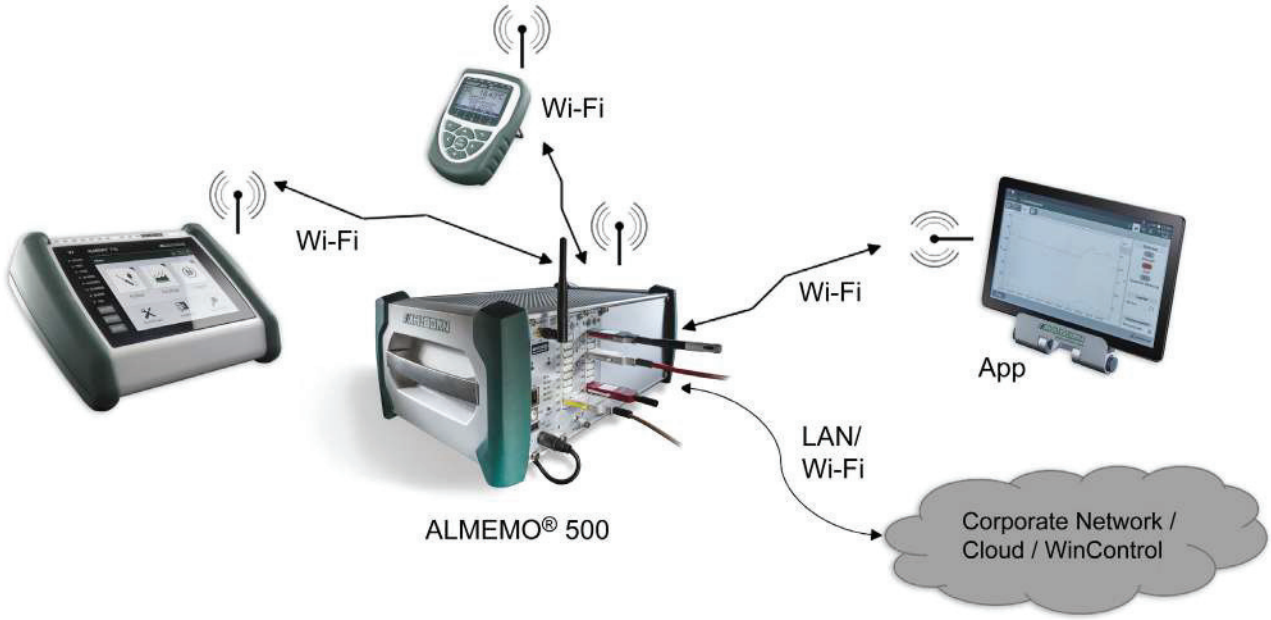
Content

ALMEMO® Network technology

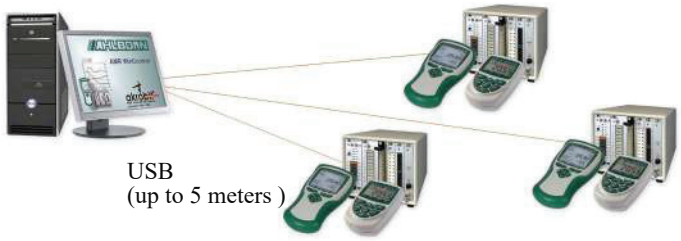


ALMEMO® networking technology

The ALMEMO® system provides optimal support for networked, decentralized measured data acquisition. Measured data can be acquired locally on site using short sensor signal lines and small modular measuring instruments and can then be evaluated all together on a central computer. This not only minimizes wiring requirements but also goes a long way to solving EMC problems (especially if optic fiber cables are used).
Via the cascadable interface provided by ALMEMO® devices it is possible, thanks to our ALMEMO® networking technology, to manage up to 100 ALMEMO® measuring instruments from just one computer. User-friendly software packages (see Chapter 05) are available for automatically scanning measuring points within the network, for evaluating the measured values, and for graphically representing results in line chart or bar chart form. This permits measuring setups in which devices can be used with such high operational reliability and with such great flexibility that even the most demanding measuring tasks can be solved.
For example:

- Data connection from the PC to ALMEMO® devices via USB, Ethernet, WLAN, RS232, Bluetooth, mobile communications, modem.
- Can be combined in a wide variety of ways via the output sockets A1 and A2 on the ALMEMO® measuring instrument
- Various networking arrangements can be implemented.
- Measuring instruments can be installed in separate rooms; considerable distances can be bridged.
- ALMEMO® devices / networks can be connected to the PC via an existing Ethernet / WLAN network.
- *New* Wireless connection between the wireless ALMEMO® sensor respectively wireless ALMEMO® interface for ALMEMO® D7 sensor and the wireless ALMEMO® data logger 470-1, see chapter ALMEMO® Measuring Instruments.
- PC and devices can be connected over a wireless link using Bluetooth modules.
- Measured data can be acquired and also read out from the measured value memory on an ALMEMO® data logger - all online - using the WinControl software package

ALMEMO® Network technology



PC connection via USB
(over a wireless Bluetooth link, see page 04.03)

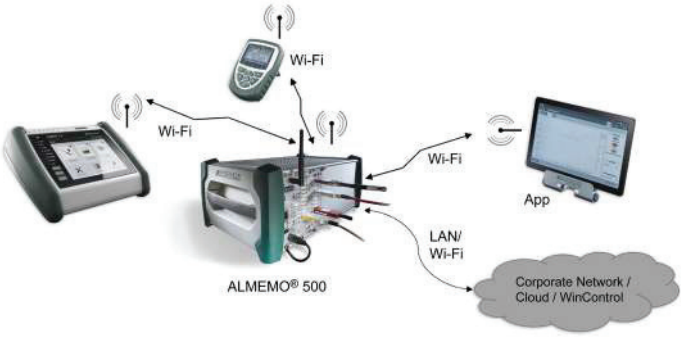
Inexpensive for relatively short distances (up to 5 m) several connections in parallel (star-configured network) for mobile use, e.g. notebook

Necessary component
ZA 1919 DKU
see page 04.05

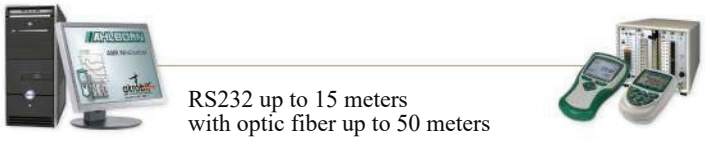
PC connection via Ethernet / WLAN
(over a wireless Bluetooth link, see page 04.03)

Measured data acquisition, on a decentralized basis, using existing LAN cabling / WLAN, relatively long distances, via Internet worldwide.

Necessary component(s)
ZA 1945 DK see page 04.05



ZA 1719-WL, see page 04.06



PC connection via RS232
(over a wireless Bluetooth link, see page 04.03)

Single connection
via COM interface up to 15 meters,
and with optic fiber up to 50 meters

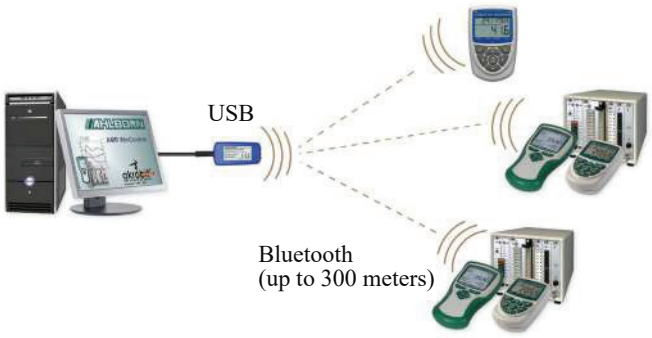
Necessary component
ZA 1909 DK5 see page 04.05

Connection between ALMEMO® measuring instruments over ALMEMO® network cable
(over a wireless Bluetooth link, see page 04.03)

Inexpensive linear network solution, flexible, plug-and-play, easy to expand.

Necessary component ZA 1999 NK5
see page 04.06

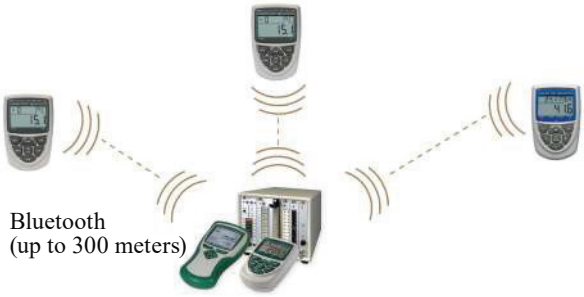
ALMEMO® Network technology



Wireless Bluetooth link PC - USB

Inexpensive USB for mobile applications

Necessary components
ZA1719BPVU,
see page 04.08



Wireless sensor connection via Bluetooth (ALMEMO® wireless sensor)

Single connection from a measuring Bluetooth device (wireless sensor) to a receiving ALMEMO® device with display and saving of measured values (also without PC). Any number of sensor connections in parallel.

Necessary components
MA2790BTFV
(with Bluetooth measuring instrument)
see page 04.11

PC connection via mobile modem : Online or Cloud

Mobile operation over any distance.

Necessary components:
ZA 1709 GPRS
see page 04.12

new: Wireless connection of wireless ALMEMO® sensor and wireless ALMEMO® interface for ALMEMO® D6 and D7 sensor to wireless data logger ALMEMO® 470-1,

See chapter ALMEMO® Measuring Instruments.

ALMEMO® PC connection using USB data cable ZA 1919 DKU
RS232 data cable, type ZA 1909 DK5, USB adapter cable ZB 1909 USB

- ALMEMO®-USB data cable for data connection between an ALMEMO® device and a PC with a USB interface
- ALMEMO® RS232 data cable with a DSUB socket for data connection between an ALMEMO® device and a PC with a COM interface
- ALMEMO® optic fiber cable (RS232) for absolute electrical isolation and extensive protection against lightning.

Types:	Order no.
USB data cable, electrically isolated, maximum 115.2 kbaud, cable length 1.5 meters, including CD with Windows driver	**ZA1919DKU**
As above but cable length 5 meters	**ZA1919DKU-05**
RS232 data cable electrically isolated, max. 115.2 kbaud, Current consumption : approx. 1 mA, cable length : 1.5 m	**ZA1909DK5**
As above, but cable lengths 5m / 10m / 15m	**ZA1909DK5-05 /-10 /-15**
RS232 data cable with optic fiber, max. 115.2 kbaud, Cable length 1,5 m	**ZA1909DKL**
Longer optic fiber (up to 50 m) for interiors, Duplex plastic 2.2 x 4.3mm, per meter	**LL2243L**

ALMEMO® PC connection using Ethernet data cable ZA 1945 DK

- For connecting almost any ALMEMO® measuring instrument to an Ethernet PC network.
- Linking up to the Internet now possible.
- Terminal operation using our AMR-Control software, available free-of-charge.
- Device-Installer configuration software also included on the AMR CD.
- Measured data acquisition via several Ethernet modules using our Win-Control software. (Version SW5600WC2 and above, see chapter Software).

Technical data

Ethernet:	Socket RJ45 (10/100 base-T) Automatic switchover 10 / 100 MHz
ALMEMO®	ALMEMO® connector for socket A1 Baud rate standard 9600 bd, max. 115.2 kbd (can be changed via Device-Installer and browser)

Power supply	12 V DC via measuring instrument (suitable mains supply unit recommended)
Current consumption	<60 mA (10 MHz), <90 mA (100 MHz)

Accessories	Order no.
Patch cable RJ45, plug / plug, 2 meters	**ZB1904PK2**

Type	Order no.
Ethernet data cable, RJ45 socket on ALMEMO® connector, cable length 1.5 meters	**ZA1945DK**

Data cable for configuring digital ALMEMO® D6 / D7 sensors

Types	Order no.
ALMEMO® USB adapter cable length 1.5 meters for connecting an ALMEMO® D6 sensor to the USB port on a PC (power supply via USB)	**ZA1919AKUV**

06/2018 • We reserve the right to make technical changes.

Wireless link between PC and ALMEMO® WLAN module ZA 1719-WL

Wireless link between a PC connected to a local WLAN radio network and an ALMEMO® measuring instrument connected to an ALMEMO® WLAN module.

WLAN-module
ZA 1719-WL

- WLAN module ZA 1719-WL, equipped with an active internal antenna, can be plugged into the A1 socket of any ALMEMO® measuring instrument (instead of the data cable) and thus be linked into a local WLAN radio network.
- Use of the existing infrastructure
- Range up to 400 meters (unobstructed)
- LEDs showing status of the power supply and data traffic
- All the usual encryption and authentication protocols can be configured.
- Configuration on the PC via USB adapter cable ZA 1919-AKUVW using configuration software
- Quick and easy incorporation in the WinControl data acquisition software via an Ethernet port.

Example
ALMEMO® WLAN
with access point ALMEMO® 500

Technical data

Standard features	WLAN 802.11a/b/g/e/i/h/j
Frequency band	2.4 GHz, channels 1– 13 5.0 GHz, channels 36– -165 (U-NII band 1, 2, 2e, 3)
Output power	100 mW (20 dBm)
Throughput	500 kbit/s
Operating range	400 meters (unobstructed)
Encryption and authentication	WPA-PSK, WPA2-PSK, PEAP, LEAP WEP64/128, TKIP, AES (CCMP)
Protocol	TCP/UDP
Ethernet port	10001 (default)
Power supply	via ALMEMO® device
Current consumption	approx. 70 mA with 9V supply
Module housing	61 x 30 x 12 mm (LxWxH) ABS PC GF (-20 to +70 °C)
ALMEMO® data rate	1200 baud up to 115.2 kbaudd

! **Advisory note**
Inside a building the operating range of the wireless link will be substantially lower.

	Order no.
Accessories	
USB adapter cable for configuring an ALMEMO® WLAN module ZA 1719-WL	ZA1919AKUVW
Option	
Cable between ALMEMO® plug and module, Length = 1 meter	OA1719BK

Variants

	Order no.
Wireless PC link (WLAN) for one ALMEMO® measuring instrument ALMEMO® WLAN module for output socket A1 on the ALMEMO® device.	**ZA1719WL**

ALMEMO® Network Interface Cables ZA 1999 NK5

Uses:

- Especially suitable for short distances and mobile measuring setups.
- Up to 100 ALMEMO® measuring instruments can be networked.

Advantages:

- Devices can be quickly and easily interconnected and networked.
- Low power consumption (approx. 1 mA) without additional power supply.
- You can easily assemble the network cable yourself, up to 50m in length, using just two single network connectors ZA1999FS5 (a couple) and one four-wire cable.

! The device network will be blocked if the measuring instrument fails to operate.
No further peripheral devices can be connected (analog output, alarm relay etc.)

Types	Order no.
Network cable for cascading several devices for baud rates up to 115.2 kbaud	
current loop, electrically isolated, 1.5 m long	**ZA1999NK5**
As above, but cable lengths 5m / 10m / 15m	**ZA1999NK5 -05/ -10 / -15/ -xx**
2 Network connectors (a couple) with screw terminals for local self-assembly	**ZA1999FS5**

ALMEMO® Network Interface Cables with Fiber Optics ZA 1999 NKL

Uses:

- Especially suitable for safe and reliable data transmission in industrial environments with high levels of interference.
- Up to 10 ALMEMO® measuring instruments can be networked (at 9600 baud, double this number, if the transmission rate is halved).

Advantages:

- Devices can be quickly and easily interconnected and networked.
- No EMC problems, highest possible immunity to interference, absolute electrical isolation of the instruments - even under high voltages.
- No additional voltage supply is required.
- You can easily assemble the network cable with plastic optic fiber yourself, up to 50m in length, using just two single network connectors ZA1999FSL, without needing any special tools.

! The device network will be blocked if the measuring instrument fails to operate.
No further peripheral devices can be connected (analog output, alarm relay etc.)

Types	Order no.
Network cable with optic fiber for cascading several devices 1.5 m long	
for baud rates up to 115.2 kbaud	**ZA1999NKL**
As above, but cable lengths 5m / 10m / 15m	**ZA1999NKL -05/ -10 / -15/ -xx**
Longer optic fiber cable for interiors, Duplex plastic 2.2 x 4.3 mm	**LL2243L** (please specify length L)
Network connector with optic fiber converter for local self assembly	**ZA1999FSL**

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Wireless data links using ALMEMO® Bluetooth modules

Various types of connection are possible

Wireless PC connection see page 04.09

Wireless connection from a PC with ALMEMO® Bluetooth CPU to one ALMEMO® measuring instrument each with Bluetooth slave

Wireless sensor connection see page 04.12

Wireless sensor connection from a Bluetooth measuring device to a measuring input of a receiving ALMEMO® device with Bluetooth sensor module. Up to 4 measuring channels can be transmitted per connection..

Common technical data

Bluetooth	class 1 with active antenna
Protocol	SPP (sequence packet protocol) (128-bit encryption)
Operating range	300 meters (free field)*
ALMEMO® data rate	1200 baud up to 115.2 kbaud
Module housing ZA 1719-Bx	(LxWxH) 61 x 30 x 12 mm Polystyrene (-10 to +70 °C)
Cable length	for plug-in module ZA 1719-Bx with option OA1719BK Length = 1 meter

* Inside a building the operating range of the wireless link will be substantially lower.

Advantages of ALMEMO® connections using Bluetooth compared with other wireless technologies

- Bluetooth wireless technology is industrial standard in compliance with IEEE 802.15.1; it ensures high transmission reliability.
- The frequency hopping procedure used ensures robustness against interference. The Bluetooth partners move continually to and from among the 79 wireless channels available.
- Any number of Bluetooth connections can operate in parallel with complete reliability.
- The multi-digit PIN code ensures that all Bluetooth participants are identified reliably and unequivocally.
- These links - once configured - will, as soon as the device is switched ON, be automatically setup - and, in the event of interruption, be automatically restored.
- These powerful new Bluetooth class 1 wireless modules incorporate an integrated active antenna ensuring an especially wide operating range (up to 300 meters free field); there is no need for an extra antenna.

Common technical features

- Bluetooth links are supplied already paired, i.e. simply plug in and start measuring.
- In the event of interruption to the Bluetooth connection the USB / COM interface in the PC remains available for the software being used. For continuous monitoring purposes this ensures very high transmission reliability. Advisory note : The Bluetooth links integrated in some laptops / PCs cannot be used for these purposes because in the event of interruption the operating system deactivates the COM interface and this must then be reactivated manually each time.
- Any ALMEMO® measuring instrument with a Bluetooth slave module connected can be used.
- The plug-in module variant with a 1-meter cable can, in order to optimize the wireless link, be positioned away from the measuring instrument between the ALMEMO® connector and the module (option OA1719BK) and specially aligned (using Velcro fastener).
- The connection can be configured end-to-end quickly and easily either with the AMR-Control software.
- To search through and select from the Bluetooth slave partner the user simply enters the appropriate PIN codes.

Wireless PC link with Bluetooth

Bluetooth USB CPU module ZA 1719 BCU

Wireless connection from a PC with ALMEMO® Bluetooth CPU to one ALMEMO® measuring instrument with Bluetooth slave

Technical data

Common technical data see page 04.07		
Cable	ZA1719BCU	Length = 1.5 meters
Voltage supply		
ZA1719BCU	via USB interface on the PC	
ZA1719BT1XS	via ALMEMO® measuring instrument, approx. 35 mA (9 V)	

ZA 1719 BCU ZA 1719 BT1XS

- Connection of the CPU module to the USB interface on a PC
- Connection of the plug-in slave module to socket A1 on an ALMEMO® device

	Order no.
Option for plug-in module ZA1719BT1XS	
Cable between ALMEMO® connector and module Length = 1 meter	OA1719BK

Variants

	Order no.
Paired wireless PC connection (USB) for 1 ALMEMO® measuring instrument (configured and ready-to-operate)	
Bluetooth CPU module with USB (ZA1719BCU) and plug-in Bluetooth slave module (ZA1719BT1XS)	ZA1719BPVU

12/2019 • We reserve the right to make technical changes.

ALMEMO® Network technology

12/2019 • We reserve the right to make technical changes.

Wireless sensor connection via Bluetooth

Wireless sensor connection from a Bluetooth measuring device to a measuring input of a receiving ALMEMO® device with Bluetooth sensor module. Four measuring channels per connection can be transmitted. Any number of sensor connections in parallel is possible.

Sensor connection via Bluetooth sensor measuring device ALMEMO® 2790 with built-in Bluetooth module

MA 2790-BTFM

ALMEMO® 2790
with sensors for humidity, temperature, atmospheric pressure
option OA 2790-RHA

ZA 1729-BTFS

- Connection of an ALMEMO® sensor to the measuring input M0 of the ALMEMO® Bluetooth device.
- Connection of the plug-in sensor module to the input socket Mxx of a receiving ALMEMO® device.

Technical features:

- 1 measuring input for all ALMEMO® sensors.
- Optional: Integrated digital sensor for humidity, temperature, atmospheric pressure. Sensors can be plugged in, replaced and individually calibrated (without any measuring instrument).
- Power supply with 3 AA rechargeable NiMH batteries, with charging via the device itself. (Please order the mains unit separately)
- Power saving sleep mode (save-to-memory cycle starting at one minute). Operating time (per charged battery) up to 200 hours with memory cycle of 1 minute, respectively 1 year with memory cycle of 1 hour.
- modern, compact housing, also for DIN rail mounting housing
- Generously dimensioned 2-row static 7 / 16 segment display including units
- Operating functions: cycle, keys can be locked via password, atmospheric pressure compensation.

Technical data MA 2790-BTFM

Measuring input:	1 ALMEMO® input socket
A/D converter, measuring ranges, standard equipment, housing: as for ALMEMO® 2490-1, see page 01.14, but:	
Sensor supply:	6 / 9 / 12 V (depending on the programmed minimal sensor supply voltage- in the ALMEMO® plug), max. 150 mA
Power supply: Rechargeable battery:	5 to 13V DC not galvanically isolated. 3 AA rechargeable NiMH batteries, integrated charge circuitry
Current consumption:	approx. 14 mA with radio link (without sensor)
ALMEMO® socket DC:	for mains unit /interfaces
Bluetooth connection:	master module integrated

Accessories:	**Order no.**
mains unit 12V/2A	ZA1312NA10
DC adapter cable 10 to 30 V DC, 12V/0.25A galvanically isolated	ZA2690UK
DIN rail mounting	ZB2490HS

Option:	**Order no.**
Integrated digital sensor for humidity, temperate, atmospheric pressure, (technical data FHAD 46-C2 see chapter Air humidity)	OA2790RHA

Technical data ZA 1729-BTFS

Common technical data see page 04.07	
Power supply:	via ALMEMO® measuring instrument, approx. 25 mA (9 V)
Module housing:	ALMEMO® plug, 61 x 20 x 8 mm (LxWxH), ABS

Variants

	Order no.
Paired wireless sensor connection (configured and ready-to-operate) with Bluetooth sensor measuring device ALMEMO® 2790, comprising:	
Bluetooth sensor measuring device ALMEMO® 2790, 1 measuring input, integrated Bluetooth, including 3 AA rechargeable NiMH batteries (MA2790BTFM), and Bluetooth sensor plug-in module (ZA1729BTFS)	**MA2790BTFV**

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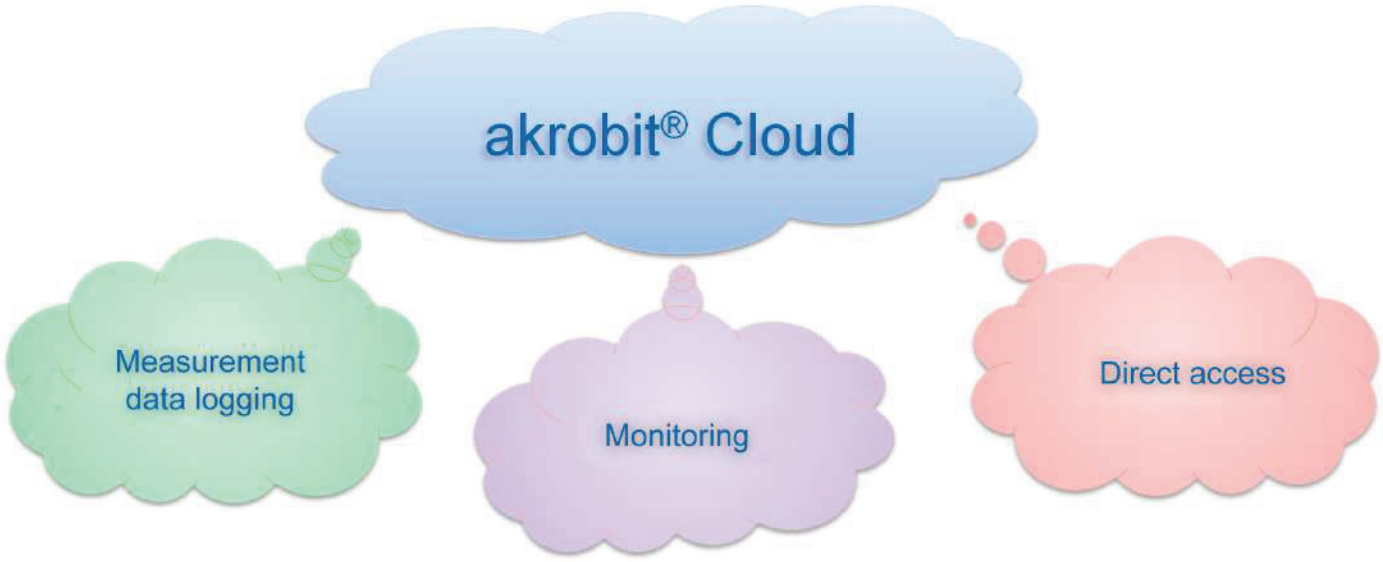
ALMEMO® Network technology

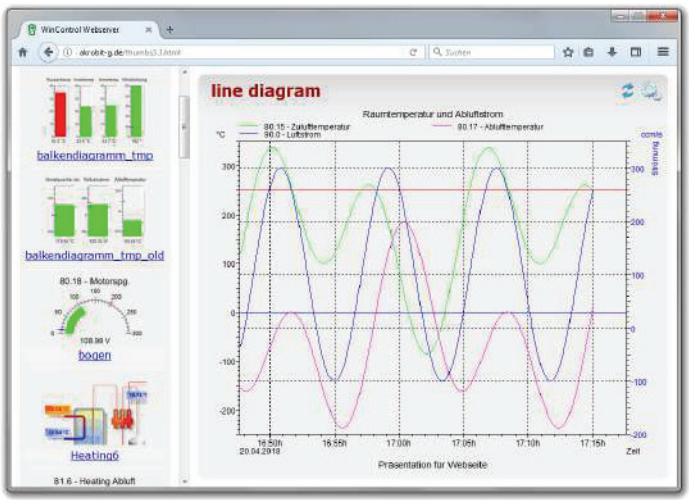
Mobile internet, combined with keywords such as cloud computing and web access, is a topical issue. Thanks to our solutions, you can connect your ALMEMO® measuring technology via the internet and record it centrally. It is irrelevant where the measuring technology is located. You have worldwide access to the recorded data of all the measuring devices via the browser on your PC in your office.

It is possible to connect via LAN, WLAN, or via mobile communications. Requirement for this setup is a corresponding data cable (ZA 1945-DK), WLAN module (ZA 1719-WL), or modem (ZA 1709GPRS), and an internet connection respectively a sufficient coverage for mobile communication on site



The akrobit® cloud server (responsible for the acquisition of measured data) queries the data from the measuring devices, saves the data and provides the data in a variety of formats to be downloaded or sent via email. RMT WinControl is recommended to display and evaluate the data (e.g. with arithmetic channels).

In the access-protected area, current measured values and measurement processes can be viewed in a browser. It is possible to set an alarm email that is triggered by a component failure or a limit value infringement



Alternatively, a direct connection to the measuring device is provided as well. In that case, the user himself is responsible for data acquisition, data storage and the alerting procedure. To manage this, the AMR WinControl software is recommended since this software has been specially developed for the convenient handling of ALMEMO® devices. The measuring device can be accessed via a secure VPN connection

Cloud service	C1	C2	C3	C4	CD
Measured value files available for download (can also be sent by email)	✓	✓	✓	✓	
Online-Visualization via web browser		✓		✓	
Alert in case of component failure or a limit value infringement (email)			✓	✓	
Customer can directly access the measuring device					✓
Contract with akrobit (24 month/ extension 12 month)					
Customer software (recommended)					
AMR WinControl					✓
RMT WinControl	✓	✓	✓	✓	

The cloud service is provided by the akrobit software GmbH. The actual prices depend on the number of devices and the desired services. Data acquisition via the mobile communications implies additional costs for the SIM card and for the transmitted data. The customer can either provide a suitable SIM card himself or the akrobit software GmbH can offer one. In case the modem is used outside Europe, it is mandatory that the customer himself provides the SIM card.

On request, we will be pleased to provide a demo version.

06/2018 • We reserve the right to make technical changes.

Mobile communications modem ZA 1709 GPRS

- Remote interrogation and remote control of ALMEMO® devices
- Ideal for measuring operations at remote sites
- Automatic memory readout or inexpensive 24-hour online measuring - thanks to a charges structure according to actual data usage.

Technical data

Frequency range	GPRS 850 / 900 / 1800 / 1900 MHz UMTS: 800/850/900/1900/2100 MHz
Connections	RS-232 (9600 baud, 9-contact. sub-D socket) FME antenna connection (male) Power supply, SIM card reader
Power supply	10 to 30 V, via mains unit, included in delivery or via cable for external voltage
Current consumption	maximum 1.2 A at 12 V
Operating temp.	-30 to +75 °C (mains unit 0 to +40 °C)
Dimensions	65 x 74 x 33 mm
Weight	approx. 110 g
Mains unit	Input voltage 110 to 240 VAC Output voltage 10.5 to 13.5 VDC Operating temperature 0 to +40 °C

Advisory note:
For technical reasons a special data tariff and a VPN access are required; these can be arranged via „akrobit software GmbH“. Akrobit software GmbH offers various tariffs for VPN and mobile communications; depending on the tariff chosen, the Mobile communications modem can be used within Germany, within Europe, or worldwide.
A VPN client software must also be installed on the computer used for evaluation. The VPN client software is included in delivery free-of-charge. For automatic memory readout the software AMR WinControl is required together with additional module „Automatic ALMEMO® memory readout“ SW5600WCZM9.

Accessories

	Order no.
Additional protocol „Automatic memory readout“ for WinControl (SW5600WC1/2/3/4)	**SW5600WCZM9**
Power supply cable with plug to the modem and free ends for external voltage 10 to 30 V DC, minimum of 1.2 A for 12 V DC	**ZB1709EK**

Variants:

	Order no.
Mobile communications modem for connecting to ALMEMO® devices, including data cable ZA1909DK5, adapter ZA1709AS, mains unit, documentation, antenna with magnetic base Cable approx. 2.5 meters.	**ZA1709GPRS**