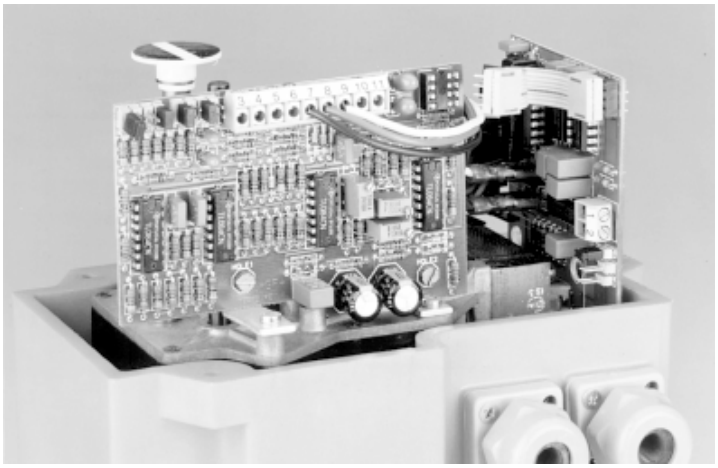
Controller Type PE 22



Instruction Manual
for the Installation of the Controller Type PE 22 in Electric Actuators Types EA 20, EA 30, EA 41 and EA 50

GEORGE FISCHER +GF+

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Contents

1. General Features

Electrically powered valves are increasingly being driven by external reference inputs.

Important Information
Electrostatic discharges caused by touching the printed circuit boards can cause the destruction of individual components. Please take appropriate precautions: antistatic workplaces, metallic connections to a water pipe, etc.

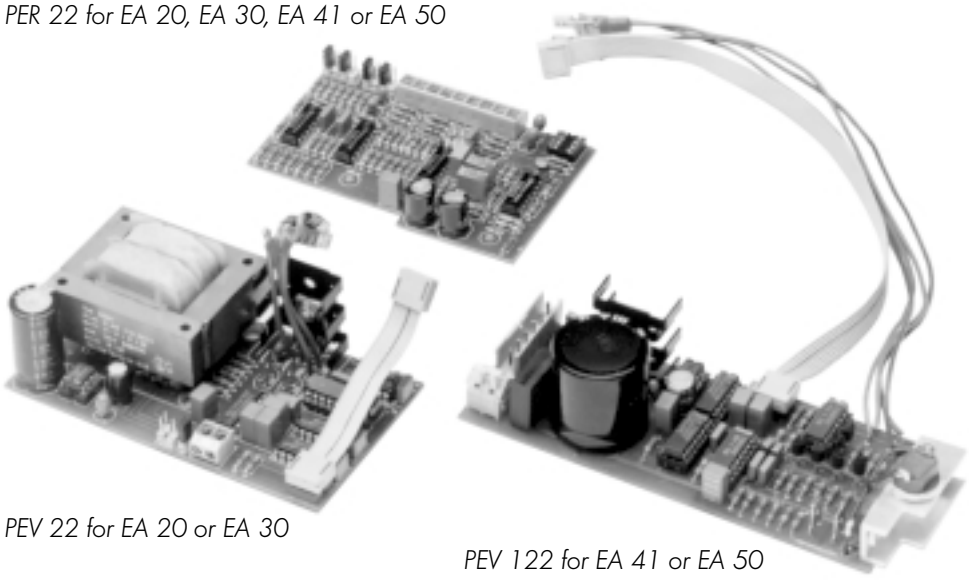
With the PE 22 Controller, the EA 20, EA 30, EA 41, and EA 50 electric actuators can be employed as follows:

- as a continuously adjustable positioner from 0 to 90° or 0 to 180°; in the process the aperture angle of the valve is measured continuously and compared with the setpoint
- as a process controller in conjunction with an external sensor and a reference input.

The PE 22 Controller comprises two parts (PEV 22/PEV 122 and PER 122) and is preferably installed in the actuator at the factory; it can, however, also be supplied in kit form (Fig. 1).

Figure 1

PER 22 for EA 20, EA 30, EA 41 or EA 50



PEV 22 for EA 20 or EA 30

PEV 122 for EA 41 or EA 50

2. Specifications

Connected voltage: (selectable)	100-120 VAC/200-240 VAC, 50-60 Hz; 24 VDC/AC, 50-60 Hz
Setpoint:	0-5 VDC/0-10 VDC/4-20 mA
Actual value, external (process controller):	0-5 VDC/0-10 VDC/4-20 mA
Actual value, internal (potentiometer):	0-5 VDC/0-10 VDC (90°/180°)
Range when used as positioner:	0-90°/0-180°
Control characteristics when used as process controller:	PI, proportional range continuously adjustable: 8 to 210%; reset time continuously adjustable: 1.2 s to 1.9 min
Duty cycle:	100% at 77°F/25°C ambient temperature for the EA 20 and EA 30 50% at 77°F/25°C ambient temperature for the EA 41 and EA 50
Ambient conditions:	temperature 14°F to 122°F/-10°C to 50°C; relative humidity 0 to 100%.

3. PE 22 Installation and Assembly

Before installation and assembly starts, the actuator must be moved to the "closed" position.

3.1. Installation in Electric Actuator Type EA 20 and EA 30

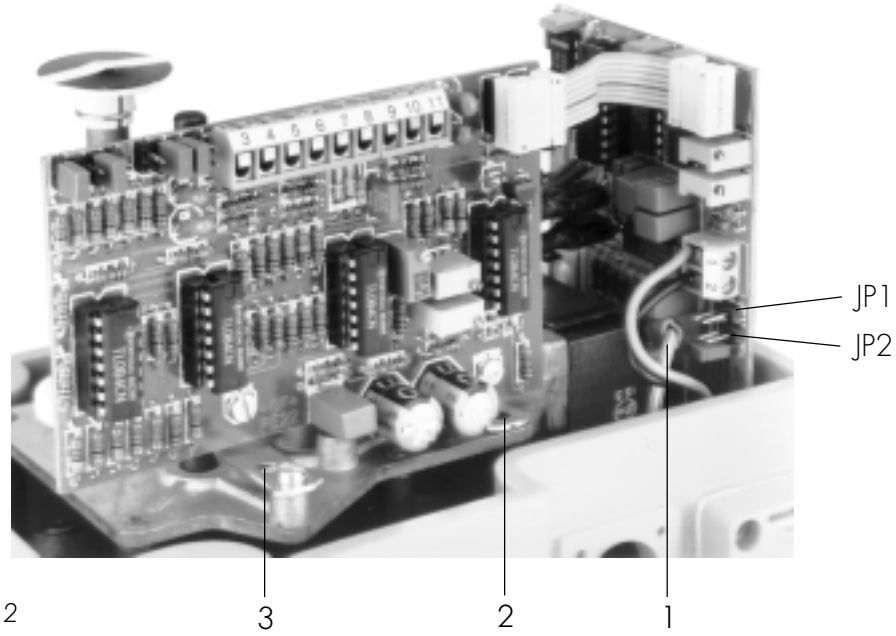


Figure 2

3.1.1. Adjustment to Power Supply Voltage

Jumbers JP1 (200-240 VAC) and JP2 (100-120 VAC) on the PEV 22 supply unit must be plugged in according to the power supply voltage available (fig. 2). As delivered: 200-240 VAC. JP1 is plugged in on the 24 V version.

3.1.2. Mounting and Connecting the PEV 22 Supply Unit

- separate actuator from power supply
- detach electrical connections
- remove existing supply unit
- install PEV 22 supply unit and bolt on securely
- attach connecting cable (green = 1, black = 2)
- connect earth to transformer (1)

3.1.3. Installing the PER 22 Control Unit

- bolt on PER 22 securely as illustrated (2+3)
- plug in the ribbon cable connection

3.2. Installation in Electric Actuator EA 41 and EA 50

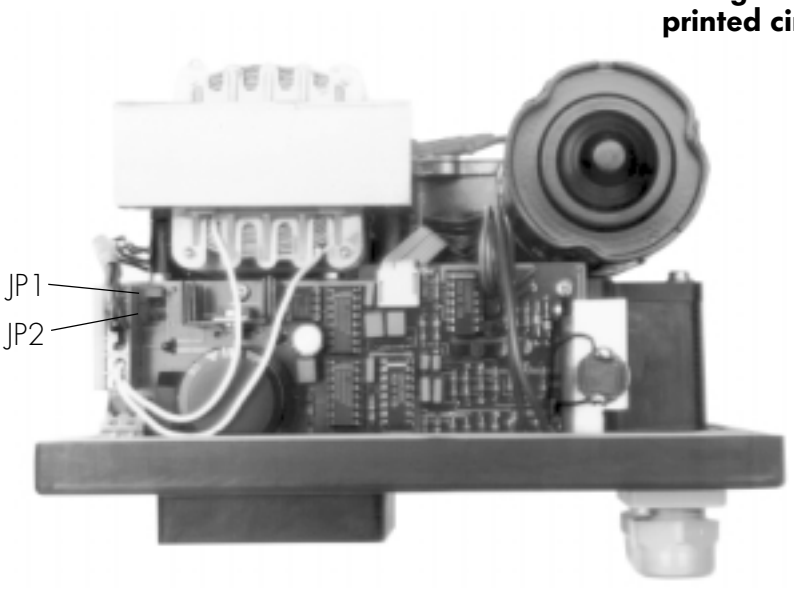
3.2.1. Adjustment to Power Supply Voltage

Jumpers JP1 (200-240 VAC) and JP2 (100-120 VAC) on the PEV 122 supply unit must be plugged in according to power supply voltage available (see fig.3). As delivered: 200-240 VAC. JP1 is plugged in on the 24 V version.

3.2.2. Mounting and Connecting the PEV 122 Supply Unit

- separate actuator from power supply
- detach electrical connections
- remove existing supply unit
- fit the PEV 122 in the same way (see fig. 3)
- wire up as shown in fig. 8

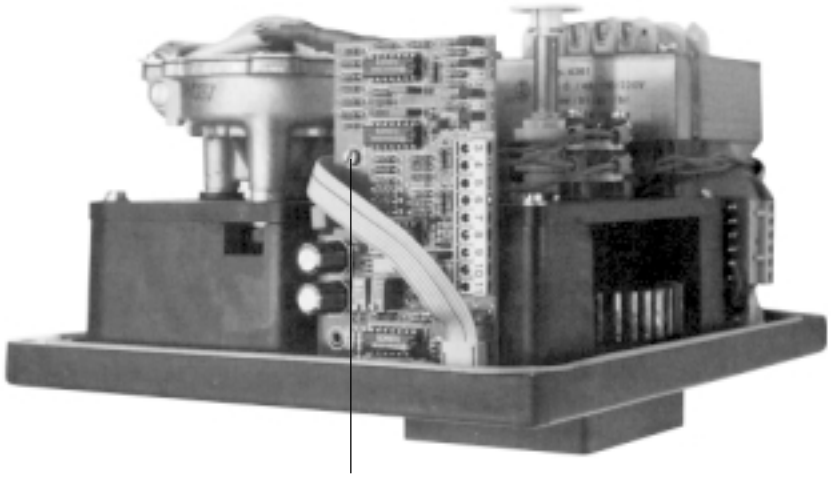
Fitting the PEV 122 printed circuit board



3.2.3. Installing the PER 22 Control Unit

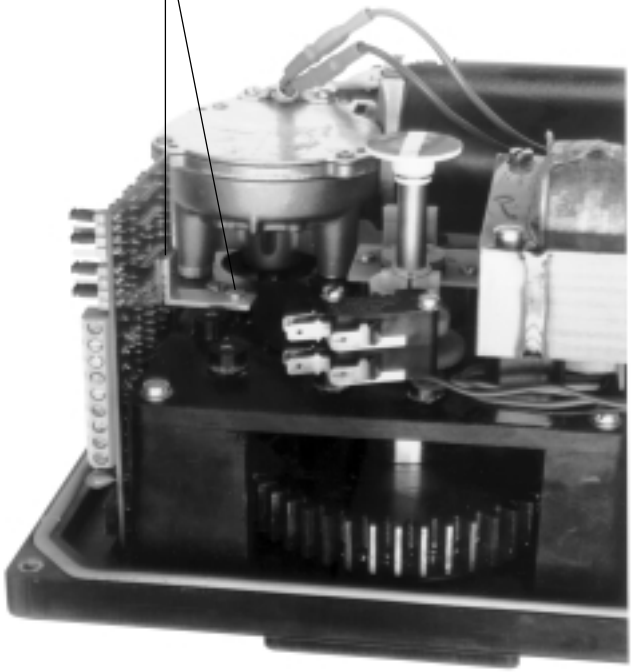
- slide the printed circuit board into the groove provided, as shown in fig. 5
- secure it with the bracket and bolts provided (fig. 4+5)
- plug in the ribbon cable connection

Figure 4



fastening bolts

Figure 5



4. Connection Diagram for the EA 20, EA 30, EA 41, EA 50 when used as a Positioner with Internal Actual Value Sensor (Potentiometer 199 190 140)

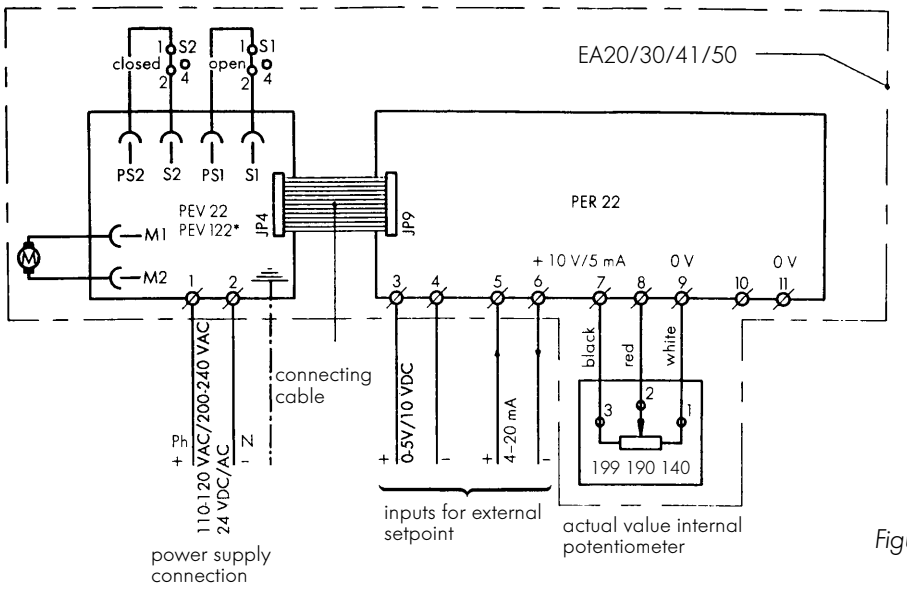


Figure 6

5. Connection Diagram for the EA 20, EA 30, EA 41, EA 50 when used as a Process Controller with 4-20 mA or 0-5/10 V External Actual Value Sensor (e.g. Transmitter)

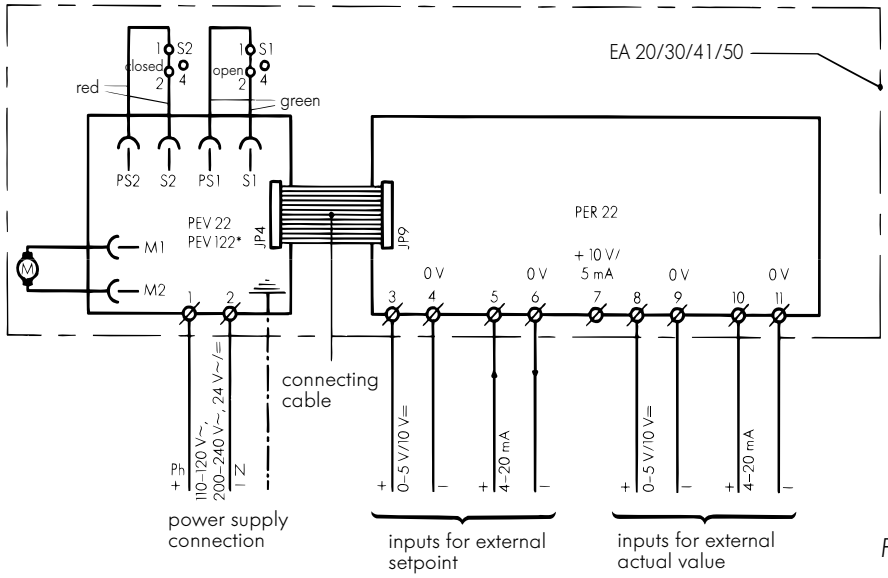
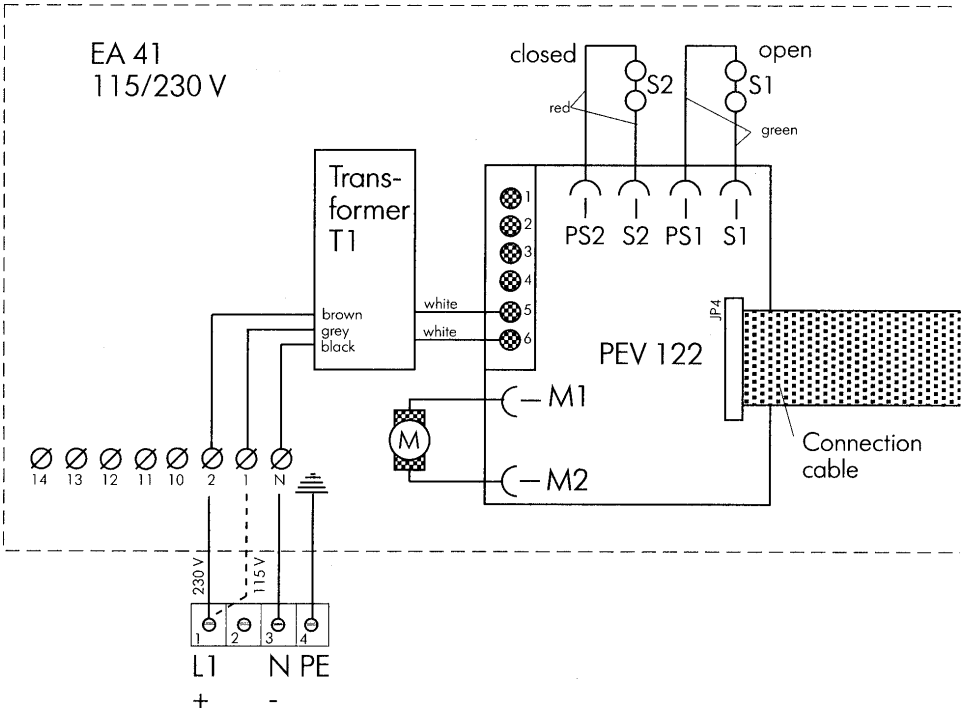


Figure 7

6. Wiring of the PEV 122 Supply Unit in the EA 41 and EA 50

Figure 8



7. Block Diagram of the PE 22

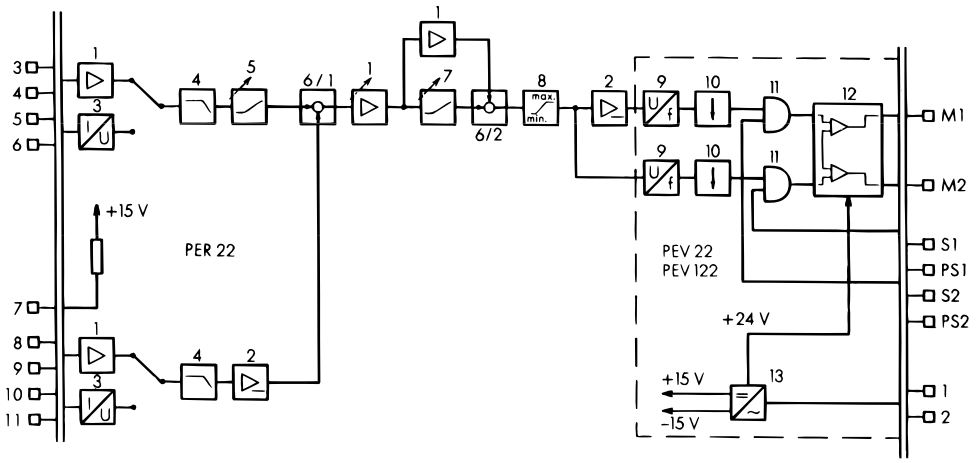
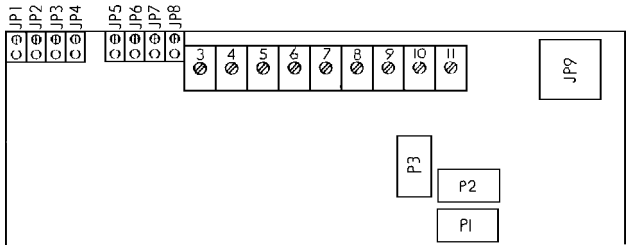


Figure 9

8. Balancing/Adjusting the PER 22

8.1. Adjusting the Input Signals

Various operating conditions can be adjusted on control unit PER 22 by means of the jumpers (JP1–JP8) provided.



1 Amplifier
2 Inverting amplifier
3 Current-voltage converter
4 Filter
5 Setpoint smoothing
6 Adder
7 Integrator
8 Limiter
9 Voltage-frequency converter
10 Monostable multivibrator
11 Logic
12 Motor driver H bridge
13 Power supply unit

8.1.1. Used as a Positioner with Integrated Potentiometer

		Jumper plugged in
Actual value		
Rotation	90°	JP5, JP7
Rotation	180°	JP5, JP8
Setpoint	0-5 V	JP1, JP3
	0-10 V	JP1, JP4
	4-20 mA	JP2, JP3

8.1.2. Used as a Process Controller with External Sensor

		Jumper plugged in
Actual value		
	0-5 V	JP5, JP7
	0-10 V	JP5, JP8
	4-20 mA	JP6, JP7
Setpoint	0-5 V	JP1, JP3
	0-10 V	JP1, JP4
	4-20 mA	JP2, JP3

8.2. Installing the Internal Potentiometer for Actual Value Feedback

Important:

Ensure that during installation (with valve closed) the potentiometer is at the left-hand stop when viewed from above (turn counterclockwise), i.e. the resistance between the red and white wires must be 0 ohm (see EA 20/EA 30/EA 41/EA 51 Instruction Manuals).

9. Adjustments

9.1. Used as Positioner with Internal Potentiometer

Potentiometers P1 and P2 (fig. 10) must be turned clockwise as far as the stop (max. 28 revs.). This is already set at the factory.

The regulating speed of the valve can be adjusted between 7 and 15 seconds by means of potentiometer P3.

Time shorter	←	Turn counter-clockwise (CCW)	Potentio-meter P3	Turn clock-wise (CW)	→ Time longer

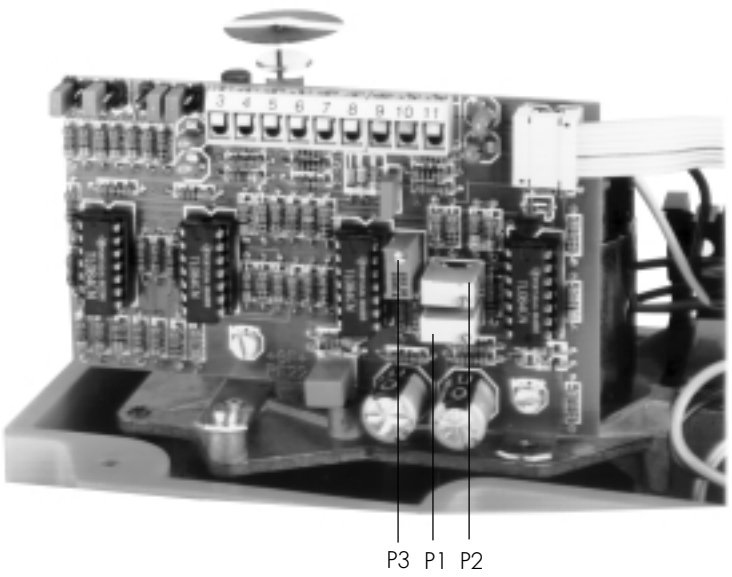


Figure 10

9.2. Used as Process Controller

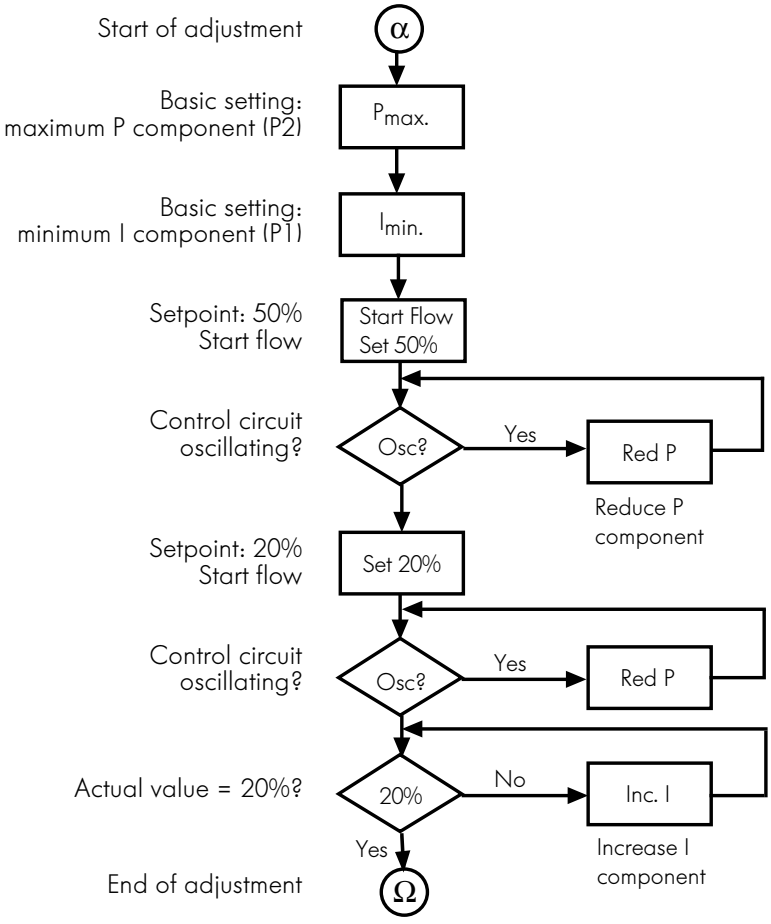
Adjusting the parameters.
The parameters are set as follows at the factory:
Proportional range maximum (210%)
Reset time maximum (1.9 min)

The controller thus displays a predominantly proportional action.

Three potentiometers are provided on the control unit (PER 22) for special adjustments:
P1 for adjusting reset time
P2 for adjusting the proportional range
P3 for delaying the setpoint (remains at left hand stop)

If the set screw is turned counterclockwise:
- the reset time is shortened (I component is increased)
- the proportional range is diminished (P component is reduced)

Control Parameters



10. Part Numbers for Actuators with PE 22 Installed

		Part number
EA 20 actuator with integrated PE 22 as positioner		
(includes 199 190 140)	115/230 V, 50/60 Hz	198 150 434
	24 VAC/DC	198 150 435
EA 20 actuator with integrated PE 22 as process controller		
(excludes 199 190 140)	115/230 V, 50/60 Hz	198 150 436
	24 VAC/DC	198 150 437
EA 30 actuator with integrated PE 22 as positioner		
(includes 199 190 140)	115/230 V, 50/60 Hz	198 150 712
	24 VAC/DC	198 150 713
EA 30 actuator with integrated PE 22 as process controller		
(excludes 199 190 140)	115/230 V, 50/60 Hz	198 150 714
	24 VAC/DC	198 150 715
EA 41 actuator with integrated PE 22 as positioner		
(includes 199 190 140)	115/230 V, 50/60 Hz	198 150 701
	24 VAC/DC	198 150 702
EA 41 with integrated PE 22 as process controller		
(excludes 199 190 140)	115/230 V, 50/60 Hz	198 150 703
	24 VAC/DC	198 150 704
EA 50 actuator with integrated PE 22 as positioner		
(includes 199 190 140)	115/230 V, 50/60 Hz	198 150 706
	24 VAC/DC	198 150 707
EA 50 actuator with integrated PE 22 as process controller		
(excludes 199 190 140)	115/230 V, 50/60 Hz	198 150 708
	24 VAC/DC	198 150 709
Components		
Controller board PER 22		199 190 225
Power supply board		
PEV 22 supply unit for EA20, EA30	115/230 V, 50/60 Hz	199 190 236
	24 VAC/DC	199 190 237
PEV 122 supply unit for EA 41, EA 50	115/230 V, 50/60 Hz	199 190 229
	24 VAC/DC	199 190 230
Potentiometer		199 190 140

GEORGE FISCHER +GF+

George Fischer Inc., 2882 Dow Avenue, Tustin, CA 92780-7285
Tel. (714) 731-8800, Toll Free (800) 854-4090, Fax (714) 731-6201
e-mail: info@us.piping.georgefischer.com
www.us.piping.georgefischer.com