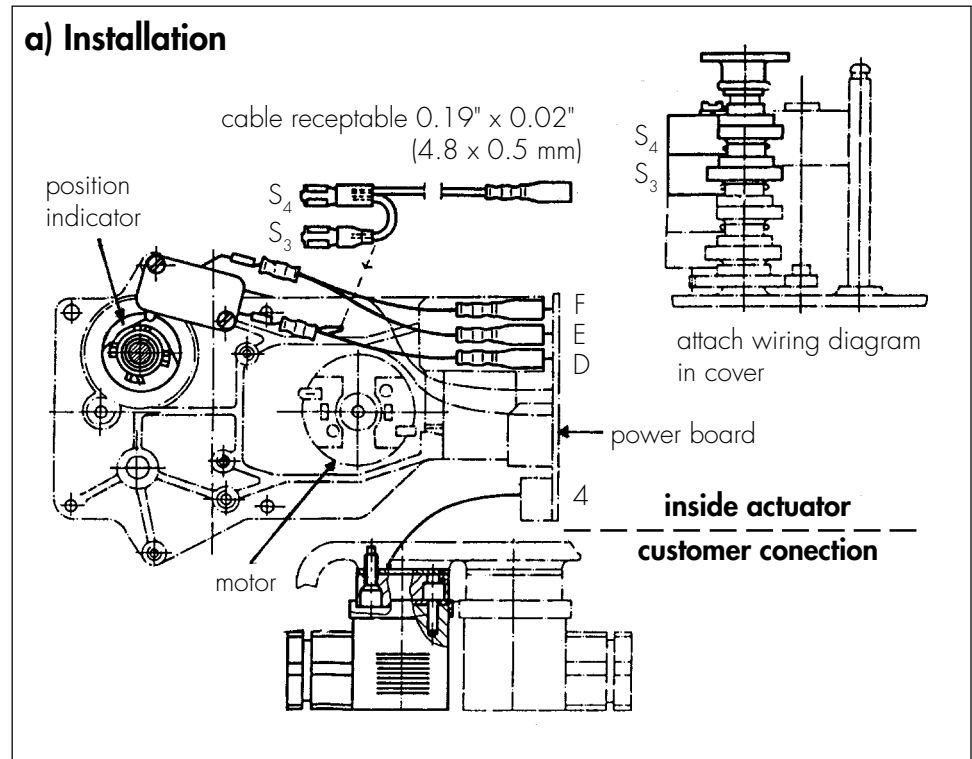
## Electrical connection



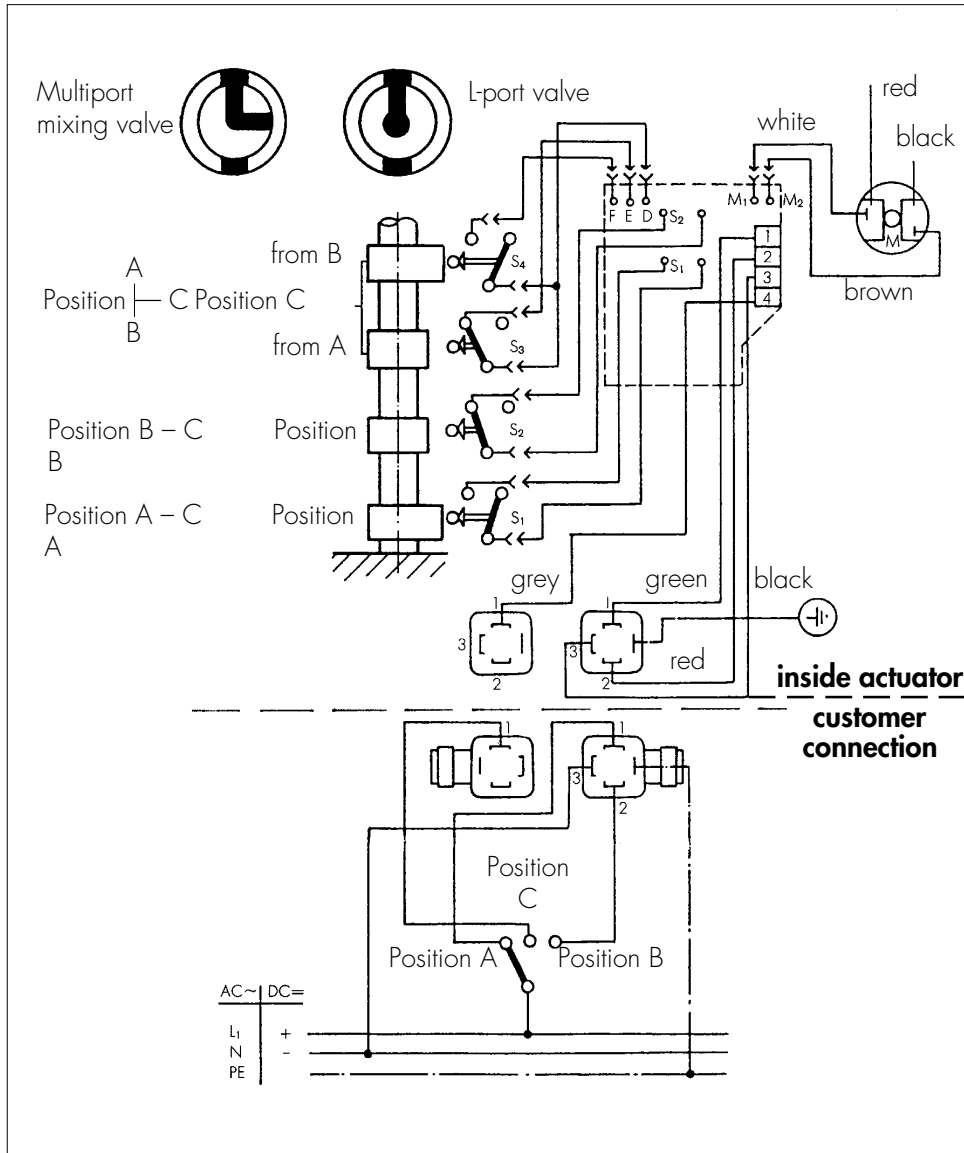
|                    | Position of actuator valve | Resistance across terminal 1 and 2 |
|--------------------|----------------------------|------------------------------------|
| 2-way model 90° †  | "Closed" C                 | 0 Ω                                |
|                    | "Open" AB                  | 1000 Ω                             |
| 3-way model 180° † | "Open" B                   | 0 Ω                                |
|                    | "Closed" C                 | 1000 Ω                             |
|                    | "Open" A                   | 2000 Ω                             |

### 3.5.4 Center stop position

Two additional limit switches for a central position (3/3-way ball valve Type 343).



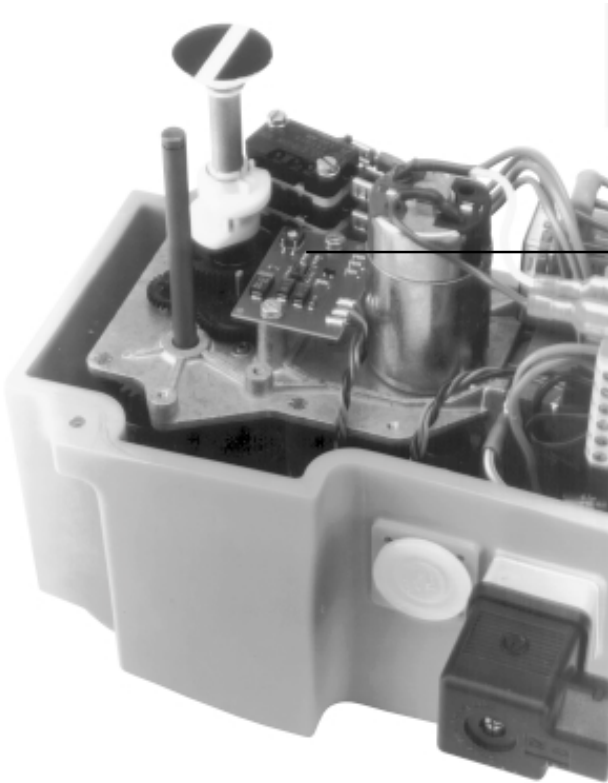
# Wiring Diagram Type EA 20 Actuator – AC Voltage "Center off Position"



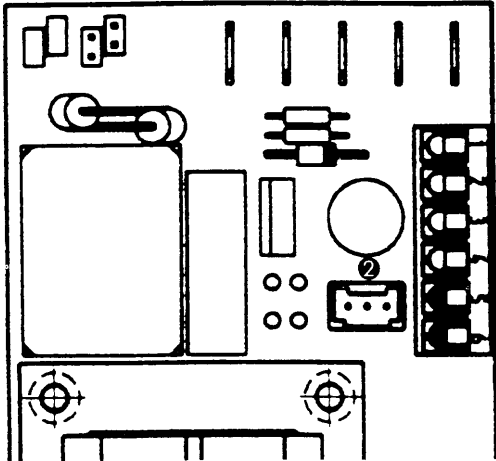


### 3.5.5 Speed control (Vario)

T = 10 – 80 seconds, part number 199 190 144  
(The vario is driving the motor stepwise)



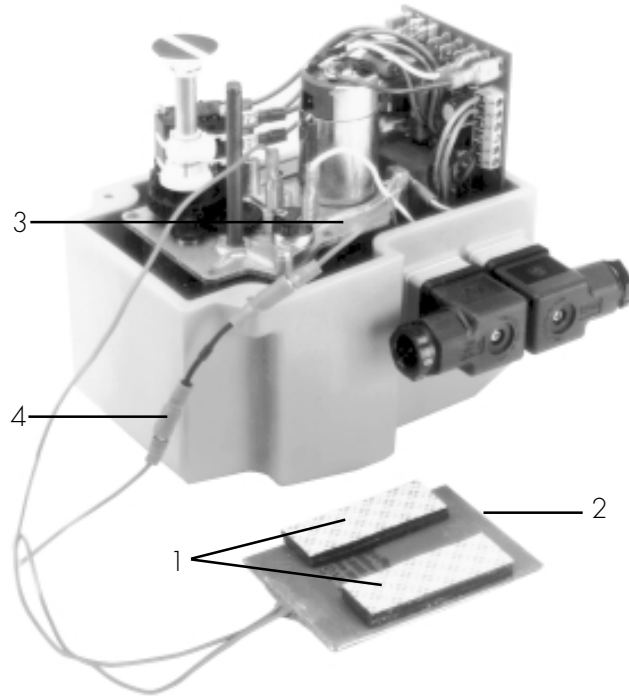
Potentiometer for time adjustment  
↶ time is reduced  
↷ time is extended



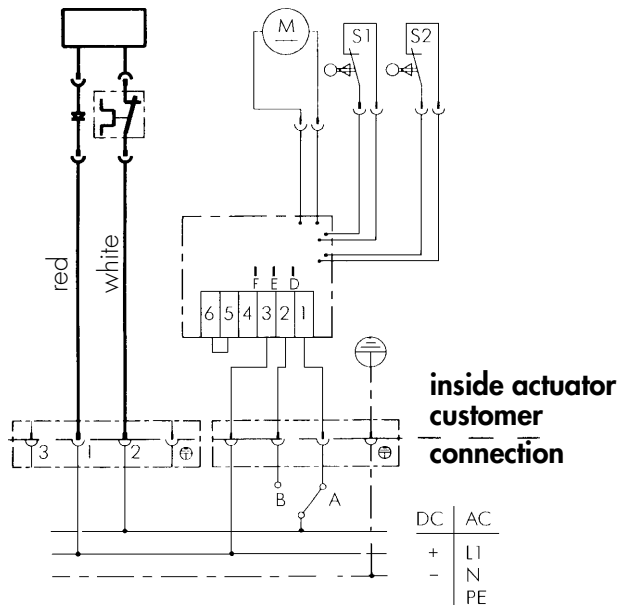
The speed control is connected electrically with this plug (2) on the power board.

### 3.5.6 Heating element

- 1 Adhesive surface
- 2 Heating element is attached to the inside of the cover
- 3 Temperature switch
- Switching point:  
on: 32°F/0°C  
off: 41°F/5°C
- 4 With diode 220 VAC  
Without diode 110 VAC



100–240 VAC part number 199 190 142  
24 VAC/DC part number 199 190 143



## 3.6 Start-up

### a) Installation check

Before starting, i.e. before connecting the actuator to the power supply, the following points should be carefully checked:

- correct voltage
- correct connection

### b) Adjustments

If a complete George Fischer valve with actuator is delivered, no additional adjustments are needed (always delivered in "Open" position).

If an actuator is repaired or installed by a user, the limit positions have to be re-adjusted and checked. These adjustments can only be done when the valve is removed completely from the line. Please follow the instructions carefully when adjusting the "Open" and "Closed" position. If in doubt, please contact the nearest George Fischer sales office or representative.

#### Procedure:

(Precondition: Actuator/valve in "Open" position)

- Adjustment to "Closed" position: Actuator runs in "Closed" direction until the exact "Closed" position is reached.
- Move the "Closed" cam in "Closed" direction, until the switch contact is made.
- Adjustment "Open" position: Same procedure as above ("Open" position adjust with "Open" cam)
- Check adjustments and make corrections if required

#### Please note:

*The angle of movement for the actuator with manual override is limited.*

*Make sure that these stops are not forced (angle of movement max. 92°).*

### **c) Overload protection**

The actuator has full overload protection.

It is an electric overload protection, responding in case of overload and thus protecting the motor against overheating.

In this case the power supply must be disconnected and the source of trouble must be eliminated (in most cases overload is caused by valve blockage).

After checking and re-connecting, the actuator is ready to be used again.

## **4. Maintenance**

The electric actuator Type EA 20 is maintenance free.

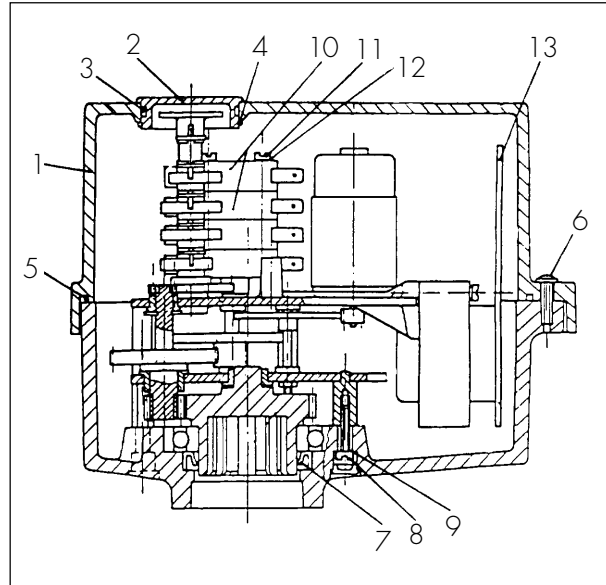
If the unit is operated within the specified range, more than 200,000 cycles are feasible.

In case of any failures, please check

- installation
- valve

If the malfunctions cannot be repaired on site, please contact the nearest George Fischer representative.

## Spare Parts for Electric Actuator Type EA 20



| No.                                    | Description  | Mat.        | Qty. | Part Number                |
|--|--|-------------|------|----------------------------|
| <b>Cover set consisting of:</b>        |  |             |      | 198 000 138                |
| 1                                      | Cover  | PPGV        | 1    |                            |
| 2                                      | Sight-glass  | SAN transp. | 1    |                            |
| 3                                      | O-ring   | NBR         | 1    |                            |
| 4                                      | Spring washer  | St          | 1    |                            |
| 5                                      | Sealing ring   | CR          | 1    |                            |
| 6                                      | PT screws  | ss          | 5    |                            |
| <b>Sealing set consisting of:</b>      |  |             |      | 198 000 139                |
| 3                                      | O-ring   | NBR         | 1    |                            |
| 5                                      | Sealing ring   | CR          | 1    |                            |
| 6                                      | PT screws  | ss          | 5    |                            |
| 7                                      | Shaft seal   | NBR         | 1    |                            |
| 8                                      | Screws   | ss          | 4    |                            |
| 9                                      | Spring washers   | St          | 4    |                            |
| <b>Limit switch set consisting of:</b> |  |             |      | 198 000 140                |
| 10                                     | Limit switches   |             | 2    |                            |
| 11                                     | Screws   | St          | 4    |                            |
| 12                                     | Spring washers   | St          | 4    |                            |
| 13                                     | <b>Power board</b><br>100-120 V/200-240 V, 50/60 Hz<br>24 VAC/DC |             |      | 198 150 586<br>198 150 587 |

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