bürkert
FLUID CONTROL SYSTEMS

SAC_{254} sensor

- UV absorption measurement at 254 nm
- Monitoring of dissolved organics in drinking water
- EDIP sensor: compatible with Type 8905/8906 measurement systems
- UV LED technology for long-lasting sensors
- Nano-coated glasses to reduce maintenance

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 8905 ▸
Online water analysis system

Type 8906 ▸
Online water analysis system

Type MZ20 ▸
Cleaning System

Type ME61 ▸
EDIP process display

Type ME43 ▸
Fieldbus gateway

Type ME63 ▸
Industrial Ethernet gateway, IP65/ IP67/ IP69k

Type ME44 ▸
I/O module, IP 20

Type ME66 ▸
büS distribution box, IP65/ IP67/ IP69k

Type description

The Type MS08 sensor is an optical sensor for measuring absorption in the UV range at 254 nm. This sensor can be used to detect dissolved organic matter in the water and thus provide a high degree of safety for drinking water production.

The SAC_{254} and turbidity 530 values can be measured, as well as TOCeq, BODeq, and CODeq through an application-specific correlation.

The measurement principle is optical absorption measurement at 254 nm and 530 nm for turbidity compensation and is implemented using 2 LEDs and a detector. The optical path length is optimized for drinking water, but can be easily adjusted by the manufacturer.

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Visit product website ▸

Table of contents

1. General technical data 3

2. Approvals and conformities 5

2.1. Conformity 5
2.2. Standards 5

3. Materials 5

3.1. Bürkert resistApp 5

4. Dimensions 5

4.1. Photometer installed into the measurement chamber (flow cell) 5
4.2. büS interface 6

5. Product connections 6

5.1. büS interface 6
Connection details 6

6. Product installation 7

6.1. Installation notes 7

7. Product operation 7

7.1. Measurement principle 7

8. Product design and assembly 8

8.1. Product assembly 8

9. Product accessories 8

9.1. Bürkert Communicator Software Type 8920 8
9.2. USB-büS interface set Type 8923 9

10. Ordering information 9

10.1. Bürkert eShop 9
10.2. Bürkert product filter 9
10.3. Ordering chart 9
10.4. Ordering chart accessories 10

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

1. General technical data

Type MS08 is a SAC_{254} measurement system consisting of a photometer with a 2 m cable with 8-pin M12 connector, a measurement chamber (flow cell) which allows a bypass installation, a büS (Bürkert system bus) interface, 3 cables of 1 m equipped with M12-connectors and a Y-splitter.

Product properties	
Material	
Make sure the device materials are compatible with the fluid you are using. Further information can be found in chapter "3.1. Bürkert resistApp" on page 5.	
Photometer	Housing in stainless steel (1.4571/1.4404)
Flow cell	• Housing in POM • Seal in NBR • Screw in stainless steel 316 (A4)
büS interface	• Front side housing in PC (polycarbonate) • Rear side housing in polyurethane potting resin, natural
Fixed connector and cable	• Cable in PUR • Screw connection in zinc die casting, matt nickel-plated
Compatibility	With online water analysis system Type 8905 Further information can be found in the data sheet of the online water analysis system, see **data sheet Type 8905** ▶.
Dimensions	
Further information can be found in chapter "4. Dimensions" on page 5.	
Photometer	333 × 48.3 mm (L x Ø) with a 50 mm path
Flow cell	150 × 65 × 65 mm
büS interface	210 × 65 × 18 mm
Weight	
Photometer	Approx. 2.3 kg
Flow cell	Approx. 0.8 kg
büS interface	Approx. 0.4 kg
Measurement technology	Photometry • Light source: 2 LED (254 nm, 530 nm) • Detector: photodiode
Measurement principle	Attenuation, transmission
Optical path	50 mm (others on request)
Measured quantity	• SAC_{254} (Spectral Absorption Coefficient) • COD_{eq} • BOD_{eq} • $TOC_{eq,}$ • $Turb_{530}$
Measuring range	With 50 mm path
SAC_{254}	0.10...30 1/m
COD_{eq}	0.15...45 mg/l
BOD_{eq}	0.05...15 mg/l
TOC_{eq}	0.06...20 mg/l
$Turb_{530}$	0.4...40 FAU
Compensation	Turbidity at 530 nm
Data logger	
büS interface	Micro SD card (not included in delivery), for storage of device parameters, configuration and for easy replacement of photometer
Maintenance	Calibration/maintenance interval: 24 months

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

Performance data	
SAC measurement	
Measurement deviation	0.2 % of full scale
Measurement interval	≥ 10 s
Response time (t100)	10 s
Electrical data	
Operating voltage	
Photometer	24 V DC ± 10 % (via connector X8 of büS interface)
büS interface	24 V DC ± 10 % - residual ripple 10 % [1)] (via connector X4 connected to online water analysis system Type 8905. Further information can be found in the chapter "5.1. büS-Schnittstelle" on page 6 or in the data sheet of the online water analysis system, see **data sheet Type 8905** ▶.)
Power consumption	
Photometer	≤ 1 W
büS interface	≤ 2 W (only consumption of the interface)
Current	
büS interface	• Max. input current: 4 A for supply via X4 (M12, A-coded, plug) • Max. output current: 4 A in total with supply via X4
Output	
Photometer	Ethernet (TCP/IP)
büS interface	Bürkert system bus (büS)
Medium data	
Fluid	Water without particles: drinking water, industrial water
Temperature of the fluid sample	+ 2...+ 40 °C (+ 36...+ 104 °F)
Pressure of the fluid sample	• Photometer alone: 3 bar • With flow cell: ≤ 1 bar
Flow rate of the fluid sample	With flow cell: 2...4 l/min
Inflow velocity of the fluid sample	0.1...10 m/s (0.33...33 fps)
Product connections	
Process connection	Hose connections of flow cell (6 or 8-mm inlet, 6-mm outlet)
Electrical connection	M12 male plug, A-coded (X4 (IN)) of büS interface
Data transfer	
External communication	• Via büS (Bürkert system bus, CANopen-based) or CANopen • Via status LED: with RGB-LED based on NAMUR NE 107 on the büS interface
Approvals and conformities	
Directives	
CE directive	Further information on the CE directive can be found in chapter "2.2. Standards" on page 5.
Environment and installation	
Ambient temperature	
Photometer	• Operation: + 2...+ 40 °C (+ 36...+ 104 °F) • Storage: - 20...+ 80 °C (- 4...+ 176 °F)
büS interface	• Operation: - 20...60 °C (- 4...+ 140 °F) • Storage: - 20...70 °C (- 4...+ 158 °F)
Relative air humidity	≤ 90 %, without condensation
Height above sea level	Max. 2000 m
Operating condition	Continuous
Equipment mobility	Fixed
Application range	Indoor and outdoor Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions.

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

Degree of protection	
Photometer	IP68 according to IEC/EN 60529, NEMA 6P
büS interface	IP65, IP67 and IP69k according to EN/IEC 60529 (with cables connected and with protective caps on unused connections)
Cable	IP65, IP67 according to EN/IEC 60529
Installation category	Category I according to UL/EN 61010-1
Pollution degree	Degree 2 according to UL/EN 61010-1

1.) The requirements of the attached components need to be considered in the selection of the power supply as well.

2. Approvals and conformities

2.1. Conformity

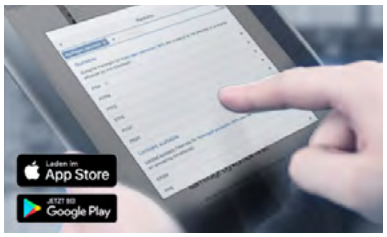
In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

2.2. Standards

The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

3. Materials

3.1. Bürkert resistApp



Bürkert resistApp – Chemical resistance chart

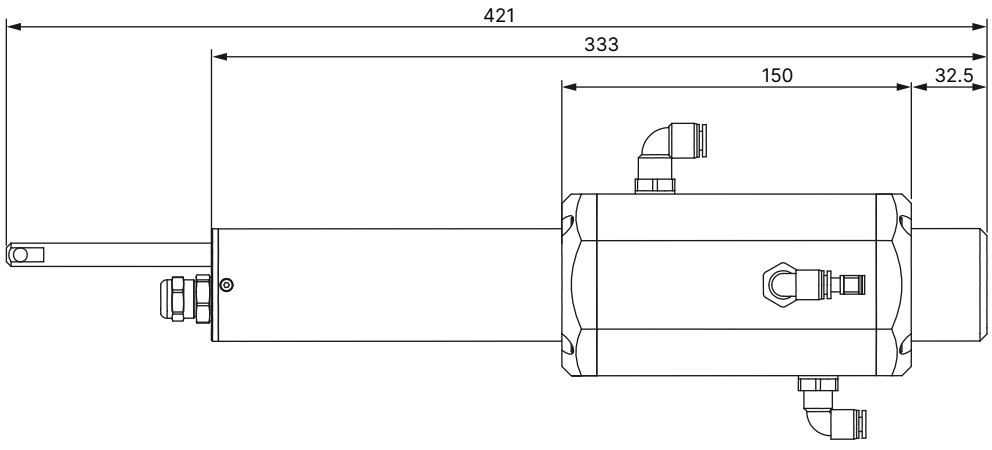
You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

Start chemical resistance check

4. Dimensions

4.1. Photometer installed into the measurement chamber (flow cell)

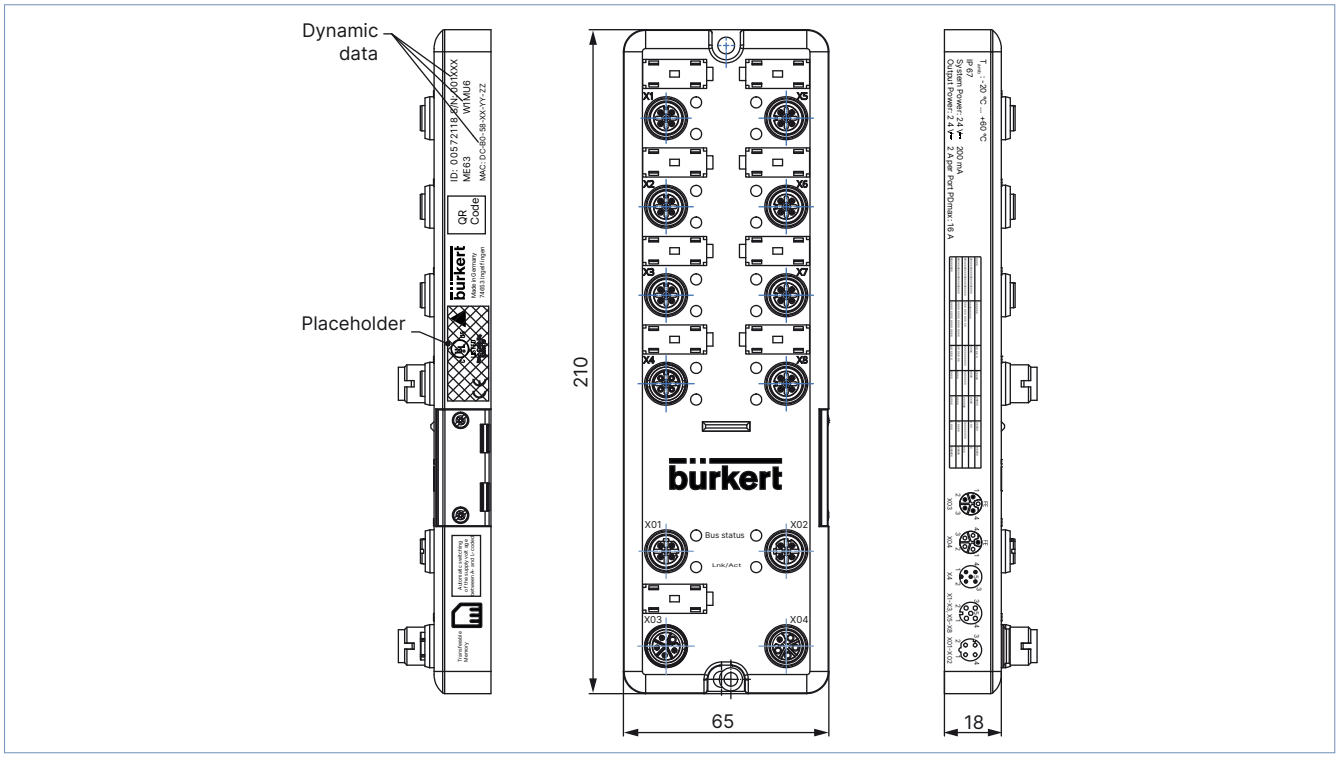
Note:
Dimensions in mm, unless otherwise stated



DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

4.2. büS interface

Note:
Dimensions in mm, unless otherwise stated

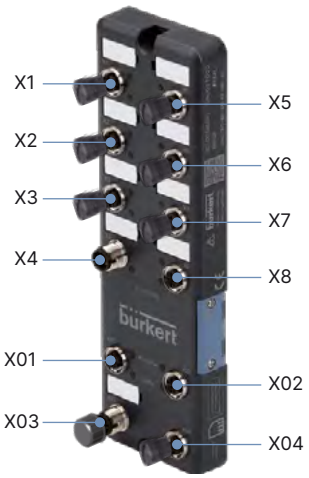


5. Product connections

5.1. büS interface

Connection details

Note:
The device automatically recognises if the power supply is connected to X4 or X03.



No.	Description
X1	M12-A, socket, not used
X2	M12-A, socket,not used
X3	M12-A, socket, not used
X4	M12-A, plug, Power IN 24 V DC, max. 4 A and büS/CANopen
X5	M12-A, socket, not used
X6	M12-A, socket, not used
X7	M12-A, terminating resistor 120 Ω, if necessary
X8	M12-A, socket, Power OUT 24 V DC, max. 4 A, to power the photometer
X01	M12-D, socket, not used
X02	M12-D, socket, Ethernet, e.g. for Ethernet integration of the photometer
X03	M12-L, plug, not used
X04	M12-L, socket, not used

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

6. Product installation

6.1. Installation notes

The SAC_{254} measurement system is designed for use with the online water analysis system, Type 8905. It is simply connected via a cable to Type 8905. But with help of the USB-büS interface set Type 8923, it is also possible to connect the SAC_{254} measurement system to a PC with the Bürkert Communicator Software Type 8920.

See **data sheet Type 8905** ▸ Online water analysis system, **software manual Type 8920** ▸ or chapter "9.2. USB-büS interface set Type 8923" on page 9 for more information.

7. Product operation

7.1. Measurement principle

Note:
It is necessary to understand the physical principles of the sensor in order to use the sensor optimally. An overview of the measurement principle, the visual arrangement and the subsequent calculation will be provided as follows.

The photometer essentially consists of four parts: a defined light source, a lens system, the optical path through the medium and a detector with ambient light suppression. The arrangement of these parts is represented schematically in the following illustration.

The light source consists of two LEDs of different wavelengths. The first LED (LED 1) emits at a wavelength of 254 nm, while the second LED (LED 2) emits at 530 nm. The latter is used for turbidity correction. The light emitted by the LEDs passes through the medium on the way to the detector and is partially weakened by the medium. The detector picks up the remaining light and thus determines its intensity "I". The weakening of the light when passing through the measurement medium is compared to the weakening caused by ultra-pure water. The measurement in ultra-pure water provides the so-called basic intensity "I_0." Using the equation, the photometer determines the transmission T ($=I/I_0$) and the absorbance A ($=-\log_{10}T$) of both of the above-mentioned wavelengths.

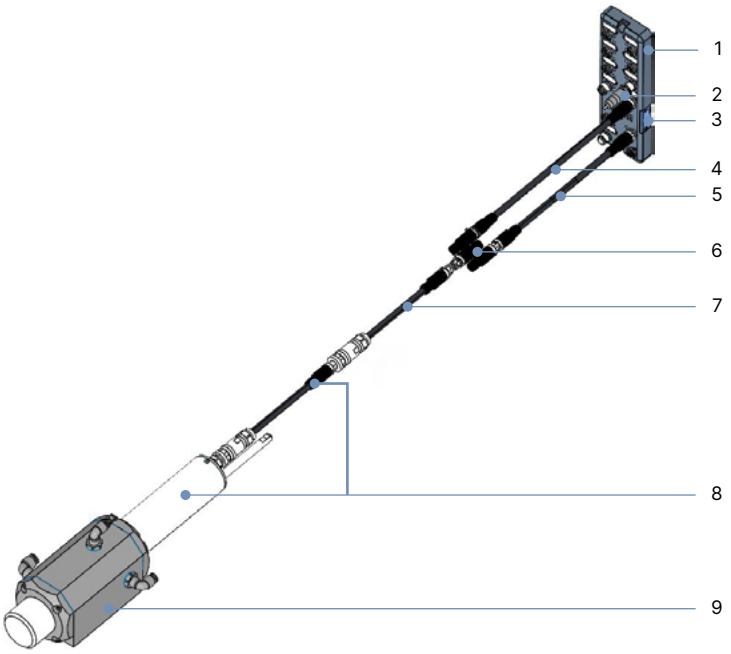
The light intensity of LEDs often varies with temperature. Therefore, a temperature correction factor is determined for each wavelength of the photometer and is used to calculate the measurement value.

The photometer outputs the SAC of the wavelength of LED 1 at 254 nm. This is referred to as SAC_{254} in the following. Accordingly, the absorption at the wavelength of LED 1 will be denoted with A_{254}.
Scattering of light on particles in a solution is seen as turbidity by the observer. The photometer uses the absorbance of 530 nm (A_{530}) for the turbidity correction of the absorption measurement of the wavelength emitted by LED 1 (A_{254}).
The SAC_{254} (spectral absorption coefficient in [1/m]) is calculated using the equation = $(A_{254}-A_{530})\cdot 1000/d$ where d is the length of the optical path in millimeters (50 mm for the MS08 measurement system).

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

8. Product design and assembly

8.1. Product assembly



No.	Element
1	büS interface
2	Terminating resistor 120 Ω, if needed
3	Micro SD card for saving device-specific settings
4	büS/CANopen shielded cable, 1 m length, with 5-pin M12 male and 5-pin M12 female connectors
5	Ethernet shielded cable, 1 m length, with two 4-pin M12 male connectors
6	Shielded Y-splitter with 8-pin M12 female connector, Y-coded + 4-pin M12 female connector, D-coded + 5-pin M12 male connector, A-coded
7	Adaptation shielded cable, 1 m length, with 8-pin M12 male and female connectors
8	Photometer with connection cable, 2 m length, with 8-pin M12 female connector, A-coded
9	Measurement chamber (flow cell)

9. Product accessories

9.1. Bürkert Communicator Software Type 8920

Note:
The associated communication software can be downloaded under **Type 8920** ▶.

The Bürkert Communicator is the most important software tool of the device platform EDIP (Efficient Device Integration Platform). The extensive features of this universal tool facilitate the configuration and parameterisation of all devices equipped with the digital CAN-open-based interface.
The Bürkert Communicator provides the user with a complete overview of all cyclic process values and acyclic diagnostic data. The integrated graphical programming environment enables the creation of control functions for decentralised sub-systems. The connection to the PC can be established via a USB-büS interface set. This is available as an accessory (see "10.4. Ordering chart accessories" on page 10).

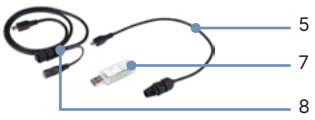
The Bürkert Communicator enables:

- Configuration, parameterisation and diagnosis of EDIP devices / networks
- Easy and convenient assignment (mapping) of cyclic values
- Graphical display of process values
- Firmware update for the connected EDIP devices
- Saving and restoring of device configurations
- Zero-point adjustment
- Guided re-calibration routine

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

9.2. USB-büS interface set Type 8923

See "10.4. Ordering chart accessories" on page 10 for ordering information.

Accessories	No.	Description
USB-büS interface set 1 	**1**	Quick-Start
	2	Power supply: 100...240 V AC/24 V DC 1 A and power supply adapters for worldwide use
	3	büS terminating resistor on büS Y-splitter
	4	5-pin M12 male connector wired on free end cable, cable length: 0.2 m
	5	büS connection cable with 5-pin M12 male connector, micro USB B plug, cable length: 0.3 m
	6	büS adapter with 5-pin M12 male connector, A-coded to 5-pin M12 male connector, A-coded
	7	büS stick (USB to büS/CANopen adapter)
	8	büS service cable with 5-pin M12 female connector, mini USB plug and circular female connector for power supply, cable length: 0.7 m
	9	Magnetic key
USB-büS interface set 2  		The Bürkert Communicator software can be downloaded from our website under the "Software" heading of **Type 8920** ▶.

10. Ordering information

10.1. Bürkert eShop

Bürkert eShop – Easy ordering and quick delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

10.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements?
Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

10.3. Ordering chart

Description	Article no.
SAC_{254} measurement system (photometer with 50 mm path + measurement chamber (flow cell) + büS interface + cables), without micro SD card	572112

DTS 1000529164 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

Further variants on request	
›	**Additional** SAC_{254} measurement: other possible measuring ranges

10.4. Ordering chart accessories

Description		Article no.
SAC_{254} photometer with 50 mm path		572114
Measurement chamber (flow cell)		572116
büS interface		572118
Micro SD card		774087
Fluidic accessories		
Sample water hose 4/6 mm	5 m	567793
	10 m	567701
	25 m	567794
Swivel elbow connector made of POM, ¼" threaded connection and 4/6 mm push-in hose connection		782348
Set with a pressure regulator (article no. 774322), a bourdon tube pressure gauge (0...4 bar), a holder and a nut		775799
Pressure regulator (pressure inlet: 0...10 bar, pressure outlet: 0...4 bar, inlet and outlet: G ¼, internal part in stainless steel)		774322
Filter housing made of plastic with NBR seal for filter element 50 µm, inlet and outlet ¼"		774292
Filter housing made of plastic with NBR seal for filter element 90 µm or 140 µm, inlet and outlet ¼"		774287
Filter element	50 µm	774293
	90 µm	774290
	140 µm	774291
Bubble trap		568492
Type MZ20 cleaning system, 2 solutions See **data sheet Type MZ20** ▸ for more information.		567124
Cleaning set for optical		574346
Calibration set	10 mm	574344
	50 mm	574345
Interface accessories		
USB-büS interface set		
USB-büS interface set 1 (Type 8923) Further information can be found in chapter "9.2. USB-büS interface set Type 8923" on page 9.		772426
USB-büS interface set 2 (Type 8923) Further information can be found in chapter "9.2. USB-büS interface set Type 8923" on page 9 .		772551
Connectors and sockets		
büS Y-distributor (M12 female connector, 5-pin to M12 male and female connectors, 5-pin)		772420
büS Y-distributor with power interrupt (M12 female connector, 5-pin to M12 male and female connectors, 5-pin)		772421
büS adapter (M12 male connector, 5-pin, A-coded to M12 male connector, 5-pin, A-coded)		772867
büS terminating resistor 120 Ω, M12 male connector, 5-pin		772424
büS terminating resistor 120 Ω, M12 female connector, 5-pin		772425
Extensions		
M12 female and male connectors, 5-pin, straight, moulded on büS cable, shielded	0.5 m	772403
	1 m	772404
	3 m	772405
	5 m	772406
	10 m	772407
	20 m	772408
Software		
Software Bürkert Communicator		Download **Type 8920** ▸

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