



WILDEBOER®



OR4 basic | OR4 pro

Smoke detector according to DIN EN 54-27 with VdS recognition and DIBt approval Z-78.6-250

USER MANUAL

5.14

WILDEBOER BAUTEILE GMBH

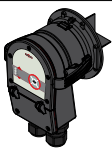



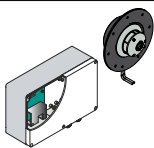





Issue: 2021-12

Table of contents

1	Application	3
2	Product overview	4
2.1	OR4 basic/OR4 pro	5
2.2	Function	6
3	Installation	6
3.1	Installation details	6
3.2	Installation in circular ventilation ducts	7
3.3	Installation in rectangular ventilation ducts	8
3.4	Dimensions	9
4	Order data	9
4.1	Options	10
4.2	Spare parts	10
4.3	Specification text	11
4.3.1	OR4 basic	11
4.3.2	OR4 pro	11
5	Annex	12
5.1	Connection overview	12
5.2	Technical data	13

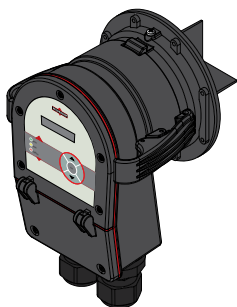
Product range:

Areas of application for smoke detectors

	Smoke detector As per DIN EN 54-27 with VdS approval		Smoke detectors As per DIN EN 54-27 with VdS and DIBt (German Institute for Construction Engineering) approval		
	RL4 basic	RL4 pro	OR4 basic	OR4 pro	OR32
					
Area of application					
<ul style="list-style-type: none"> For detection of smoke in ventilation ducts For activation of fans 	X	X	X	X	X
<ul style="list-style-type: none"> For activation and release of fire dampers and smoke protection dampers for ventilation ducts 			X	X	X
<ul style="list-style-type: none"> For activation and release of fire dampers and smoke protection dampers for air transfer applications 					X
<ul style="list-style-type: none"> For use in particularly cramped installation scenarios 					X
You will find further information on our product website. Use the QR code to open the link.					

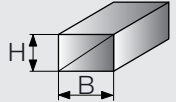
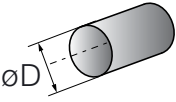
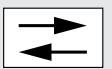
1 Application

OR4 smoke detector



- For detection of smoke in round and rectangular ventilation ducts
- For activation and tripping of fire dampers and smoke protection dampers
- For activation of fans
- For transmission of signals to fire detection systems or the building management system
- VdS approval (G221008)
- DIBt approval (Z-78.6-205)



Installation options	
	Ventilation ducts, rectangular (B x H): $\geq 100 \times 100$ mm Distance from disruption points: 1.5 x hydraulic \varnothing , upstream and downstream
	Ventilation ducts, circular (\varnothing): \geq DN100 Distance from disruption points: 1.5 x hydraulic \varnothing , upstream and downstream
	Installation not dependent on position or direction of air flow

Product features
<ul style="list-style-type: none"> ▪ Quick release fastener for quick accessibility and functional test without use of tools ▪ Integrated flow monitoring ▪ Enclosed casing for electronics ▪ Replaceable protective screen for protection from soiling ▪ RM4 smoke switch with automatic tracking of the response threshold for longer service life ▪ LEDs + LCD display screen for visualisation of operating statuses, soiling and setting operating parameters. ▪ TEST locally or using the GLT interface ▪ Cable glands with strain relief for up to 7 connection lines ▪ Spring terminals for maintenance-free connection of all lines ▪ Galvanically isolated inputs and outputs ▪ Galvanically isolated RS485 interface with BACnet MS/TP and Modbus RTU ▪ Alarms and faults saved in case of power failure

Area of application	
Voltage supply	230 V AC or 24 V AC/DC*
Min./max. flow velocity	1 ... 20 m/s
Min./max. temperature for operation, transportation, storage, environment	-20 ... +60 °C
Max. relative humidity	95 %, non-condensing

* Any CE certified power supply unit (SELV) can be used for the 24 V AC/DC voltage supply.

Interfaces/protocols	
Alarm relay	2 x changeover contact
Inputs	2 x galvanically isolated <ul style="list-style-type: none"> ▪ Test/reset ▪ Activate flow sensor
Outputs	6 x galvanically isolated <ul style="list-style-type: none"> ▪ Warning ▪ Alarm/fault ▪ Flow present ▪ Ready for operation ▪ 70 ... 99 % level of soiling ▪ 100 % level of soiling
RS485	Galvanically isolated with BACnet MS/TP and Modbus RTU

Approvals/certificates
VdS approval (G221008)

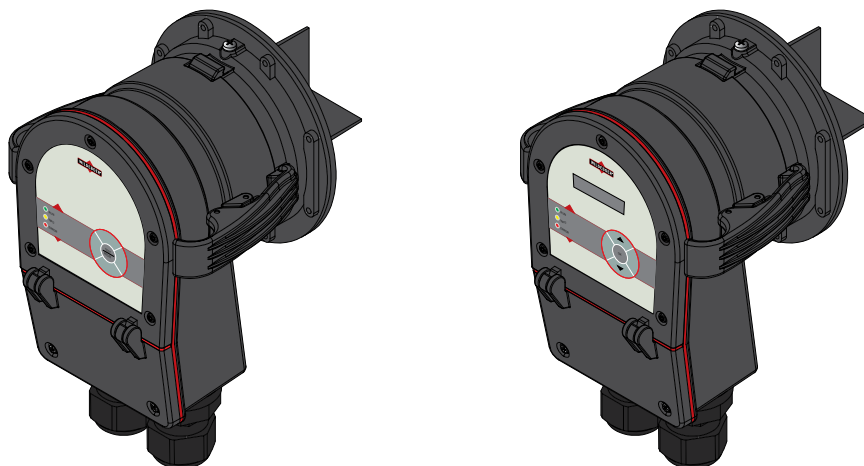


- An overview of equipment variants **OR4 basic** and **OR4 pro** can be found on Page 5.
- Refer to the installation and operating instructions for detailed information on mechanical and electrical installation.

2 Product overview

Illustration	No. Description																		
	<table border="1"> <tr> <td data-bbox="635 360 1074 837"> <p>1 Casing with analysis and control electronics</p> <p><i>OR4 basic:</i> LEDs for visualisation of operating statuses and soiling as a percentage.</p> <p>TEST/RESET button</p> <p>Galvanically isolated outputs</p> </td> <td data-bbox="1074 360 1441 837"> <p><i>OR4 pro:</i> LEDs + LCD display screen for visualisation of operating statuses, soiling as a percentage, and setting operating parameters.</p> <p>3 buttons for operation on the device</p> <p>Galvanically isolated inputs and outputs and RS485 interface</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 837 1441 947"> <p>2 RM4 smoke switch For detection of smoke in ventilation ducts with automatic alarm threshold tracking for extended service life.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 947 1441 1120"> <p>3 Flow insert</p> <p><i>OR4 basic:</i> For optimum flow-through of the smoke switch.</p> <p><i>OR4 pro:</i> For optimum flow-through of the smoke switch with integrated flow sensor.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1120 1441 1189"> <p>4 Protective screen For protection of the smoke switch from coarse soiling.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1189 1441 1397"> <p>5 Protective film For protection of the smoke switch and the protective screen from soiling during the construction stage.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1397 1441 1597"> <p>6 R/K installation socket For more straightforward installation of the smoke detection and tripping device in circular and rectangular ventilation ducts. A saddle pipe [9] is required for installation in circular ventilation ducts.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1597 1441 1688"> <p>7 Drilling template For marking the required sections and drilled holes on required ventilation ducts.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1688 1441 1839"> <p>8 Optional: Sealing cover for installation socket For sealing the installation socket when the smoke detector has not yet been installed during the construction stage.</p> </td> </tr> <tr> <td colspan="2" data-bbox="635 1839 1441 1968"> <p>9 Optional: Saddle pipe For installation of the smoke detector in circular ventilation ducts.</p> </td> </tr> </table>	<p>1 Casing with analysis and control electronics</p> <p><i>OR4 basic:</i> LEDs for visualisation of operating statuses and soiling as a percentage.</p> <p>TEST/RESET button</p> <p>Galvanically isolated outputs</p>	<p><i>OR4 pro:</i> LEDs + LCD display screen for visualisation of operating statuses, soiling as a percentage, and setting operating parameters.</p> <p>3 buttons for operation on the device</p> <p>Galvanically isolated inputs and outputs and RS485 interface</p>	<p>2 RM4 smoke switch For detection of smoke in ventilation ducts with automatic alarm threshold tracking for extended service life.</p>		<p>3 Flow insert</p> <p><i>OR4 basic:</i> For optimum flow-through of the smoke switch.</p> <p><i>OR4 pro:</i> For optimum flow-through of the smoke switch with integrated flow sensor.</p>		<p>4 Protective screen For protection of the smoke switch from coarse soiling.</p>		<p>5 Protective film For protection of the smoke switch and the protective screen from soiling during the construction stage.</p>		<p>6 R/K installation socket For more straightforward installation of the smoke detection and tripping device in circular and rectangular ventilation ducts. A saddle pipe [9] is required for installation in circular ventilation ducts.</p>		<p>7 Drilling template For marking the required sections and drilled holes on required ventilation ducts.</p>		<p>8 Optional: Sealing cover for installation socket For sealing the installation socket when the smoke detector has not yet been installed during the construction stage.</p>		<p>9 Optional: Saddle pipe For installation of the smoke detector in circular ventilation ducts.</p>	
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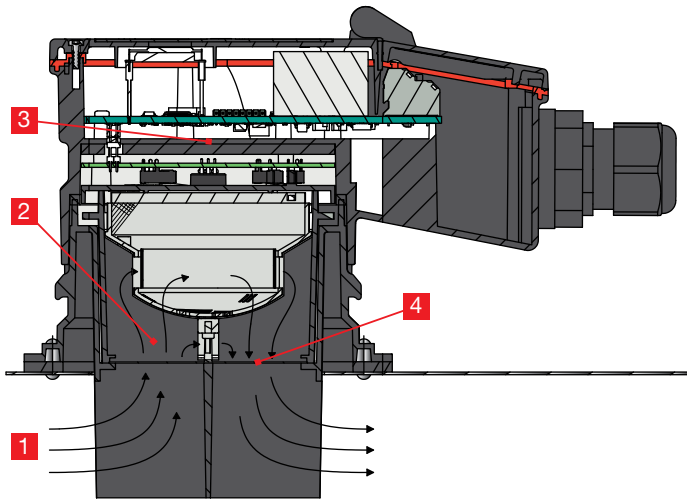
2.1 OR4 basic/OR4 pro



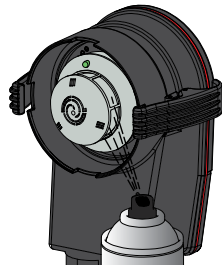
General information	OR4 basic	OR4 pro
Display screen	-	LCD display screen, 2 lines, backlit
Operation	1 x Reset/Test button	3 buttons for operation on the device
Flow monitoring	-	Yes
Signalling	Optical	Optical and acoustic
GLT interface RS485	OR4 basic	OR4 pro
Communication interface	-	RS485
Communication protocol	-	BACnet MS/TP, Modbus RTU
Galvanically isolated	-	Yes
GLT interface inputs	OR4 basic	OR4 pro
Quantity	1 x semiconductor input for external normally open contact ⇒ for Reset/Test	2 x semiconductor input for external normally open contact ⇒ for Reset/Test ⇒ for flow sensor On/Off
Specification	24 V DC (SELV), 11 mA	EN 61131-2, type 1
Signal voltage 0	-	0 ... 5 V DC (SELV)
Signal voltage 1	-	15 ... 30 V DC (SELV)
Galvanically isolated	-	Yes (potential group)
GLT interface outputs	OR4 basic	OR4 pro
Quantity	1 x changeover contact (relay) ⇒ Soiling display at ≥ 70 %	6 x semiconductor outputs ⇒ Warning ⇒ Alarm/fault ⇒ Flow present ⇒ Ready for operation ⇒ Soiling 70 - 99 % ⇒ Soiling 100 %
Specification	-	EN 61131-2
Nominal load	-	24 V DC (SELV), max. 600 mA per output
Contact load	30 V AC/DC (SELV), 2 A	-
Galvanically isolated	Yes	Yes (potential group)
Alarm interface	OR4 basic	OR4 pro
Quantity	2 x changeover contact (relay)	
Contact load	24 V AC/DC (SELV), 250 V AC, min. 11 mA, max. 8 A	
Max. bounce time, closing/opening	4 ms / 10 ms	

i For further technical data see ⇒ [Page 13](#).

2.2 Function



Part of the air which flows in the ventilation duct [1] is diverted into the flow chamber [2]. The separation plane [3] and the protective screen [4] protect the electronics from soiling in the process. The electronics monitor the air flow for soiling and particles. Messages can be transmitted to a fire detection system or the building management system so that, in case of smoke detection, the necessary control scenarios can be triggered in good time in order to prevent smoke from transferring to other fire compartments.

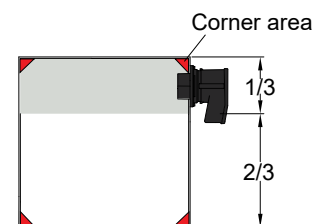
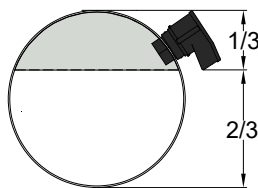
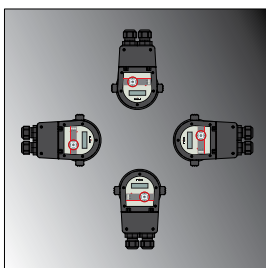


The analysis and control unit can be removed and sprayed with a test aerosol for a functional test.

3 Installation

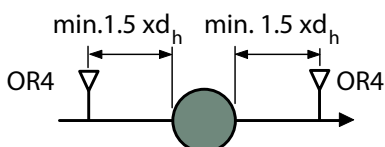
3.1 Installation details

The OR4 can be installed with any alignment in ventilation ducts regardless of the direction of air flow (horizontally, vertically or at an angle). The continual through-flow and thus effective smoke detection must be guaranteed in the process. The corner area on rectangular ventilation ducts must not be used for installation.

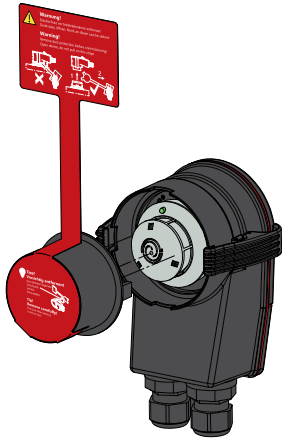


In small and medium-sized duct cross sections, installation at the top, side or bottom is possible. In large, horizontal cross sections, installation in the upper third of the ventilation duct is recommendable in the interest of early smoke detection. Installation must be performed at a sufficient distance from connection points, such as plug connections or flanges.

The gap upstream and downstream of disruption points (of all kinds) must be at least $1.5 \times d_h$ (hydraulic diameter).



Disruption point



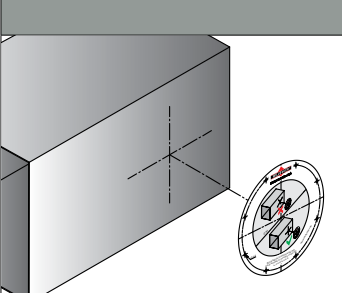
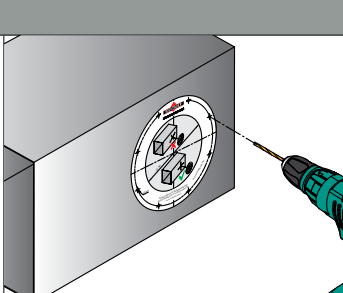
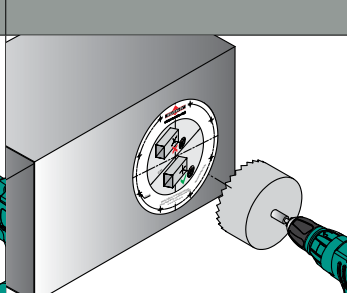
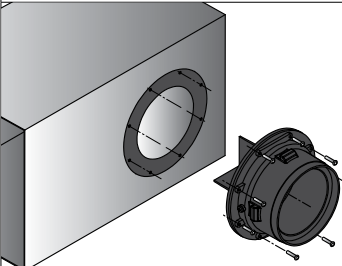
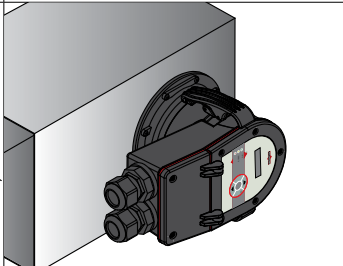
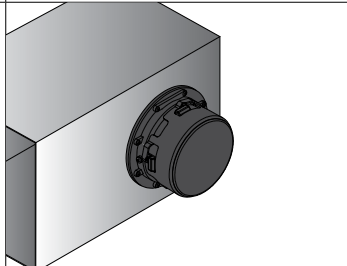
A protective film is fitted in the factory in order to protect the smoke switch and the protective screen from soiling during the construction stage. It must be removed before commissioning.

3.2 Installation in circular ventilation ducts

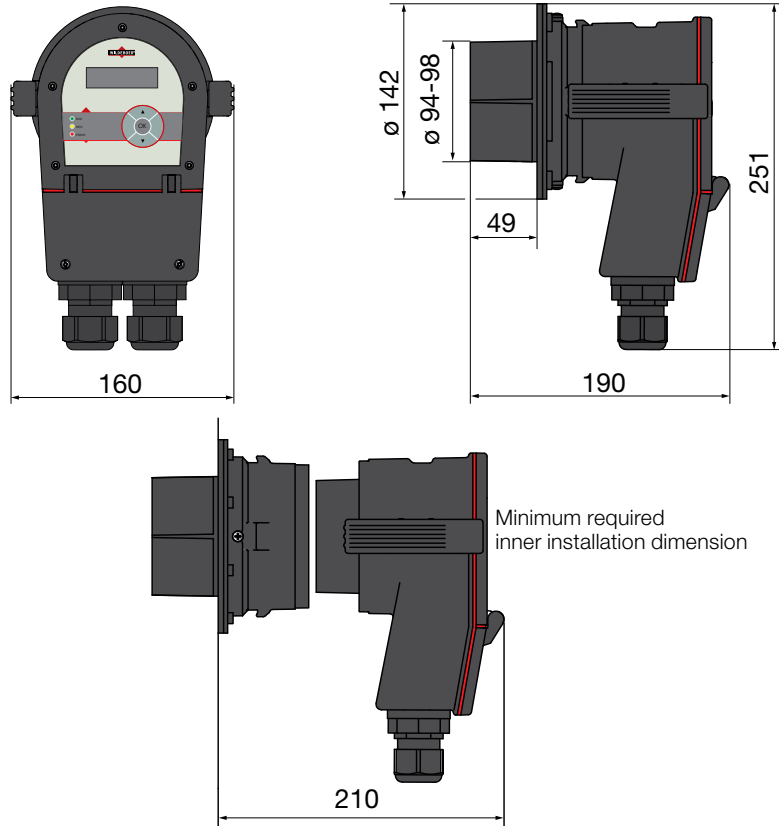
Installation in circular ventilation ducts is shown with the optional saddle pipe.

<p>Create the installation opening for the installation socket (Ø 94 ... 98 mm).</p>	<p>Connect the connection socket to the saddle pipe, aligning the installation socket to the direction of the air in the process.</p>	<p>Prick the saddle pipe slightly with the retaining screw, and pre-drill it without the installation socket (Ø 3 mm). Then, fit the installation socket again and secure it with screws.</p>	<p>Apply sealant (provided by the user) to the saddle socket so that it is airtight.</p>
<p>Insert the saddle pipe into the installation opening with the installation socket.</p>	<p>Drill (Ø 3.3 mm) and rivet the fastening holes for the saddle socket.</p>	<p>Fasten the casing to the installation socket with the analysis and control unit.</p>	<p>Optional: A sealing cover can be used to seal the installation socket when the smoke detector has not yet been installed during the construction stage.</p>

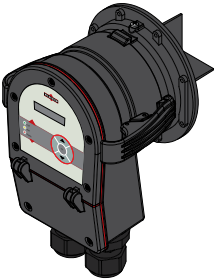
3.3 Installation in rectangular ventilation ducts

		
<p>Measure the centre point of the installation opening and stick on the drilling template.</p>	<p>Drill the fastening holes for installation of the installation socket (3.3 mm).</p>	<p>Create the installation opening for the installation socket (Ø 94 ... 98 mm).</p>
		
<p>Insert the installation socket into the installation opening and fasten it with pop rivets. In the process, align the installation socket to the direction of air.</p>	<p>Fasten the casing to the installation socket with the analysis and control unit.</p>	<p>Optional: A sealing cover can be used to seal the installation socket when the smoke detector has not yet been installed during the construction stage.</p>

3.4 Dimensions



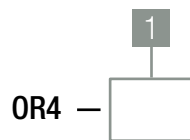
4 Order data



- For activation of fire dampers and smoke protection dampers for ventilation ducts
- For monitoring ventilation duct in conjunction with a fire detection system or the building management system
- For activation of fans
- Alarms and faults saved in case of power failure
- DIBt approval Z-78.6-250
- VdS approval G 221008

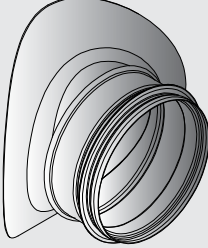



To product website

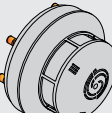
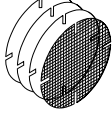
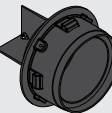

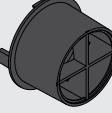


1	Equipment variant
	<i>Optional:</i>
basic	OR4 basic variant
pro	OR4 pro variant

4.1 Options

Illustration	Description	Nominal diameter	Order data
	Pack: Saddle pipe	DN 100	ORSTU10
		DN 125	ORSTU12
		DN 140	ORSTU14
		DN 150	ORSTU15
		DN 160	ORSTU16
		DN 180	ORSTU18
		DN 200	ORSTU20
		DN 224	ORSTU22
		DN 250	ORSTU25
		DN 280	ORSTU28
		DN 315	ORSTU31
		DN 355	ORSTU35
		DN 400	ORSTU40
		DN 450	ORSTU45
		DN 500	ORSTU50
		DN 560	ORSTU56
DN 630	ORSTU63		
DN 710	ORSTU71		
DN 800	ORSTU80		
	4 x sealing cover for installation socket	-	ZUB 0475

4.2 Spare parts

Illustration	Description	Order data
	1 x RM4 smoke switch	ZUB 0471
	20 x protective screen	ZUB 0470
	2 x R/K installation socket	ZUB 0472
	1 x flow insert with flow sensor (OR4 pro)	ZUB 0474
	1 x flow insert without flow sensor (OR4 basic)	ZUB 0473

4.3 Specification text

4.3.1 OR4 basic

Smoke detector with general type approval for activation and tripping of fire dampers and smoke protection dampers. Smoke detector for detection of smoke in ventilation ducts, for activation of fans and for transmitting signals to fire alarm systems or the building management system. Casing with flow insert and protective screen. Smoke switch and analysis electronics with floating relay outputs. Additional input without galvanic isolation. Smoke switch with automatic tracking of the response threshold in order to achieve a long service life. Removable without using tools for straightforward inspection and cleaning. Button for function test and for resetting after smoke detection. LEDs for visualisation of operating statuses and the soiling of the smoke switch as a percentage in multiple stages. Alarms and faults saved in case of power failure.

Suitable for installation at a short distance from disruption points (1.5 x hydraulic diameter). Installation not dependent on position or direction of air flow in rectangular ventilation ducts with an edge length of 100 mm or more and in ventilation pipes with a diameter of 100 mm or more.

..... pcs.	Supply voltage:	230 V AC / 24 V AC/DC
	Manufacturer:	WILDEBOER
	Type/series:	OR4 basic
	VdS approval:	G221008

4.3.2 OR4 pro

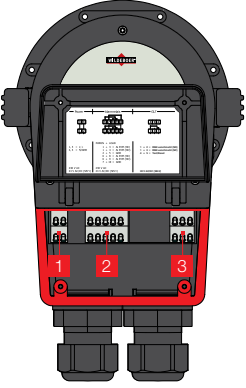
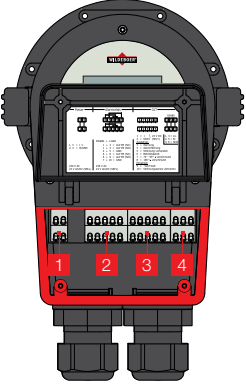
Smoke detector with general type approval for activation and tripping of fire dampers and smoke protection dampers. Smoke detector for detection of smoke in ventilation ducts, for activation of fans and for transmitting signals to fire alarm systems or the building management system. Casing with flow insert, protective screen and integrated flow sensor for flow monitoring. Smoke switch and analysis electronics with galvanically isolated and floating inputs and outputs. Smoke switch with automatic tracking of the response threshold in order to achieve a long service life. Removable without using tools for straightforward inspection and cleaning. Button for function test and for resetting after smoke detection. LEDs for visualisation of operating statuses and the soiling of the smoke switch as a percentage in multiple stages. LCD display screen for diagnostics, display and setting of all operating parameters. With galvanically isolated RS485 interface (protocols: BACnet, Modbus) for connection to GLT.

Suitable for installation at a short distance from disruption points (1.5 x hydraulic diameter). Installation not dependent on position or direction of air flow in rectangular ventilation ducts with an edge length of 100 mm or more and in ventilation pipes with a diameter of 100 mm or more.

..... pcs.	Supply voltage:	230 V AC / 24 V AC/DC
	Manufacturer:	WILDEBOER
	Type/series:	OR4 pro
	VdS approval:	G221008

5 Annex

5.1 Connection overview

Terminal diagram	No.	Connection description																																	
 <p>OR4 basic</p>	1	Mains connection																																	
		<table border="1"> <thead> <tr> <th rowspan="2">Connection</th> <th colspan="2">Signal</th> </tr> <tr> <th>OR4 basic</th> <th>OR4 pro</th> </tr> </thead> <tbody> <tr> <td>1, 3</td> <td colspan="2">L / +</td> </tr> <tr> <td>2, 4</td> <td colspan="2">N / GND</td> </tr> </tbody> </table>	Connection	Signal		OR4 basic	OR4 pro	1, 3	L / +		2, 4	N / GND																							
Connection	Signal																																		
	OR4 basic	OR4 pro																																	
1, 3	L / +																																		
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5.2 Technical data

Casing		
Dimensions (L x B x H)	Approx. 251 x 160 x 190 mm	
Weight	Approx. 975 g	
Material	ABS plastic	
Connection cover tightening torque	0.3 Nm	
Cable gland tightening torque	10 Nm	
Retaining screws tightening torque, R/K on flanged collar	0.5 Nm	
Ambient conditions	Operation/transportation/storage	in the air duct
Temperature	-20 ... +60 °C	-20 ... +60 °C
Relative humidity	95 %, non-condensing	≤ +34 °C ⇒ 95 % > +34 °C ⇒ max. 35 g/m ³
Permissible flow range	-	1 ... 20 m/s
Safety		
Protection class	Class II	
Protection rating	IP 54	
Mains connection	OR4 basic	OR4 pro
Voltage supply	24 V AC/DC ± 10 % / 230 V AC/DC ± 15 %	
Nominal flow	24 V AC/DC	135 mA / 100 mA
	230 V AC	30 mA
Power consumption	24 V AC/DC	P = 2.5 W / 2.4 W, S = 3.2 VA / 2.4 VA
	230 V AC	P = 3 W, S = 7.0 VA
		210 mA / 155 mA 40 mA P = 4.0 W / 3.7 W, S = 5.1 VA / 3.7 VA P = 4.2 W, S = 8.9 VA
Alarm interface ³	OR4 basic	OR4 pro
Quantity	2 x changeover contact (relay)	
Contact load	24 V AC/DC (SELV), 250 V AC, min. 11 mA, max. 8 A	
Max. bounce time, closing/opening	4 ms / 10 ms	
GLT interface - inputs	OR4 basic	OR4 pro
Quantity	1 x input for external normally open contact	2 x semiconductor input
Specification	Semiconductor, 24 V DC (SELV), 11 mA	EN61131-2, type 1
Galvanic isolation	-	Potential group, isolated from the analysis electronics
Signal voltage 0	-	0 ... 5 V DC (SELV)
Signal voltage 1	-	15 ... 30 V DC (SELV)
GLT interface - outputs	OR4 basic	OR4 pro
Quantity	1 x changeover contact (relay)	6 x semiconductor outputs
Specification	-	EN61131-2
Galvanic isolation	Yes	Potential group, isolated from the analysis electronics
Nominal load	-	24 V DC (SELV), max. 600 mA per output
Contact load	30 V AC/DC (SELV), 2A	-
Certification	CE marking	
DIN EN 54-27:2015-05	Directive 2014/30/EU (EMC Directive)	
VdS 2344:2014-07	Directive 2014/35/EU (Voltage Limits Directive)	
Principles of design and testing 1967-12 par. 4.5.1, 4.5.2	Directive 2014/65/EU (RoHS 2)	
Spring terminals ¹		
Permitted conductor cross section	0.5 ... 1.5 mm ² (single-wire and extra-fine wired conductors without wire end ferrule) 0.5 ... 1.0 mm ² (extra-fine wired conductors with wire end ferrule)	
Stripping length	9 ... 10 mm	
Wire end ferrules (WEF) ²	Not required	
Slotted screwdriver	2.5 mm blade width	
Current rating	10 A per contact	

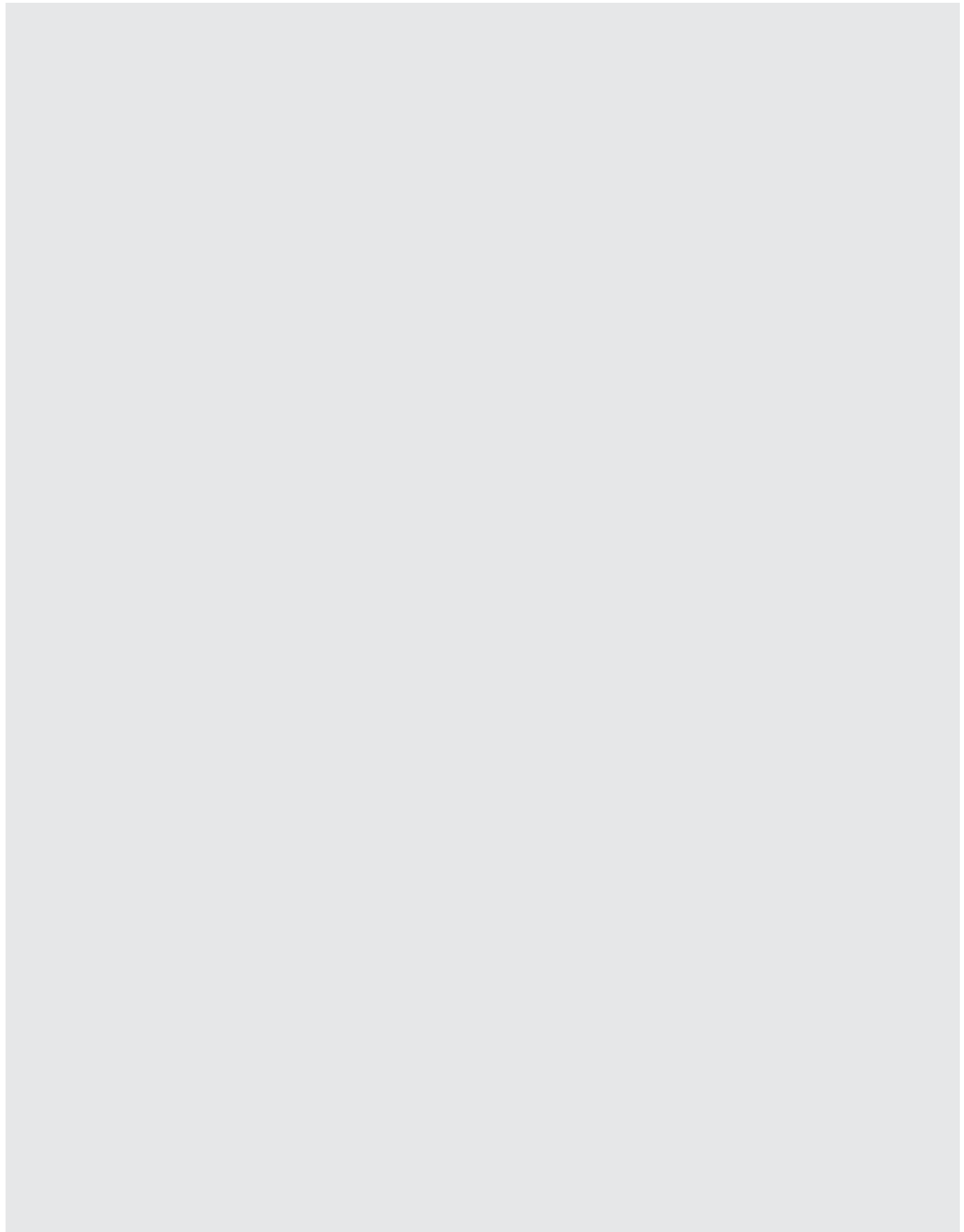
¹ With lever activation for connection of extra-fine wired conductors and disconnection of conductors.

² Flexible conductors can be used with wire end ferrules (WEF) as per DIN 46228 part 1 or part 4.

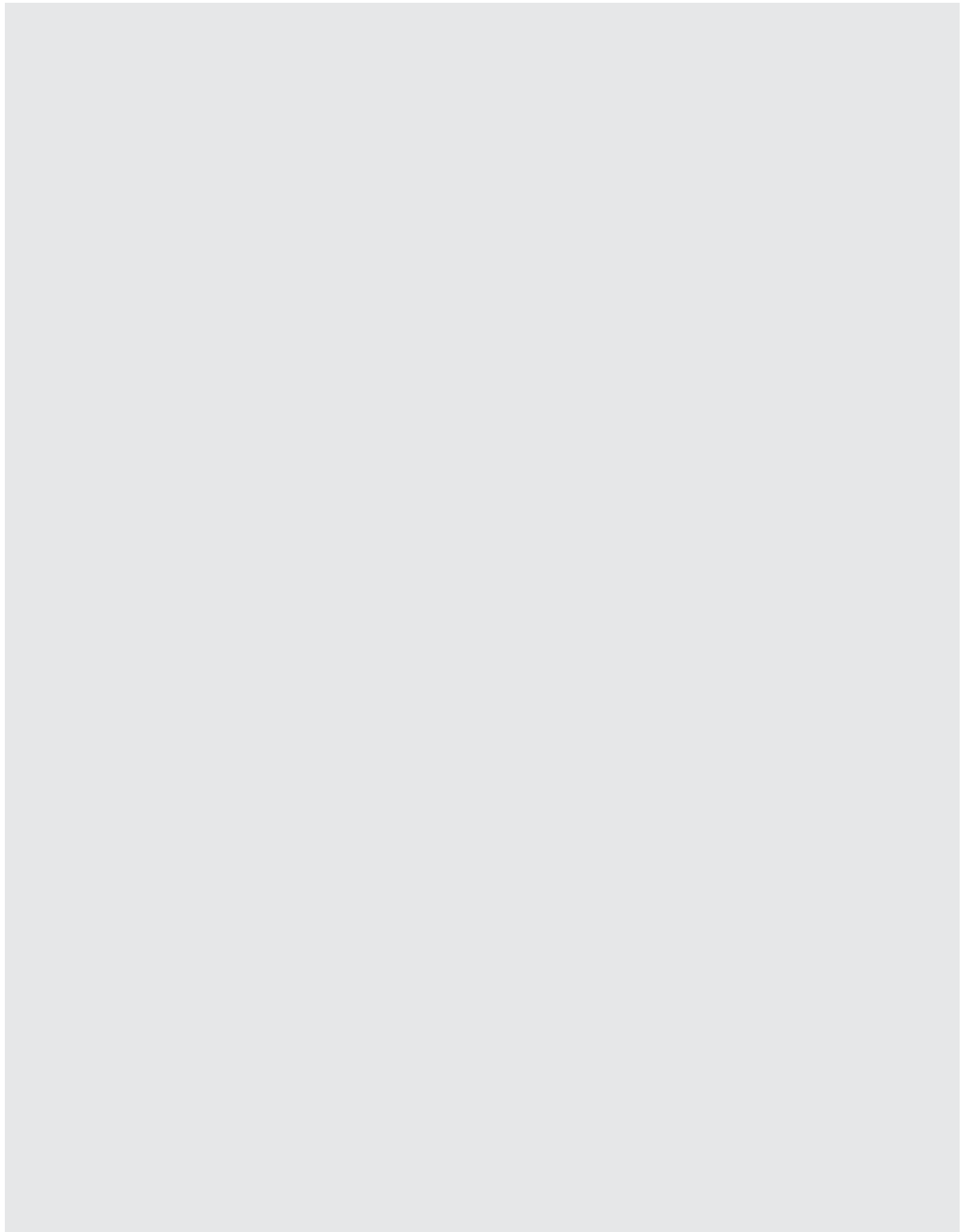
³ Take into account derating. See installation and operating instructions.

 The technical data applies at input voltage nominal values and +24 °C ambient temperature.

Notes



Notes



WILDEBOER®

Factory administration

Telephone: +49 4951 - 950 - 0
E-mail: info@wildeboer.de
Internet: www.wildeboer.de

WILDEBOER®

Utrecht office

Telephone: +31 30 767 0150
E-mail: info@utrecht.wildeboer.eu
Internet: www.wildeboer.de/nl

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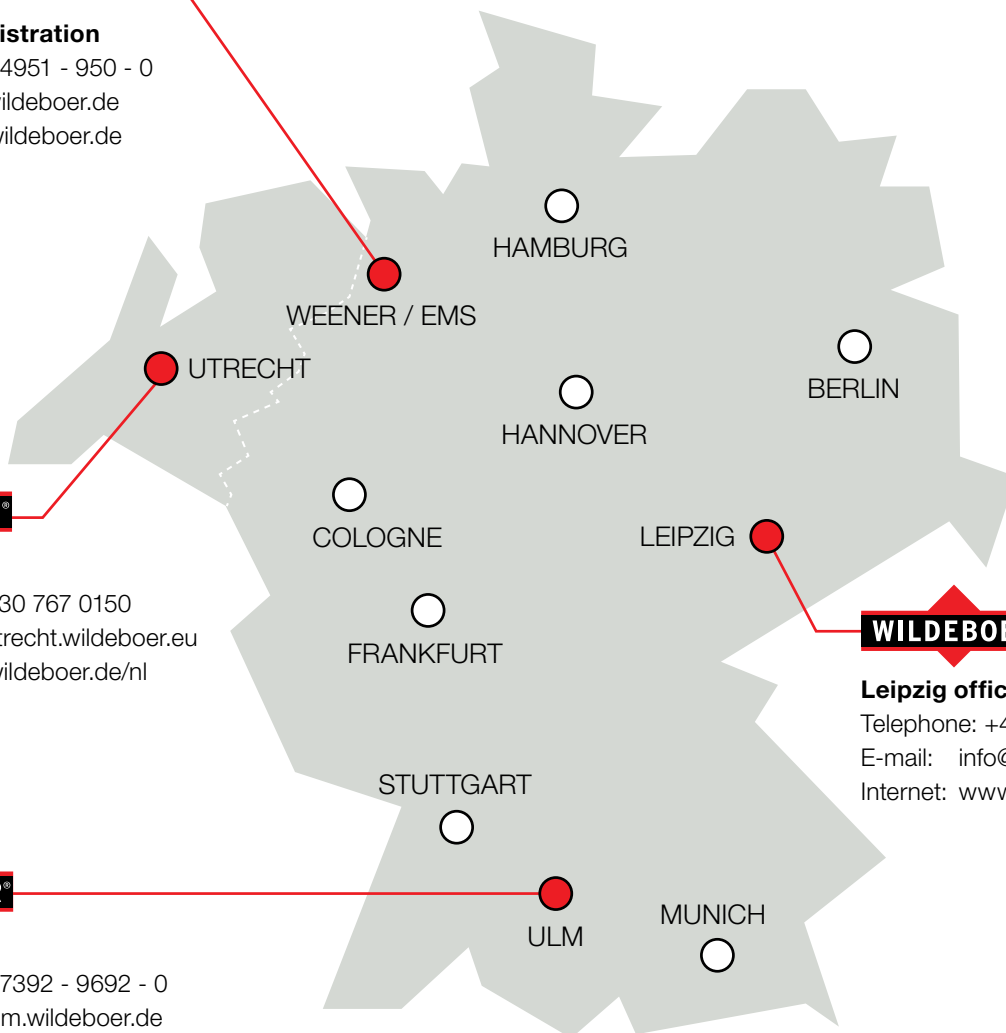
Ulm office

Telephone: +49 7392 - 9692 - 0
E-mail: info@ulm.wildeboer.de
Internet: www.wildeboer.de

WILDEBOER®

Leipzig office

Telephone: +49 34444 - 310 - 0
E-mail: info@leipzig.wildeboer.de
Internet: www.wildeboer.de



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