

## **Compact controller 227PM**

FläktGroup' compact controller 227PM is a complete unit comprising an actuator, a dynamic differential pressure sensor for pressure-dependent air flow control and a user interface with a 3-digit display which makes it possible to monitor pressure and set values without external equipment.

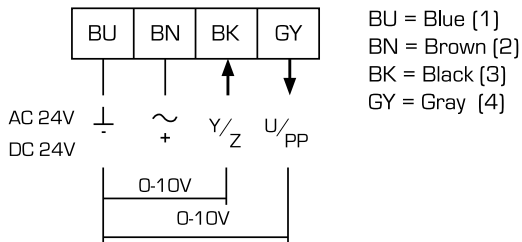
The controller operating range is set to a standard value of 0–10 V on delivery. To change the operating range to 2–10 V, see Setting the values, quick reference guide.

The controller can also be force controlled via closing contacts (timer, presence detector, etc.) to override the set min or max air pressure. It is also possible to use the controller independently without any external control.

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### Connection diagram

Actuators are provided with color coded and numbered wires.



BU-BN	operating voltage	24 VAC/VDC
BU-BK	control signal	0...10 V / 2...10 V
BU-GY	feedback signal	0...10 V / 2...10 V
Load for output GY		max. 0,5 mA

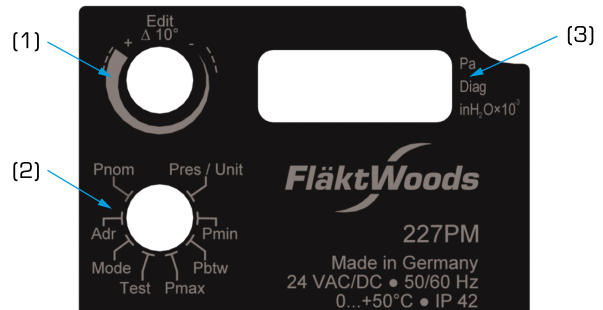
Observe polarity on secondary of transformers. All common and signal (-) must be connected in line. Incorrect polarity can cause controller damage or operation error. Provide overload protection for line voltage and disconnect as required. Consider voltage drops when connecting multiply actuators in parallel.

See "STRA Room controller Installation and maintenance"-manual for detailed instructions how to connect the actuator to FläktGroup' room controller. When using 3rd party controllers, notice that a separate transformer should be used for the controller if the controller power is full-wave rectified.

### User interface

On the cover of the actuator there are two selectors, value selector (1) and function selector (2).

Also there is the 3-digit display (3) to show selected functions, values and units.



## Setting the values, quick reference guide

When the actuator is connected to power supply, settings can be made with the selectors using, for example, a screw driver.

1. Select pressure unit: A dot on the upper-right or lower-right corner of the display indicates which unit is used, Pa or in-H<sub>2</sub>Ox10<sup>-3</sup>.

If there is need of change, turn the function selector until it points to "Pres/Unit".

Then turn the value selector until the dot on the display toggles to the other position. After the selection the display flashes three dashes (- - -) twice for indication that the new setting is stored.

2. Setting up Pmax: Turn the function selector until it points to "Pmax". Then turn the value selector until the desired pressure is shown on the display. After the selection the display flashes twice for indication that the new Pmax setting is stored.

3. Setting up Pmin: Turn the function selector until it points to "Pmin". Then turn the value selector until the desired pressure is shown on the display. After the selection the display flashes twice for indication that the new Pmin is stored.

4. Select input signal range: Turn the function selector until it points to "Mode". The currently valid range is shown on the display, 0-n for 0-10 V or 2-n for 2-10 V. If there is need of change, turn the value selector until the desired range is shown on the display.

After the selection the new range is saved and the display flashes twice for indication.

## Functions, detailed description

### 1. Value selector

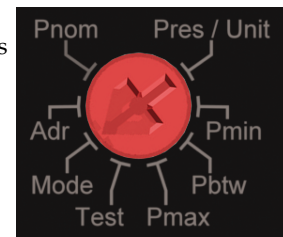
The value selector allows the changing of values. The position of the arrow shows the value set. The changes are displayed as soon as the selector is moved  $\pm 10^\circ$  from its position.

By turning the selector clockwise or counterclockwise the corresponding values are shown.



### 2. Function Selector

The function selector allows choosing the function depending on its position. If there is no function selected the display will show three dashes(- - -).



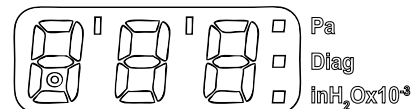
### Pres / Unit

Shows the pressure in Pa or inH<sub>2</sub>Ox10<sup>-3</sup>; Diag is for diagnostic purposes. The reading is also obtained with the feedback signal U.

The display starts flashing if the actuator hits an end stop before the desired pressure has been set.

An overflow (measuring pressure difference higher than 300 Pa) is indicated on the display by a small circle.

Turning the value selector allows unit selection.



Dot on the upper-right corner of the display: the unit of pressure used is Pa.

Dot on the lower-right corner of the display: the unit of pressure used is inH<sub>2</sub>Ox10<sup>-3</sup>.

### Pmin

Allows to set the desired minimum pressure for the external reference signal Y=0V/2V by turning the value selector. The selected value is shown on the display in Pa or inH<sub>2</sub>Ox10<sup>-3</sup>.

### Pmax

Allows to set the desired maximum pressure for the external reference signal Y=10V by turning the value selector. The selected value is shown on the display in Pa or inH<sub>2</sub>Ox10<sup>-3</sup>.

### Test

Opens the diagnose menu. All outside input signals on the Y wire are neglected and the controller only operates

according to the selected override function. All override functions are disabled after a time-out of 10 hours.

The display toggles after the selection of the function between pressure (8s showing time) and the function (2s showing time). OFF-mode toggles with Y-signal.

Selecting another function will disable the Diag function and set it automatically to OFF.

The appropriate symbols are toggled as indicator.

	Pa Diag InH <sub>2</sub> Ox10*	oP(en) opens the actuator
	Pa Diag InH <sub>2</sub> Ox10*	cL(ose) closes the actuator
	Pa Diag InH <sub>2</sub> Ox10*	Hi(gh) forces the actuator to P <sub>max</sub>
	Pa Diag InH <sub>2</sub> Ox10*	Lo(w) forces the actuator to P <sub>min</sub>
	Pa Diag InH <sub>2</sub> Ox10*	on Test mode is switched on. The actuator stays in the current position.
	Pa Diag InH <sub>2</sub> Ox10*	off Test mode is switched off. The actuator starts controlling according to external signal Y.

### Mode

Allows to set the input signal range (0...10V or 2...10V) by turning the value selector. The feedback signal range of U corresponds to Y.

	Pa Diag InH <sub>2</sub> Ox10*	0-n signal range is 0-10V
	Pa Diag InH <sub>2</sub> Ox10*	2-n signal range is 2-10V

### Adr

Not in use.

### Pnom

Is used to compensate length of measuring tube. If the tube is longer than 10 m, contact FläktGroup' technical support.

## Input signals (analog)

The input signal Y allows to control the actuator according to the selected mode of operation.

In mode 0...10VDC the input signal Y matches to the following pressures:

$$P_{act} = P_{min} + \frac{Y}{10VDC} \cdot (P_{max} - P_{min})$$

and the pressures match to

Y = 0VDC as (Pmin) and Y = 10VDC as (Pmax)

$$Y = 10VDC \cdot \frac{P_{act} - P_{min}}{P_{max} - P_{min}}$$

In mode 2...10VDC the input signal Y matches to the following pressures:

$$P_{act} = P_{min} + \frac{Y - 2VDC}{8VDC} \cdot (P_{max} - P_{min})$$

and the pressures match to

Y = 2VDC as (Pmin) and Y = 10VDC as (Pmax)

$$Y = 2VDC + 8VDC \cdot \frac{P_{act} - P_{min}}{P_{max} - P_{min}}$$

Mode 2...10VDC includes a special feature to close when the input signal Y = 0VDC.

See also Fig 1. "Reference Signal Y"

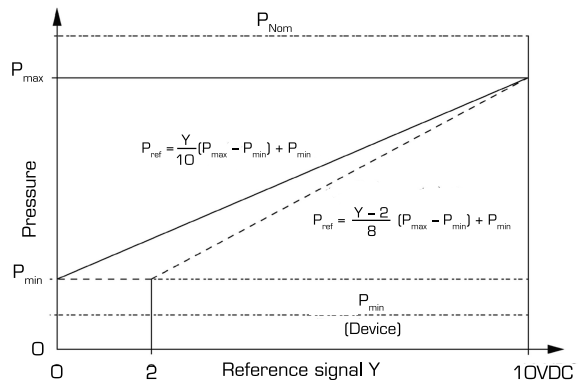


Fig. 1. Reference signal Y

### Output signals (analog)

In mode 0...10VDC the output signal U matches to the following pressures:

$$U = 10\text{VDC} \cdot \frac{P_{act}}{300\text{Pa}} \quad U = 10\text{VDC} \cdot \frac{P_{act}}{1.2\text{inWC}}$$

and to calculate the actual pressure P<sub>act</sub> from the feedback signal U:

$$P_{act} = P_{nom} \cdot \frac{U}{10\text{VDC}}$$

In mode 2...10VDC the output signal U matches to the following pressures:

$$U = 2\text{VDC} + 8\text{VDC} \cdot \frac{P_{act}}{300\text{Pa}}$$

$$U = 2\text{VDC} + 8\text{VDC} \cdot \frac{P_{act}}{1.2\text{inWC}}$$

and to calculate the actual pressure P<sub>act</sub> from the feedback signal U:

$$P_{act} = 300\text{Pa} \cdot \frac{U - 2\text{VDC}}{8\text{VDC}}$$

See also Fig 2. "Actual pressure U"

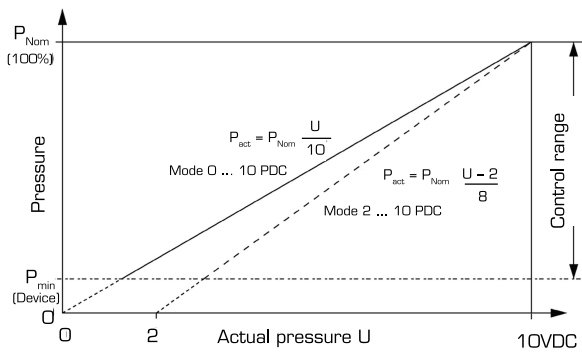


Fig. 2. Actual pressure U

### Forced controls

The controller can be force controlled to the following positions via closing contacts (see fig. 3):

(Open) Y= pos. rectified half wave from 24VAC supply

(Close) Y= connected to ground conductor of 24 VAC supply (only with mode 2-10 VDC)

(Pmax) Y= full wave from 24VAC supply

(Pbtw) Y= neg. rectified half wave from 24VAC supply

(Pmin) Y= disconnected

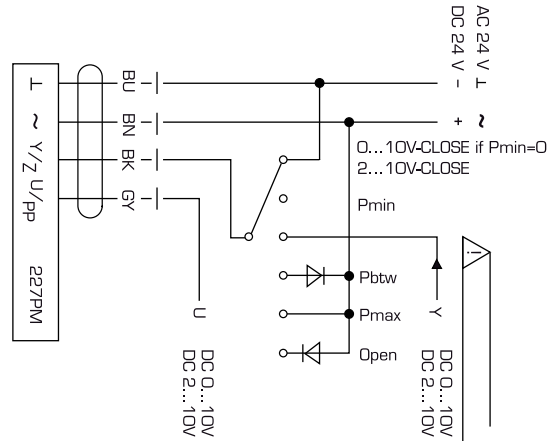


Fig. 3. Forced control functions

## Setting the controller to a constant pressure

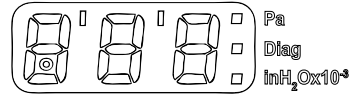
The controller can be set to a constant pressure neglecting all analog inputs Y. This functionality can be used as an advanced diagnostic function.

To activate this function Pmax needs to be set to 0.

The Diag dot on the display appears and the controller uses Pmin as the constant pressure to control to. Use the Pmin function to set desired constant pressure.

## Display

The display (3) uses 7-segment numbers in full 3-digits. Additional signs include a small circle, three square dots and two rectangular slashes.



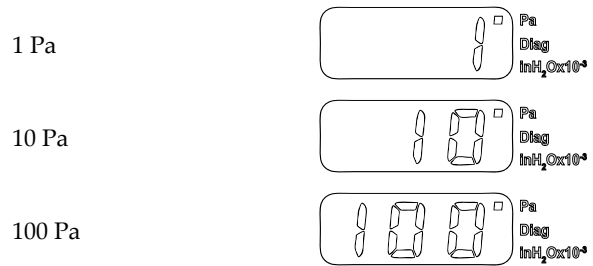
The square dots are used with the externally printed text to visualize certain functions or units (Pa, inH<sub>2</sub>Ox10<sup>-3</sup>). It is meant to denote the unit of the value shown in the display. In the shown case it could be Pa, inH<sub>2</sub>Ox10<sup>-3</sup> or activated Diag (diagnostic function).

An overflow (differential pressure above 300Pa or 1.2 inH<sub>2</sub>Ox10<sup>-3</sup>) is indicated in the display by a small circle at the first digit.

If the controller tries to match reference and actual pressures, this is shown as flashing dot of the chosen unit.

If the controller cannot meet reference and actual pressure, there will be a stop, and the complete display starts flashing to indicate this problem.

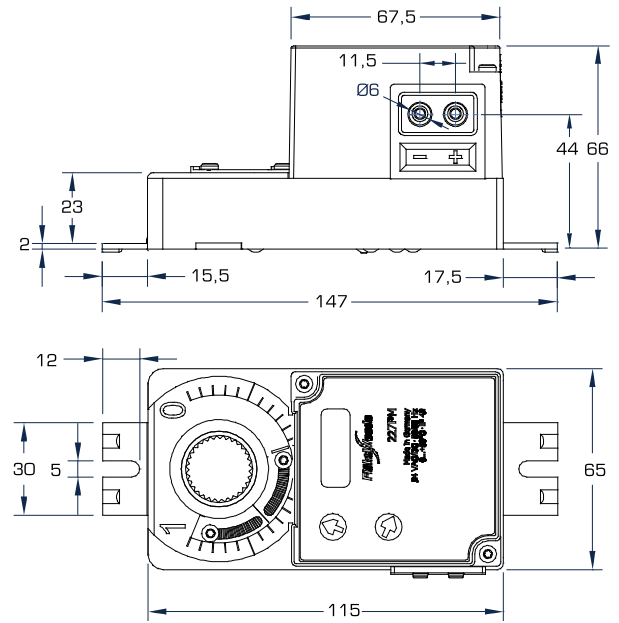
See following examples:



**Technical data**

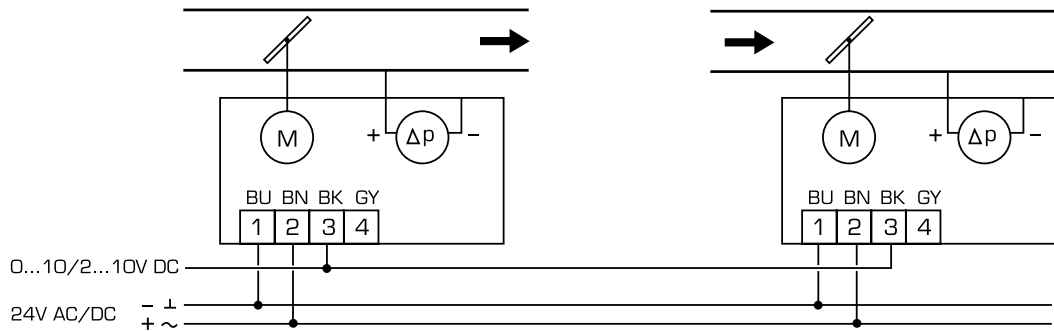
Power supply	24 VAC/VDC ± 20%, 50/60 Hz
Over voltage	Up to 40 VDC, max. 5 sec.
Power consumption	4 VA/5Nm, 4.5 VA/10Nm
Input signal	Proportional to [V <sub>min</sub> ... V <sub>max</sub> ] 0 - 10 / 2 - 10 VDC, or 0 - 20 / 4 - 20 mA with 500 Ω resistor and override controls
Input impedance	>50 kΩ
Feedback signal	0 - 10 / 2 - 10 VDC proportional to air volume flow
Permissible ambient	0 °C to 50 °C (32 °F to 122 °F) -20 °C to 80 °C (-4 °F to 176 °F) - humidity 5-95% RH, non-condensing

**Dimensions**

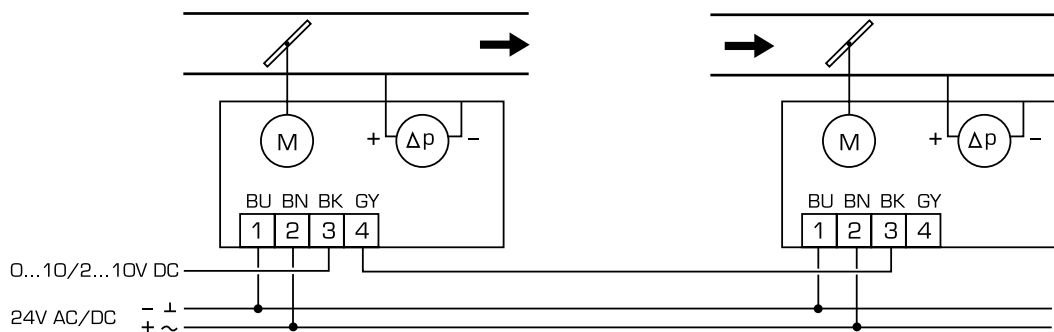


## Wiring

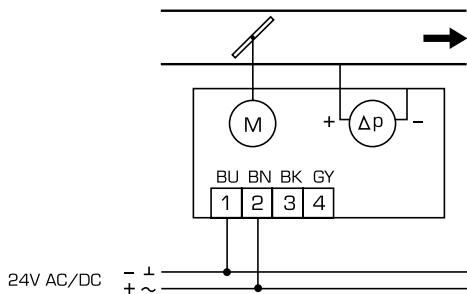
### Parallel control of two pressure controllers



### Master-Slave control of two pressure controllers



### Constant pressure



NOTE:  
Pmax must be set to 0  
the controller will have Pmin as setpoint