

Installation and Operation Instructions

Read these instructions carefully before use.
The instrument must be installed by qualified personnel, only.
Observe the stated power supply voltage.
Do not use with combustible gas.

Caution: Filling Fluid!

This instrument contains filling fluid!
Open the valves (V) only **after** the unit is mounted at the wall.
Close both valves **before** the device is removed from the wall.

Description

The Rixotact₄ is a pressure, draft and differential pressure meter for non combustible gases, mainly air.
The instrument is equipped with an integrated Three-Point-Step-Controller, and a transmitter output 0-10V.

Measuring System

The measuring system works on the Ringbalance principle and is especially designed for low ranges.

Controller

Three-Point-Step-Controller with relay output. The control settings P, D, F are adjusted manually.

Setpoints (W1, W2)

The Rixotact₄ has two setpoints, set by potentiometers W1 and W2.

Setpoint W1: terminals 3-4 are open;

Setpoint W2: terminals 3-4 are bridged.

Switch "LCD"

Upper position (standard):

The LCD shows the actual value "X"

Lower position:

The LCD indicates the active setpoint "W" (W1 or W2)



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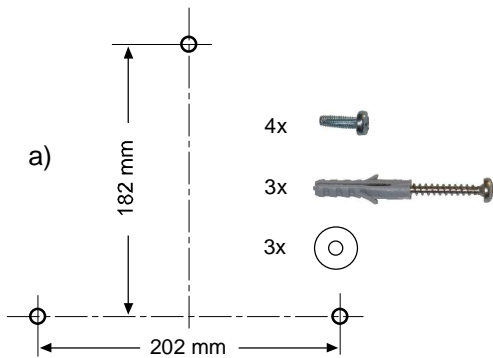
1. Mounting

There are two ways to attach the Rixotact_4 on the wall:

a) with the aid of the mounting frame

Loosen cover fastening screws "E" and remove cover. Fasten the housing on the frame using the attached screws M4x12.

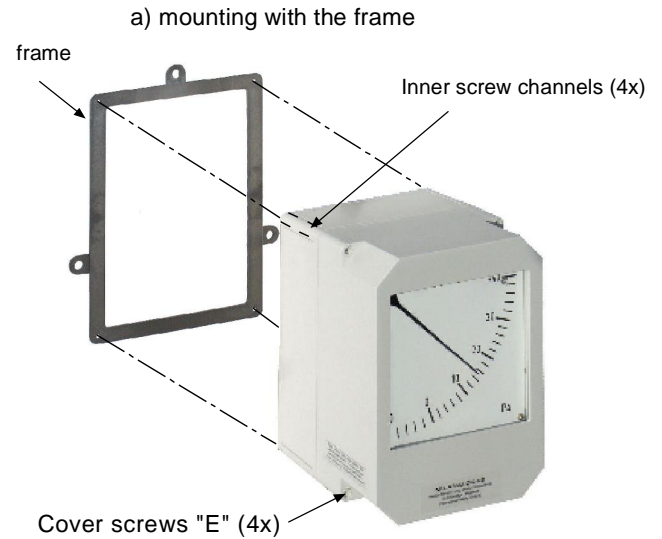
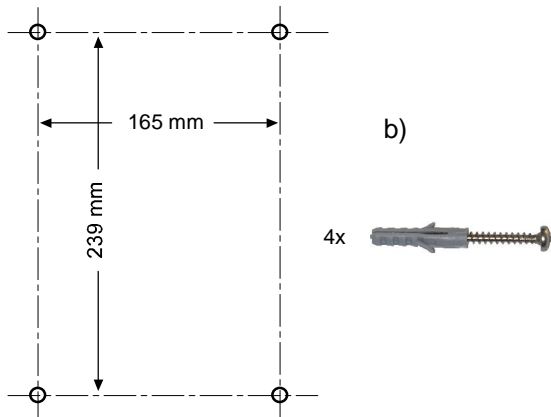
Mount the complete unit (housing with frame) exactly upright on the wall.



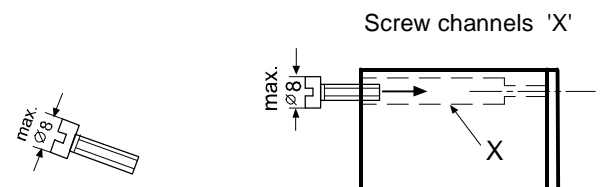
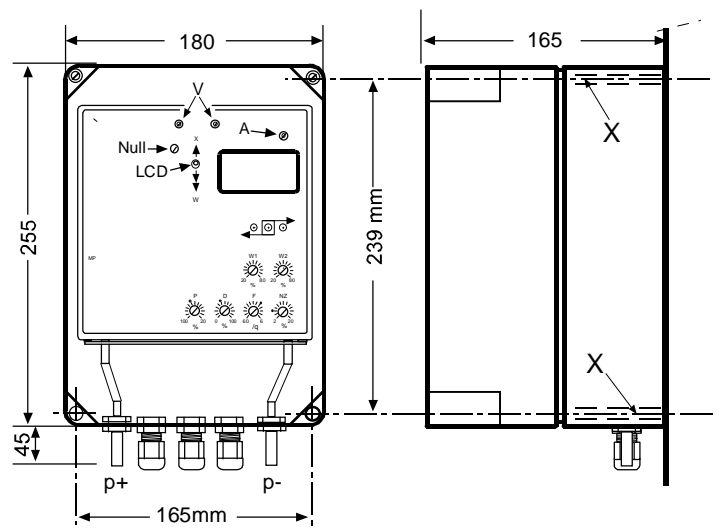
b) Wall mounting without the frame

Mount the instrument exactly upright on the wall through the mounting holes "X" ("screw channels").

Use the attached drilling plan (in the accessories bag)



Mounting without the frame



2. Open the Valves (V)

Attention! Do not open the valves before the unit is attached to the wall!
Open both valves "V" by turning both screws **fully** counter clockwise (up to stop).

3. Locking screw

Turn locking screw "A" **fully** counter clockwise. The ringbody should move now slowly to the zero position.

4. Electrical connections

Check first, if your power supply voltage is according to the specification of the Rixotact_4.
Make electrical connections according to plan:

Terminals 1 - 2

Output signal 0-10V DC; proportional to the actual value "X"; min load 2k Ohm, not short-circuit proof (fuse on socket, see page 5). Transmitter output.

Terminals 3 - 4:

External Setpoint change-over
3-4 open = Setpoint W1 active
3-4 bridged = Setpoint W2 active

Terminals 5 - 6 - 7

Control output (also read point 5 below!)
potential-free contacts, rated at 250V/2A
Actual value X > Setpoint W = 7-5 switching
Actual value X < Setpoint W = 7-6 switching

Terminals 8 - 9

Power supply
see specification of the label on the front scale

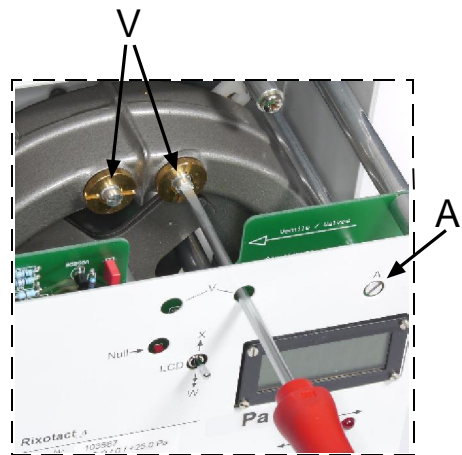
Terminal 10 - Protective earth

5. Turn on the power supply

Attention:

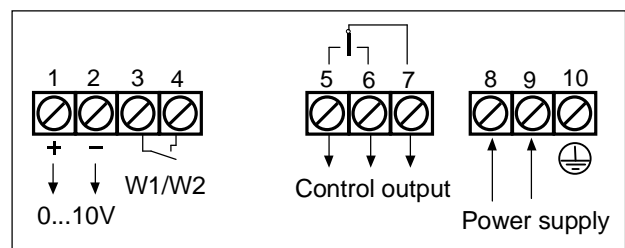
Take care that the start of the control does not impair the safety of the plant.

In doubt rather disconnect the control output (terminals 5-6-7) until the Zero adjustment and the Setpoint adjustment is done, and after all the pressure ports (p+/p-) are connected.



Valves (V); Locking device (A)

Terminal Diagram



6. Zero Correction

For zero setting, the pressure connections (p+/p-) must be free (open) to the atmosphere!
Turn potentiometer "Null" on the front scale until the LCD indicates zero.

7. Setpoint W1 (terminals 3-4: open)

Push and hold the switch "LCD" in the lower position, in which it indicates the active setpoint "W" - and adjust the first setpoint with potentiometer W1.
Make use of the special screw-driver, stuck inside the housing.

If a second setpoint is required:
Setpoint adjustment W2: (terminals 3-4 bridged)
Same procedure as setting of W1.

8. Process connections p+ / p-

Make connections only after zero adjustment!
Pressure left fitting p+
Draft right fitting p-
Differential pressure . . . higher pressure at p+ (left)
lower pressure at p- (right)

Variable pressure, like +/-25Pa or -10/0/+40Pa:
left fitting only (label "p+/p-")

9. Start the control

Connect control outputs (terminals 5-6-7) to the plant again (if disconnected before).

Switch-on the complete plant. The pressure (actual value) should now draw closer to the setpoint. However, if deviation between "X" and "W" increases instead of decreasing, you must change-over the wires of terminals 5-6 (change direction of actuator).

Control Adjustments

The potentiometers P, D, F, NZ are preset at defaults (circle as marker) which have proved for most of the applications.

P - (proportional-) Range

Within the P-band, the duty-cycle of the output relays is proportional to the deviation. Outside the P-band, the output relay is continuously activated (= 100% ON).

Example: P=20%
100% ON at +/-10% control deviation; fast control, but oscillation of pressure could occur.

Example: P=100%
100% ON at +/-50% control deviation, slow control, but low risk concerning oscillating of the system.

D - Action

The duty-cycle of the relays changes in proportion to the time rate-of-change of the deviation. Rapid increasing of deviation lengthens the output pulse, and rapid decreasing shortens it.

F - Frequency

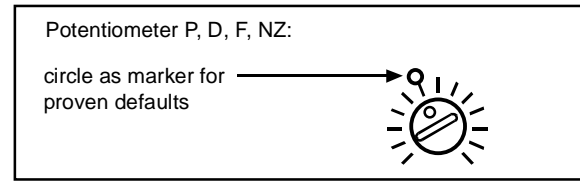
This adjustment determines the frequency (switching rate) of comparison of the actual value with the setpoint. Normal position: 6 pulses / minute (for maximum wear protection of relays).

N.Z. - Neutral Zone (Deadband)

Within the Neutral Zone, the controller does not react to deviations between actual value and setpoint.

MP - Minimum Pulse Width

Extends the duty-cycle of the relays additionally. For very slow actuators, only.



10. Optimize the control

Slow down the control

If the actual value (pressure) is oscillating around the setpoint continuously:

- increase the P-band step-by-step, until oscillations stop.
- increase the deadband N.Z.
- finally you should check, if increasing or decreasing of the D-action improves the control

Speed-Up the control

Based on the standard settings:

- decrease the P-band step-by-step
- increase the D-action gradually
- increase F-frequency a little (results more wear of the relays)

11. Dismantling / Before Transporting

Attention!

The Ringbalance instrument contains filling fluid. Before dismantling or transporting:

- switch off the power supply
- remove the cover
- disconnect terminal connections
- close both valves (V)**, turn clockwise fully up to stop
- lock down the ringbody (measuring system): turn the ringbody by hand in the middle position and turn **locking screw (A)** clockwise fully up to stop.
- remove the instrument from the wall and close the cover.

12. Maintenance

The Ringbalance measuring system is virtually maintenance-free, when the pressure overload limits are not exceeded. See "The Measuring Principle"
The service life of the relays is mainly depending on a careful spark suppression (RC-element) at the connected actuator or contactor.

13. Technical Data

Housing

for wall mounting, glass-reinforced polycarbonate, protection class IP65; front pane: hardened glass
Dimensions: 255 x 180 x 165 mm

Weight: 3,2 kg

Measuring system

Ringbalance, factory filled ringbody

Measuring pick-up

"Hall" - Sensor

Accuracy

max. error +/-1,5% of span, or +/-1,5 Pa

Display

LCD, 3 1/2-digit, 12,5 mm high

Switch "LCD"

Upper position: indication of the actual value "X"

Lower position: indication of the setpoint "W"

Process connections (p+/p-)

2 tube fittings, outside diameter 8 mm

Electrical connections

screw terminals max. 2,5mm² (AWG 30...12)

Cable fittings

3 x PG9 with strain relief

cable outside diameter max. 3,5...8,0 mm

Transmitter output 0-10V (terminals 1+ / 2-)

Minimum load 2k Ohm; not short-circuit proof, fuse 50mA, and spare fuse in sockets (see picture below)

Setpoint switchover (terminals 3-4)

load of external contact: 24V/12mA

Control output (terminals 5-6-7)

2 potential-free contacts, rated at 250V/2A

Power supply (terminals 8-9)

the specific value is noted on the front label.

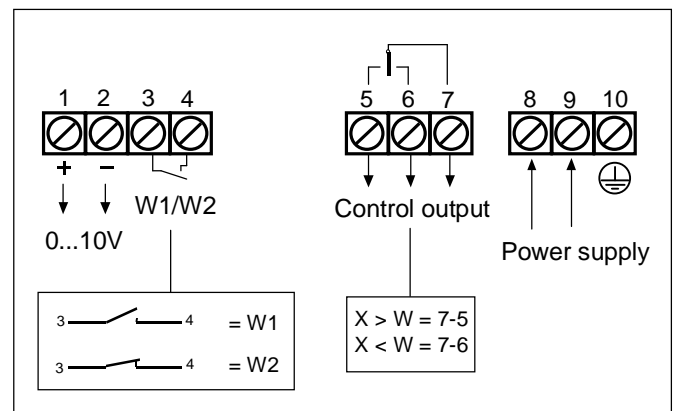
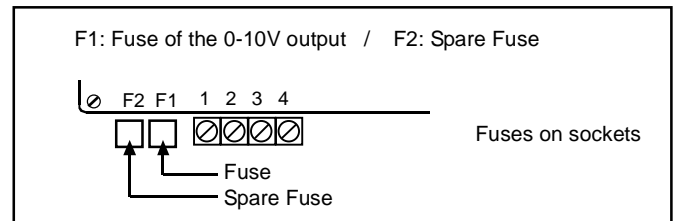
Consumption: 3,5VA, no internal fuse for power supply.

Ambient temperatures

0 ... +50C°

EMV / CE

Electromagnetic compatibility according to EN50081-2 (emission) and EN50082-2 (immunity).



14. Functional Check

. . . of the Ringbalance measuring system.
If, through any circumstances, a part of the filling fluid spills out, the following functional checks are recommended:

1: Quantity check

Carefully(!) pressurize the instrument (beware of excessive pressure) and watch the LCD at the same time. If the maximum of the measuring range can be reached, no filling fluid should be added. The range is recorded on the front label.
Stop pressurizing when the maximum range is reached!

However, if the applied pressure comes out of the other pressure connection, and results in "bubbling-through" before the maximum range is reached, oil of the same type must be added.

2: Zero Check

Pull off the tube(s) from the process connection(s) p+ and p- that both fittings are open to the atmosphere. Now correct the zero setting, according to point 6 on page 3.

The Ringbalance is most likely to be functioning correctly when:

1. **the maximum value can be reached**
2. **when the instrument can be exactly "zeroed"**

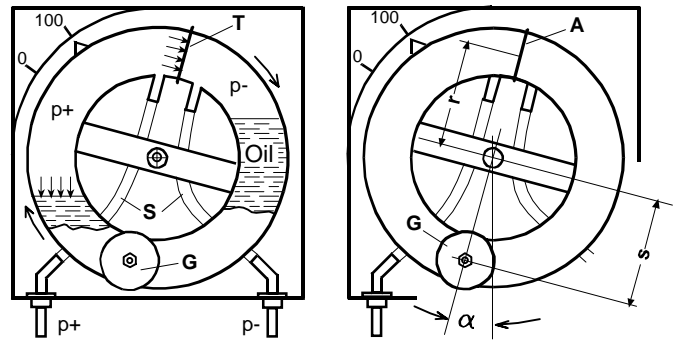


Fig. 1

Fig. 2

15. The Ringbalance Measuring Principle

Fig. 1:

A hollow ring, free to rotate on bearings, and half filled with fluid, is divided by partition wall (T) into two chambers. Positive, negative or differential pressure are applied to the ringbody chambers via flexible tubes (S). The pressure differential across the dividing wall (T) causes the ringbody to rotate until an equilibrium is reached with counterweight (G).

Fig. 2:

The Ringbalance Equation:
 delta-p Differential pressure [Pa]
 s counterweight moment arm [m]
 r average ringbody radius [m]
 A area of partition wall [m²]
 G counterweight [N]

$$\Delta p = \frac{G \times s}{A \times r} \sin \alpha$$

Since the differential pressure is ultimately balanced by the counterweight (G), it follows that neither the quantity nor the density of the filling fluid play a role in the actual measurement or in the Ringbalance equation.

16. Overload Protection

Every Ringbalance is inherently protected to at least +/-900 Pa (3.5"W.C.) even it has, for example, a measuring range of only 40 Pa (0.15"W.C.).

With the synthetic oil as filling fluid, the Ringbalance is inherently protected to +/-2.1 kPa (8"W.C.).

If those limits (900 Pa respectively 2.1 kPa) are expected to be exceeded in the specific application, the overload protection device "DZ" is available as an option on all Ringbalances.