

Unical 9000

Electro-pneumatic controller for fully automated pH measurement, cleaning and calibration



Polished stainless steel for food and pharmaceutical applications



Powder-coated steel for corrosive environments

In combination with the Protos process analysis system and the SensoGate or Ceramat retractable holders, Unical offers the ideal functionality of a complete system for automatic process control of a pH measurement. It allows highly accurate measurements to be taken, even with difficult process conditions such as high pressure, high temperatures, and high levels of impurities. The system can be installed next to the process, within hazardous areas.

Cleaning without interrupting the process

Since the sensor is not removed for cleaning, the process can continue uninterrupted. This allows problem-free measurements in a pressurized tank or pipe. Elaborate and lockable bypasses are eliminated and accuracy increases.

Low maintenance

Fully automatic sensor calibration in user-defined intervals without interrupting the process. Two buffer solutions are automatically pumped into the calibration chamber. Only the buffer bottles need to be refilled.

Cost-efficient

Low-wear and low-maintenance pump with extremely low consumption of buffer.

Long sensor life — also in critical processes

When measuring in aggressive media or at high process temperatures, the sensor rests in the calibration chamber and is only briefly moved into the process for measurement. This method significantly increases the sensor life.

Safe and easy measurement, even in highly polluted media

Sensor cleaning and rinsing are performed at user-defined intervals. Cleaning solution and water are automatically pumped into the calibration chamber. Sensor removal and manual cleaning are not required.

Distinction between calibration and adjustment

This allows you to check the sensor data in the running process. An adjustment is only carried out when preset deviations of the calibration values are exceeded.

Fieldbus integration

The interface to PROFIBUS PA or FOUNDATION Fieldbus allow the Unical system to be integrated directly into a fieldbus network, even in hazardous locations.

Universal adaptation to retractable fittings

The modular structure of the Unical allows any retractable fitting to be used. Optimum functionality is achieved with the Ceramat and SensoGate retractable holders.

Clean and safe construction

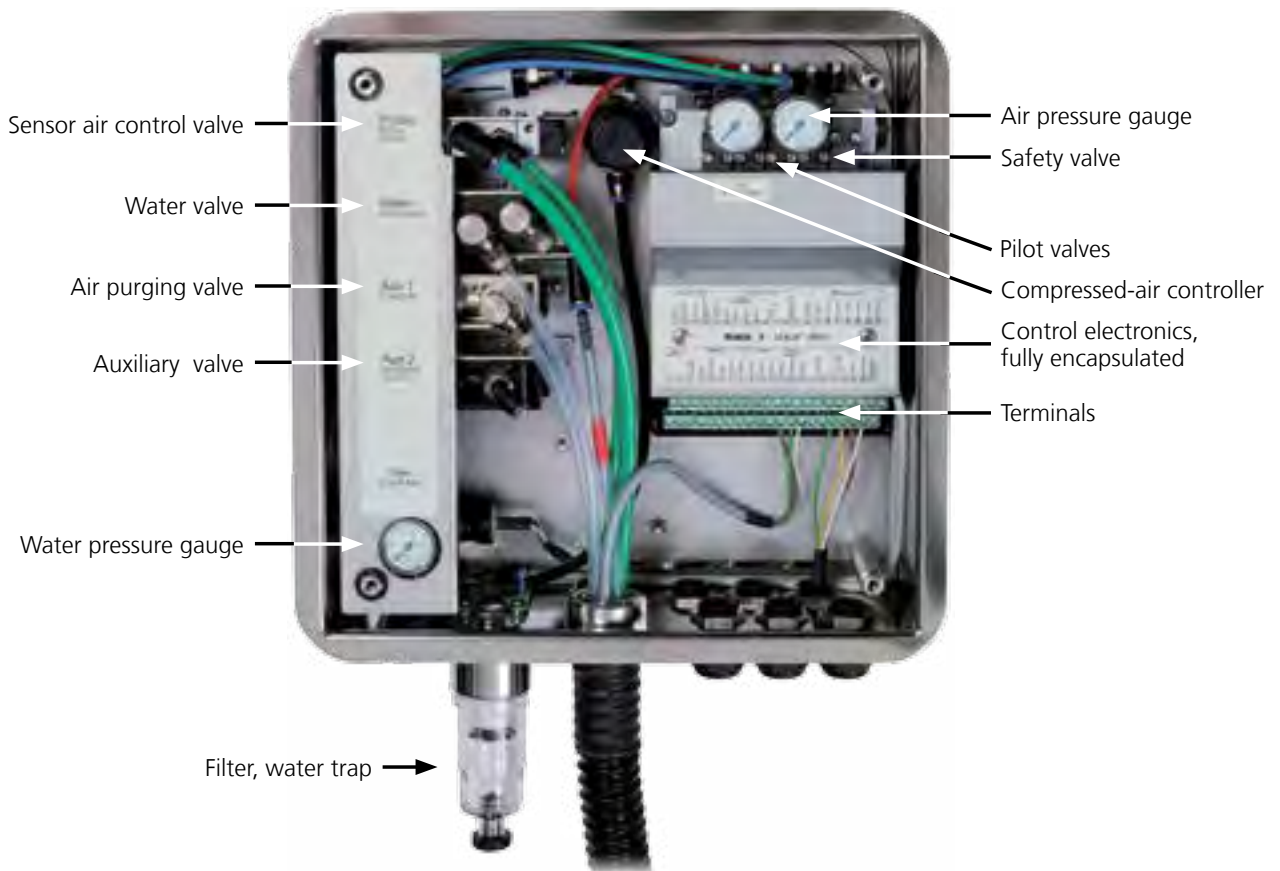
All features for easy, safe, and low-maintenance operation are provided as standard:

- Water pressure gauge
- Service switch with alert message and probe position indication
- Air filter and water trap integrated

Facts

- Consistent enclosure concept for all devices
- Modular design, adaptable to virtually every measuring task
- Easy assembly and retrofitting
- Sanitary version (polished stainless steel) or corrosion-proof (powder-coated steel)
- No mixed fluids due to separate routing of the media
- Low maintenance due to innovative pump technology and extremely low consumption of media
- Automatic 2-point calibration
- Time-controlled cleaning and calibration
- Cleaning with water and additional cleaning solution
- Reduced maintenance with automatic calibration
- No interruptions in production for calibration
- Operation in hazardous locations (all system components)
- Longer sensor life due to user programmable measurement intervals and regular cleaning
- Immediate readiness for measurement after production interruption since sensor is safely stored in liquid
- Safety ensured by monitoring of the compressed air and water supply, as well as the probe position and buffer/cleaning solution levels

Inside View



The valve units are expandable.

Unical 9000

New, Innovative Pump Design for Low Maintenance Costs

- No moving mechanical parts
- No wear
- No stored energy as defined in ATEX 94/9/EC
- All process-wetted parts are chemically resistant



Modular Flexibility for Very Simple Adaptation

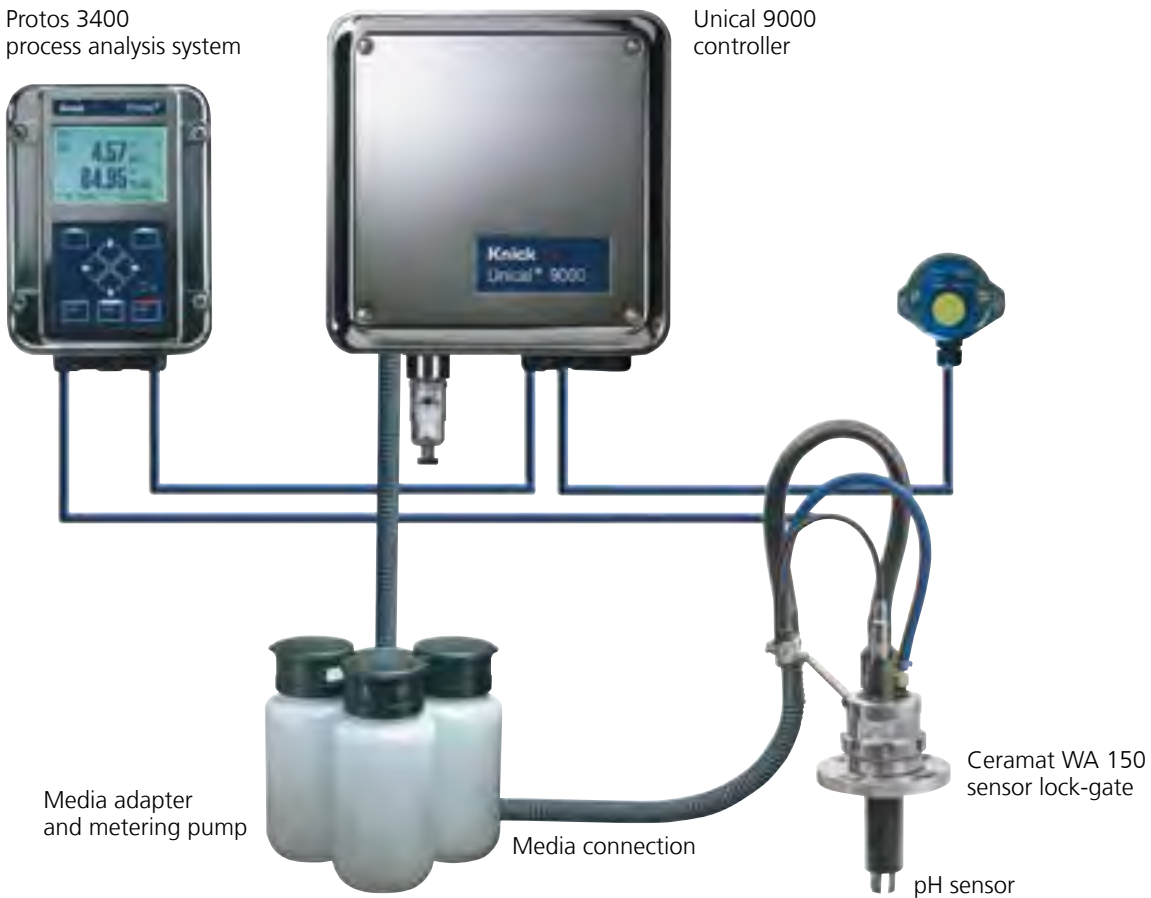
- The buffer or cleaning solution bottles (3.5 l) are replaceable, self-diagnostic units with an integrated pump; easy refilling of buffer or cleaning solution, without removing the pump.
- The pump units are automatically recognized by the system.
- The enclosure consists of a conveyor cap with funnel and buttoned lid.
- This innovative construction provides previously unknown flexibility and service friendliness.



Overview – The Complete System

Protos 3400
process analysis system

Unical 9000
controller



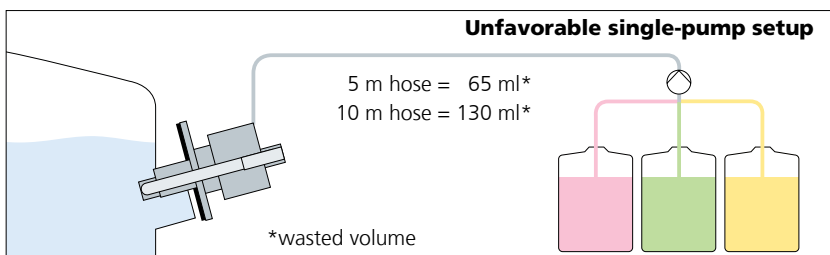
Media adapter
and metering pump

Media connection

Ceramat WA 150
sensor lock-gate

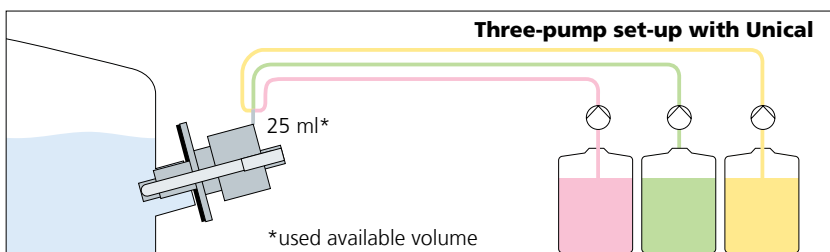
pH sensor

Safe Pump System with Minimal Buffer Consumption and Minimal Entrainment



Entrainment
through 5–10 m hose

Waste of complete
hose volume



Separate hoses – no entrainment
= max. accuracy!

Minimum buffer consumption
(only 25 ml / cycle)

Unical 9000

Specifications

Compressed air	oil- and condensate-free
Permitted pressure range	58 ... 145 psi (4 ... 10 bar)
Pressure monitoring	automatic monitoring, message
Connection	1/4" internal thread
Rinse water	filtered 100 µm
Permitted pressure range	29 ... 87 psi (2 ... 6 bar)
Temperature range	41 ... 42.8 °F (5 ... 6°C)
Pressure monitoring	automatic monitoring, message
Connection	1/4" internal thread and 3/4" external thread (for coupling)
Pump (option)	for buffer solution/cleaning solution
Number of bottles	max. 3
Usable bottle volume	3.5 l
Max. pumping height	10 m
Displaced volume	25 ml/stroke
Level monitoring	continuous, messages
Material	PP, PE, EPDM, (optional FKM), check valves: glass, HC4
Dimensions	150 mm x 150 mm x 340 mm with 3.5-L bottle
Weight	approx. 1.5 kg (with empty 3.5-L bottle)
Supply	supplied via Protos PHU module
(Ex ia IIC)	$V_i = 8.5 \text{ V}$ $I_i = 200 \text{ mA}$ $P_i = 400 \text{ mW}$ $6.8 \text{ V} (\pm 10 \%) / 15 \text{ mA}$
Connection	terminals, conductor cross section max 2.5 mm ² (preassembled connecting cable to Protos 3400)
RS 485	communication with Protos PHU module or external host computer (e.g. DCS/PLC)
(Ex ia)	$V_i/V_o = 5 \text{ V}$ $I_i/I_o = 250 \text{ mA}$ $R_i = 20 \text{ ohms}$
Transmission	1200 bauds/8 data bits/1 stop bit/no parity
Security	CRC16
Connection	terminals, conductor cross section max 2.5 mm ² (preassembled connecting cable to Protos 3400) max. length 10 m
Media connection	compact multiplug connection for 3 x buffer, 1 x rinse water, 1 x cleaning solution, 1 x purge air, 5 integrated check valves for buffer solution, water and cleaning solution, 2 x compressed air connection for drive, noncontacting electrical limit position control
Media adapter	approx. 2 kg
Service switch	wall or pipe mounting (Ø 30 ... 65 mm), cable length → Unical 9000: 5 m (opt. 10m)
DCS Input M/S	Measuring/Service
(Ex ia IIC)	$V_i = 30 \text{ V}$, floating, galvanic isolation up to 60 V

Specifications – *continued*

Switching voltage	0 ... 2 V AC/DC 10 ... 30 V AC/DC	inactive (measuring) active (service)
Connection	terminals, conductor cross section max. 2.5 mm ²	
DCS input A/M	automatic mechanism blocked	
(Ex ia IIC)	Vi = 30 V, floating, galvanic isolation up to 60 V	
Switching voltage	0 ... 2 V AC/DC 10 ... 30 V AC/DC	inactive (automatic intervals enabled) active (automatic intervals blocked)
Connection	terminals, conductor cross section max. 2.5 mm ²	
DCS inputs PRG1 ... 3	program selection 1 ... 8	
(Ex ia IIC)	Vi = 30 V, floating, inter-connected, galvanic isolation up to 60 V	
Switching voltage	0 ... 2 V AC/DC 10 ... 30 V AC/DC	inactive active
Connection	terminals, conductor cross section max. 2.5 mm ²	
DCS outputs ML1 ... 3	check-back signals: Service, measuring, program electronic relay contacts, floating, inter-connected	
(Ex ia IIC)	Vi = 30 V li = 100 mA Pi = 800 mW, galvanic isolation up to 60 V	
Voltage drop	< 1.2 V	
Connection	terminals, conductor cross section max. 2.5 mm ²	
Explosion protection	II 2(1)G Ex ia IIC T4	
EMC	EN 61326 EN 61326/A1	
Lightning protection	EN 61000-4-5, Installation Class 2	
Protection against electric shock	according to EN 61010	
Ambient conditions	41 ... 131°F (5 ... 55°C) (Ex: 41 ... 122°F (5 ... 50 °C))	
Ambient temperature	(different temperature range on request)	
Transport/Storage temperature	-7 ... 158°F (-20 ... 70°C)	
Relative humidity	10 ... 95 %, not condensing	
Enclosure	Unical 9000 S Unical 9000 C	Stainless steel A2, polished Stainless steel A2, coated, color: pigeon blue
Assembly	wall and pipe mounting (see dimension drawing)	
Dimensions	W x H x D approx. 320 mm x 400 mm x 120 mm	
Ingress protection	IP 65/NEMA 4X	
Cable glands	6 cable glands M20 x 1.5 knockouts for NPT 1/2" or Rigid Metallic Conduit	
Weight	approx. 9 kg	

Unical 9000

Product Line

Order No.

Basic unit	Unical 9000 /	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explosion protection	for hazardous area Zone 1 none	X	N											
Enclosure	steel, coated stainless steel, polished	C	S											
Media connection (rinse function only)	5 m (sealing material: FKM)	1		0	0	0	0	0						
	10 m (sealing material: FKM)	2		0	0	0	0	0						
	15 m (sealing material: FKM)	5		0	0	0	0	0						
	5 m (sealing material: EPDM)	A		0	0	0	0	0						
	10 m (sealing material: EPDM)	B		0	0	0	0	0						
	15 m (sealing material: EPDM)	E		0	0	0	0	0						
Media connection (calibration and rinse function)	5 m (sealing material: FKM)	3												
	10 m (sealing material: FKM)	4												
	17 m (sealing material: FKM)	6												
	5 m (sealing material: EPDM)	C												
	10 m (sealing material: EPDM)	D												
	17 m (sealing material: EPDM)	F												
Media interface	with (for standard probes)	1												
	without (for WA 130, WA 150, WA 160)	0												
Media adapter with port I – III	with (sealing material: FKM)			1										
	with (sealing material: EPDM)			A										
	without			0										
Port I	metering pump with empty 3.5-L bottle (EPDM)			2										
	none			0										
Port II	metering pump with empty 3.5 -L bottle (EPDM)					2								
	none					0								
Port III	metering pump with empty 3.5-L bottle (EPDM)							2						
	metering pump with empty 3.5-L bottle (FKM)							B						
	none							0						
Supplementary air purging kit	with									C				
	without									N				
Supplementary ext. valve kit	1 external valve											E		
	none											N		
Special variant	none												0	0
													0	0

Accessories for Unical 9000

Order No.

Pipe-mount kit for Unical 9000	ZU 0601
Pipe-mount kit for media adapter	ZU 0606
Connection kit for Unical 9000 (water and air)	ZU 0656
Commissioning Unical 9000 Commissioning comprises the following steps: – Connection of hoses and cables and commissioning of the Unical 9000 system. – Training of operators Prior to arrival of our engineer, the customer must prepare the following: – Protos 3400, Unical 9000 and retractable fitting assembled (Observe maximum length of connecting hose between Unical 9000 and retractable fitting). – Electric supply: Cable ducts/rails must be present. Auxiliary power supply for Protos 3400 must be pre-installed in 2 x 1.5 mm wires. – Air supply: Hose with connection nipple for G 1/4" internal thread. Nominal hose width > 6 mm. Water supply: Hose with connection nipple for G 1/4" internal thread or G 3/4" external thread. Nominal hose width > 6 mm.	ZU 0649
Chemical pump (supplementary ext. valve kit required)	ZU 0741

Spare Parts and Retrofit Parts for Unical 9000

Order No.

Media connection, rinse, 5 m (FKM gaskets)	ZU 0572/1
Media connection, rinse, 5 m (EPDM gaskets)	ZU 0572/2
Media connection, rinse, 10 m (FKM gaskets)	ZU 0573/1
Media connection, rinse, 10 m (EPDM gaskets)	ZU 0573/2
Media connection, rinse, 15 m (FKM gaskets)	ZU 0652/1
Media connection, rinse, 15 m (EPDM gaskets)	ZU 0652/2
Media connection, rinse + cal, 5 m (FKM gaskets)	ZU 0574/1
Media connection, rinse + cal, 5 m (FKM gaskets), steel balls instead of glass balls*)	ZU 0574/1S
Media connection, rinse + cal, 5 m (EPDM gaskets)	ZU 0574/2
Media connection, rinse + cal, 10 m (FKM gaskets)	ZU 0575/1
Media connection, rinse + cal, 10 m (EPDM gaskets)	ZU 0575/2
Media connection, rinse + cal, 17 m (FKM gaskets)	ZU 0653/1
Media connection, rinse + cal, 17 m (EPDM gaskets)	ZU 0653/2
Media interface for standard probes	ZU 0576
Metering pump (PP, FKM) with empty 3.5-L bottle	ZU 0580/1
Metering pump (PP, EPDM) with empty 3.5-L bottle	ZU 0580/2
Metering pump (PP, EPDM) with empty 3.5-L bottle, steel balls instead of glass balls*)	ZU 0580/2S
Metering pump (PP, FKM) with empty 3.5-L bottle, Ex	ZU 0580 X/1
Metering pump (PP, EPDM) with empty 3.5-L bottle, Ex	ZU 0580 X/2

*) included with special version -001

Unical 9000

Spare Parts and Retrofit Parts for Unical 9000 – continued

Order No.

Supplementary air purging kit	ZU 0587
Supplementary Aux 2 kit	ZU 0588
Media adapter (FKM gaskets)	ZU 0577/1
Media adapter (EPDM gaskets)	ZU 0577/2
Media adapter, Ex (FKM gaskets)	ZU 0577 X/1
Media adapter, Ex (EPDM gaskets)	ZU 0577 X/2
Service switch, coated steel	ZU 0729 NC
Service switch, coated steel, Ex	ZU 0729 XC
Service switch, polished stainless steel	ZU 0729 NS
Service switch, polished stainless steel, Ex	ZU 0729 XS

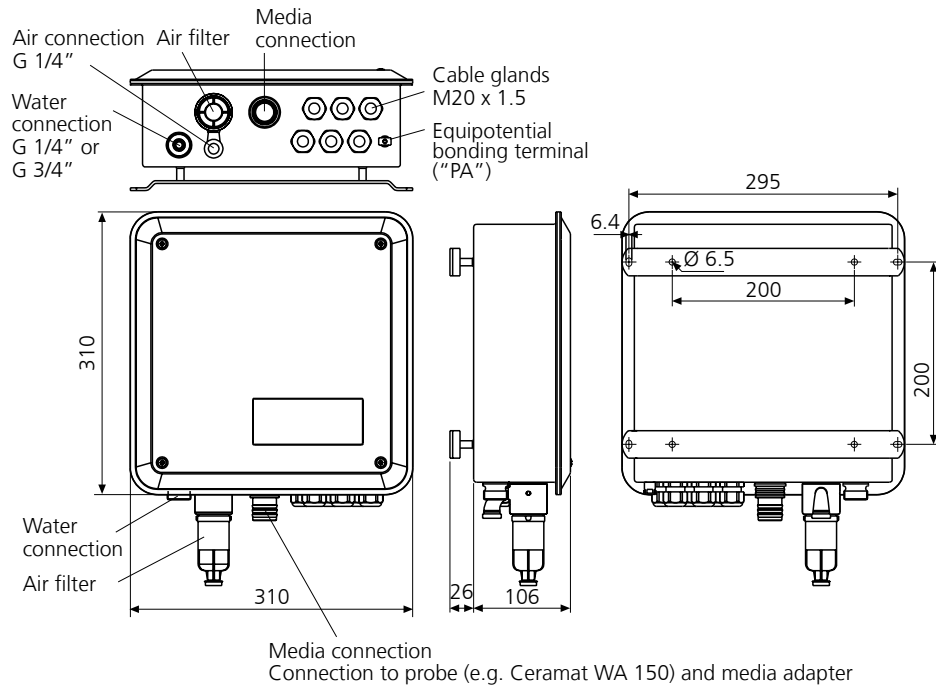
Service Parts for Unical 9000

Order No.

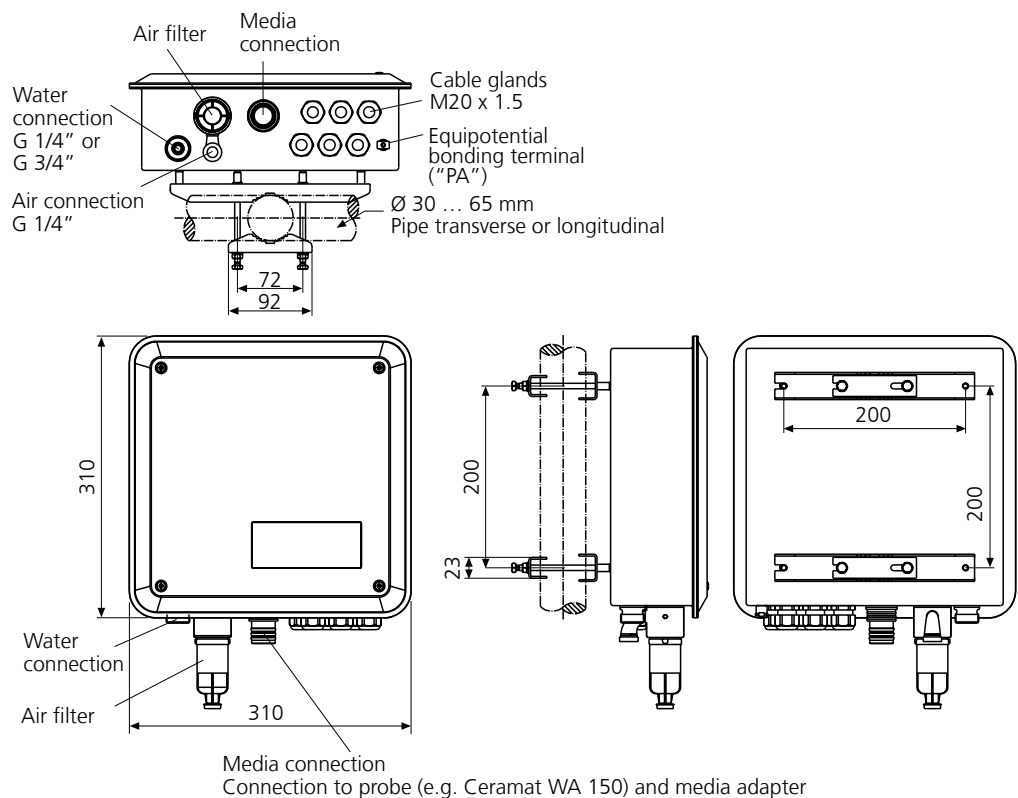
Air pressure switch	ZU 0632
Water pressure switch	ZU 0633
Probe valve, complete	ZU 0634
Water valve	ZU 0714
Sensor dismount guard, complete	ZU 0644
Air purge valve, complete	ZU 0636
Aux 2 valve, complete	ZU 0637
Piezo valve for valve block	ZU 0638
Gasket for port at media adapter (EPDM)	ZU 0639
Filter insert (5 ... 10 µm)	ZU 0640
Replacement filter housing	ZU 0641
Electronics module, tested, encapsulated	ZU 0642
Electronics module, tested, encapsulated, Ex	ZU 0642 X
Small-parts set (various screws, springs etc.)	ZU 0643
Multiplug service set, FKM gaskets	ZU 0812/1
Multiplug service set, EPDM gaskets	ZU 0812/2
Reed switch, short (service part for multiplug)	ZU 0813/1

Dimensional Drawings

Wall mounting



Pipe mounting

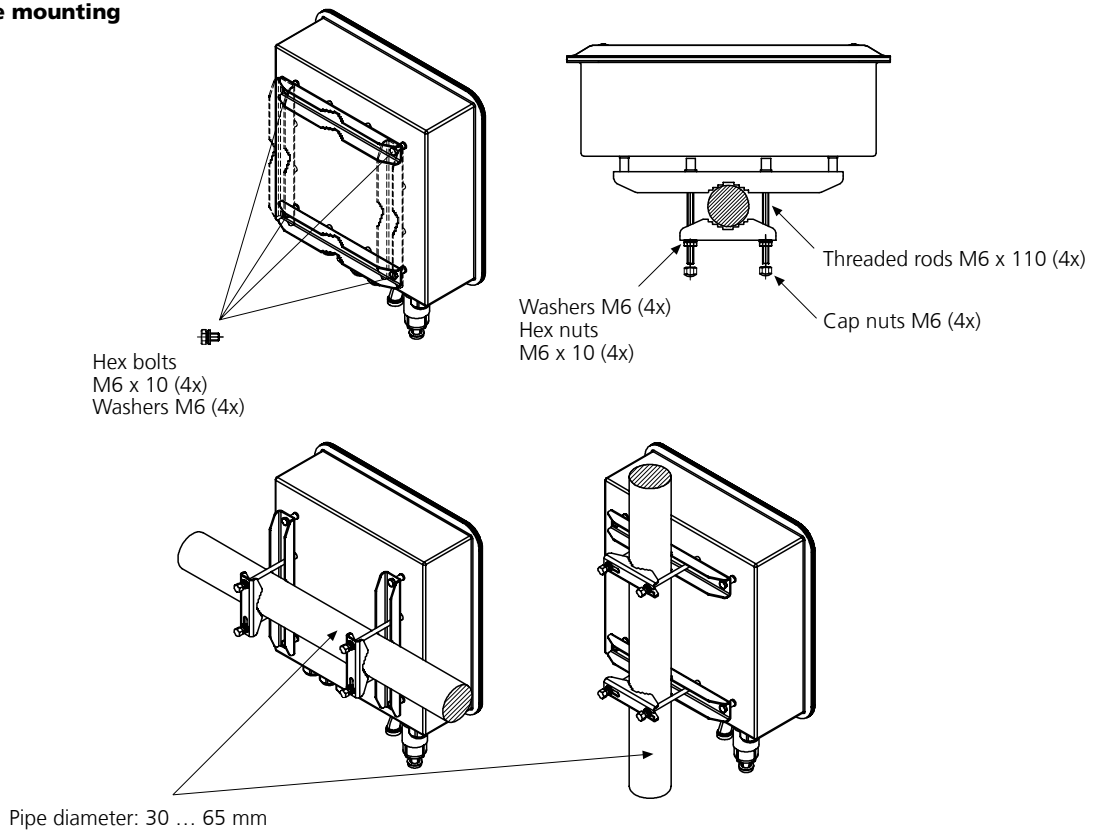


All dimensions in mm.

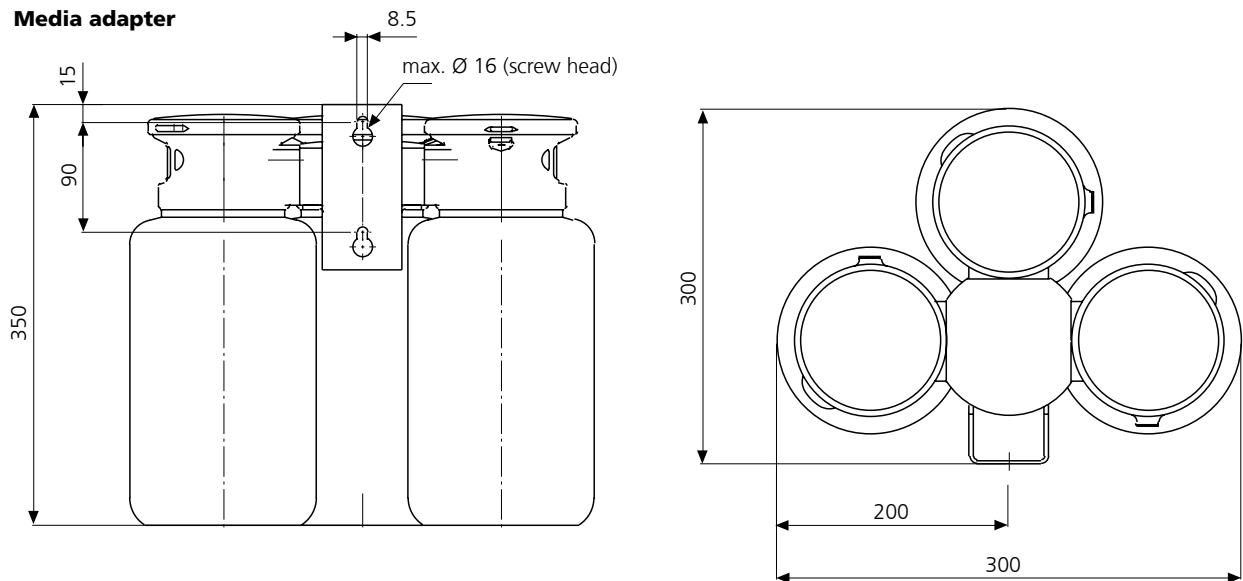
Unical 9000

Dimensional Drawings – continued

Pipe mounting



Media adapter



All dimensions in mm.

Terminal Assignments

Valves											Monitoring									
GND	Reserve	GND	Auxiliary 2	GND	Auxiliary 1	GND	Water	GND	Probe	GND	Safety	GND	Sense pressure (air)	Sense reserve	GND	Sense water	GND	Sense electrode	GND	Sense water stop
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81

Output to DCS				Input from DCS							Metering pumps									
GND	Program runs	Service	Measuring	Do not connect	GND	Program selection	Bin 3	Bin 2	Bin 1	Auto/manual	Measuring/service	Do not connect	GND	Level	Pump	Level	Pump	Level	Pump	
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51

Unical® 9000

User specific		Feedback			Service switch			Probe position		Protos/M700										
Do not connect	GND	Sense B	GND	Sense A	GND	LED 1	LED 2	Switch	GND	Service	Meas	Power off	RS 485 A	RS 485 B	GND	Power	External power			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21