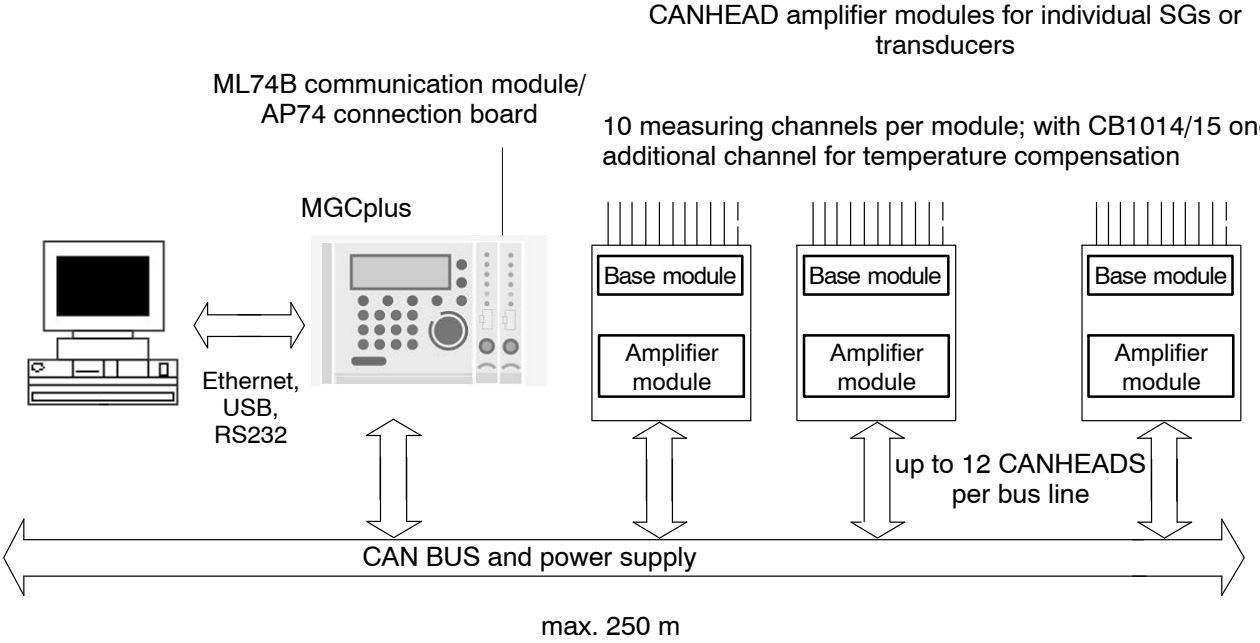
CANHEAD

Data Sheet

Special features

- **10–channel amplifier modules for installation close to measuring points**
- **Measured data transmission to communication master via field bus**
- **Base modules for individual SGs, SG full and half bridges, DC voltage sources**
- **Suitable for unlimited cascading**
- **Uniform amplifier module for all base module types**
- **Connection of amplifier module/base module by simply plugging in**

Distributed measurement acquisition



Specifications

Amplifier module							
Type		**CA1030**					
Accuracy class		0.1					
Carrier frequency		600					
Number of measurement channels		10 (plus 1 compensation channel)					
Bridge excitation voltage [1]		0.5; 1.0; 2.5 (global changeover for all channels)					
Measuring ranges	mV/V	20; 10; 4 (acc. to bridge excitation voltage)					
Measurement resolution	bits	up to 23					
Sampling rates [2]	1/s	1; 2; 5; 10; 20; 25; 30; 50; 60; 100; 150; 300					
Filter type: Bessel		Nom. value (Hz)	−3 dB (Hz)	−1 dB (Hz)	Delay-time (ms)	Internal Sampling rate [4] (Hz)	
		25	23.2	13.1	13.3	300	
		10	10.43	5.94	33.3	300	
		5	5.08	2.90	76.7	150	
		2.5	2.523	1.439	163.3	75	
		1.25	1.259	0.718	336.6	37.5	
		0.6	0.6297	0.359	683.3	18.75	
		0.15	0.1623	0.0910	1712	300	
		0.08	0.0811	0.0455	3411	300	
		0.04	0.0406	0.0227	6814	150	
Additional phase delay resulting from CANbus data transmission, depending on the number of CANHEADs assigned on the ML74B.	Number	1	2	3	4	5	6	7–12
	ms	6.67	13.33	20.0	26.7	33.3	40.0	80.0
Noise							
Filter [3]	Hz	25	10	5	2.5	1.25	
Noise, typ. (peak–peak) of the measuring range	%	0.015	0.009	0.006	0.004	0.003	
Power supply (electrically isolated in the amplifier)	V	10...36					
Insulation resistance (supply to SG connection, CAN bus or housing)	V	50					
Power consumption							
Module (without SGs)	W	typ. 1					
Module with max. SG count	W	typ. 1.8					
CAN bus interface							
Baud rate	kBaud	250					
Bus length, max. (see table on next page, top)	m	250					
Number of base modules on the bus, max.		12 (=120 channels)					
Synchronization		all the bus nodes are synchronized phase–locked with defined CAN messages					
Insulation resistance		50					
Mechanical system and environment							
Connection to base module		all connections via a 64–pin VG strip (DIN 61412)					
Dimensions (w x l x h), approx.	mm	118 x 71 x 23					
Weight, approx.	g	120					
Temperature range							
Operation	°C	–30 ... + 70					
Storage	°C	–30 ... + 70					
Perm. rel. humidity, non–condensing	%	10 ...90					
Degree of protection		not relevant, as plug–in module					
Maximum configuration							
per ML74B		max. 12 CANHEADs (120 SG measuring points)					
per MGC system (max. two ML74B)		max. 24 CANHEADs (240 measuring points), any desired number of cascadeable MGCplus					

[1] When using half bridge (full bridge) with CB1010 and an excitation voltage of 2.5 V, the transducer impedance must be 120 ohms (230 ohms) at least.

[2] The data transmission rate of the CANbus is limited to a total of 3,000 values/s. Therefore, if several CANHEADs are connected to the same bus line, the sampling rate of each individual module may be additionally limited (e.g. 5 CANHEADs correspond to 50 channels on one bus line; max. sampling rate: 60 Hz).

[3] When used with CB1010 in a half–bridge configuration, the noise is independent of the current filter setting; the filter frequency specification 25 Hz applies.

[4] In the CA1030, the sampling rate on the input side is 1200 Hz. Implementation of digital filters requires a reduction of the sampling rate (through repeated averaging and subsampling). This reduced sampling rate is called “internal sampling rate”.

Specifications

Maximum bus length in m (without drop lines, Thin Media Cable, 0.38 mm^2, ambient temperature < 45°C				
for quarter bridges with... for half bridges with... for full bridges with... for DC voltage measurement	120 Ω 120 Ω 240 Ω –	– – 350 Ω –	350 Ω 350 Ω 700 Ω –	≥ 700 Ω ≥ 700 Ω ≥ 1400 Ω –
Power consumption per CANHEAD[1] about	1.70 W	1.35 W	1.15 W	1.00 W
No. of CANHEADs[2]				
12	90 m	125 m	140 m	165 m
11	100 m	140 m	155 m	180 m
10	110 m	155 m	170 m	200 m
9	120 m	170 m	190 m	220 m
8	135 m	190 m	215 m	250 m
7	155 m	220 m	250 m	250 m
6	180 m	250 m	250 m	250 m
5	220 m	250 m	250 m	250 m
≤ 4	250 m	250 m	250 m	250 m

[1] 2.5 V bridge excitation voltage (most unfavorable case)

[2] Bus length computed for the case of all CANHEAD modules concentrated near the end of the bus line (most unfavorable case)

Base modules for individual SGs in quarter–bridge connection				
Type		**CB1014**	**CB1015**	**CB1016**
		3-wire circuitry	4-wire circuitry	
Transducer		Single SG		
Available versions Each base module is provided with an internal completion resistor. Its resistance value depends on the respective version.		120 Ω 350 Ω 700 Ω 1000 Ω		120 Ω 350 Ω – –
Max. connection lengths for 3-wire and 4-wire circuitry as per EN IEC 61000–4–5	m	30		
Related amplifier module		CA1030		
Number of measurement channels		10 (plus 1 compensation channel)		10
Selectable compensation methods for all channels simultaneously, individually disconnectable or connectable		– no compensation – with compensation – with PT100 and polynomial correction		–
Temperature range for PT100 compens.	°C	–100 ... +200		–100 ... +200
Shunt resistor external internal		A shunt resistor with certification that can be plugged into a plinth can be cut in to all the measuring points one after the other. Standard misalignment 1 mV/V		
Miscellaneous		All the relevant channel and measuring point information is saved in non–volatile memory.		
Mechanical system and environment				
CAN BUS connection (male and female connectors)		5–pin M12 fixed connector for CAN bus and excitation (as per the DEVICENET specification)		
Amplifier installation		64–pin VG socket connector strip		
Measuring point connection		CAGE CLAMP spring–loaded terminals for line cross–sections 0.08 ... 0.5 mm^2 (AWG 28...20). Plus solder pads for soldering		RJ45 shielded sockets *)
Displays		2 status LEDs		
Enclosures		Aluminum		
Dimensions (w x l x h), approx.	mm	182 x 131 x 40		
Weight, approx.	g	540 (without CA1030)		
Protection system		IP30		
Temperature range Operation Storage	 °C °C	 –30 ... +70 –30 ... +70		
Perm. rel. humidity, non–condensing	%	10 ... 90		
EMC compliance applies with CA1030 amplifier module plugged in		per EN 61326 (if shielded cables and, if required, shielded plugs are used)		

*) For EMC reasons, we advise agaiunst using RJ11 plugs, that are electromechanically compatible, instead of shielded RJ45 plugs.

Specifications

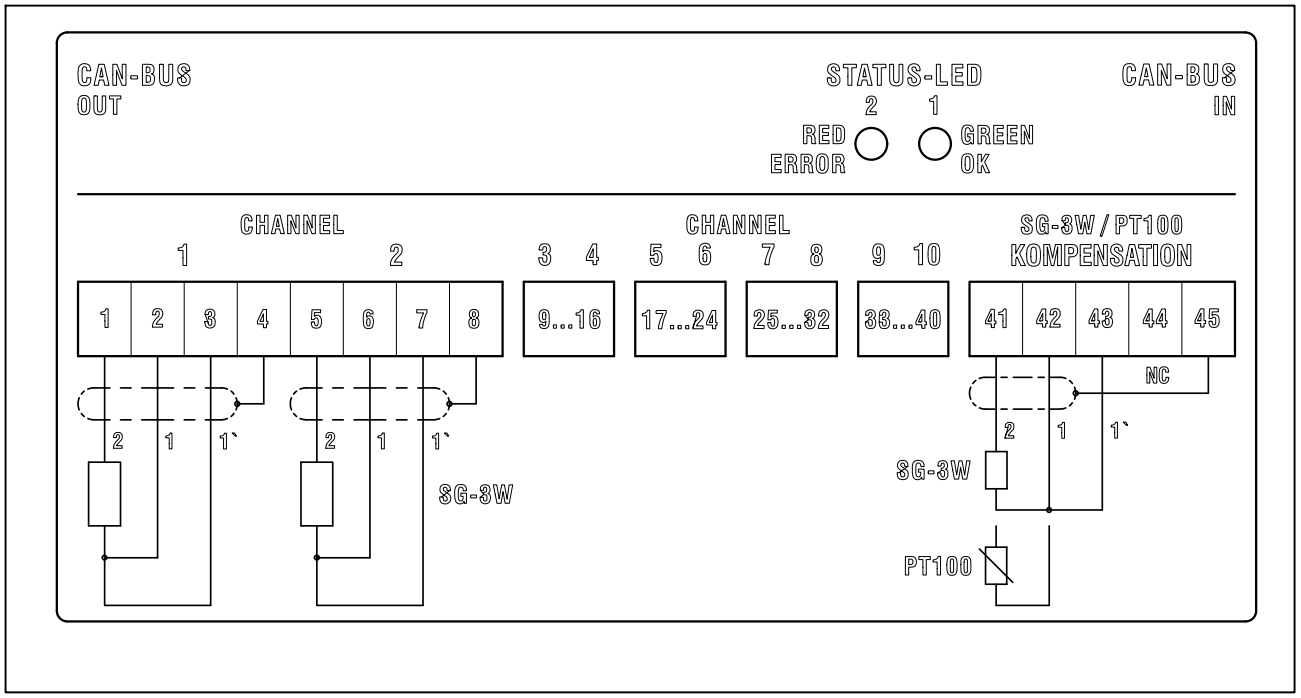
Base module for SG half and full bridges, measurement of DC sources		
Type		**CB1010**
Accuracy class	%	With strain−gage half and full bridges: 0.1 With measurement of DC voltage sources: 0.2
Transducer Types Excitation		 Full and half bridges in regulated 6−wire circuitry, DC sources Setting of excitation voltage for full and half bridges via the measuring amplifier
Voltage input Measuring range Perm. common−mode voltage (channel−channel; channel housing) Input resistance, symmetrical	 V_{DC} V MΩ	 ±10 ±45 2
Connection lengths, max. [1]	m	30
Mixed operation		All channels individually configurable for full bridge, half bridge or 10 VDC
T−ID/TEDS		For full and half bridge in zero wire technology With voltage signals, connection to separate cable cores is required
Related amplifier module		CA1030[2]
Number of measurement channels		10
Power consumption	W	< 0.1 (without transducer and without measuring amplifier)
Miscellaneous		All the relevant channel and measuring point information is saved in a non−volatile memory
Mechanical properties and environment		
CAN BUS connection (male and female connectors)		5−pin M12 fixed connector for CANBUS and supply (as per the DEVICENET specifications) Electrical isolation between CANBUS and supply
Amplifier installation		64−pin VG socket connector strip
Measuring point connection		RJ45 shielded sockets
Displays		2 status LEDs
Enclosures		Aluminum
Dimensions (w x l x h), approx.	mm	182 x 131 x 40
Weight, approx.	g	540 (without CA1030)
Protection system		IP 20
Temperature range Operation Storage	 °C °C	 −30 ... + 70 −30 ... +70
Perm. rel. humidity, non−condensing	%	10 ... 90
EMC compliance, applies for all base modules with plugged in CA1030 amplifier module		per EN 61326 (if shielded cables and shielded plugs are used)

[1] as per EN IEC 61000−4−5

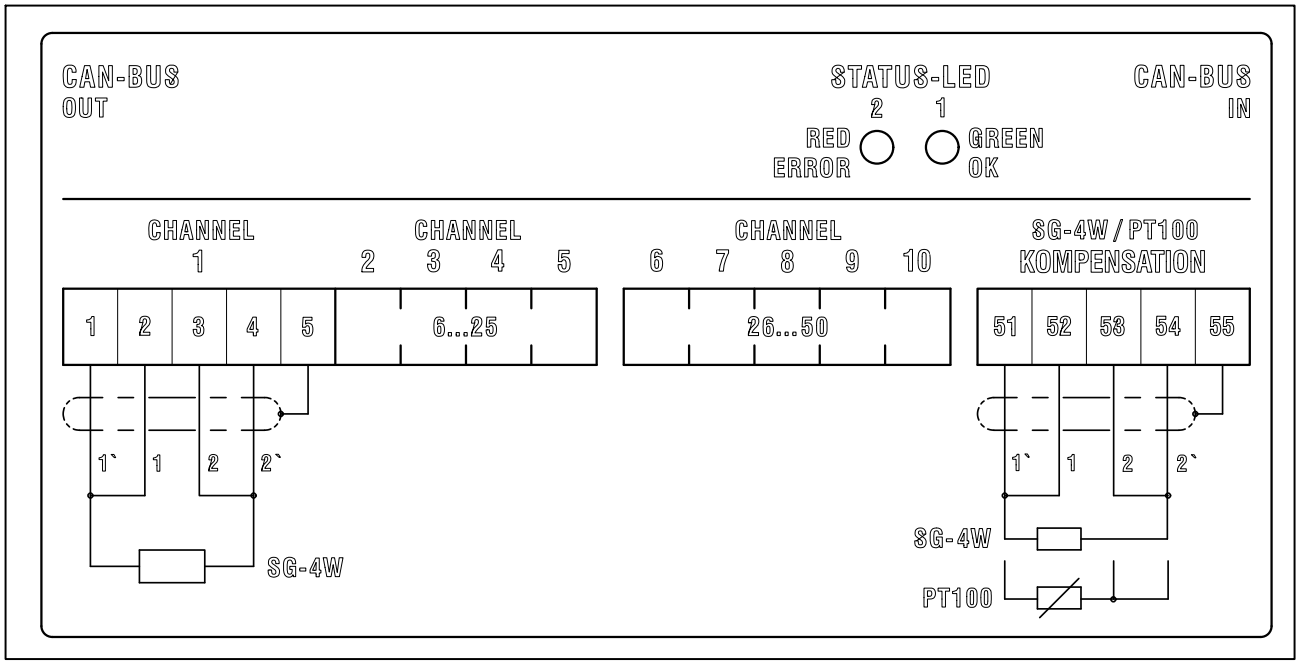
[2] required hardware revision: 1.20 or higher

Documentation for the CANHEAD system with ML74B and AP74 is included on the MGC system CD.

Pin assignment CB1014/1015

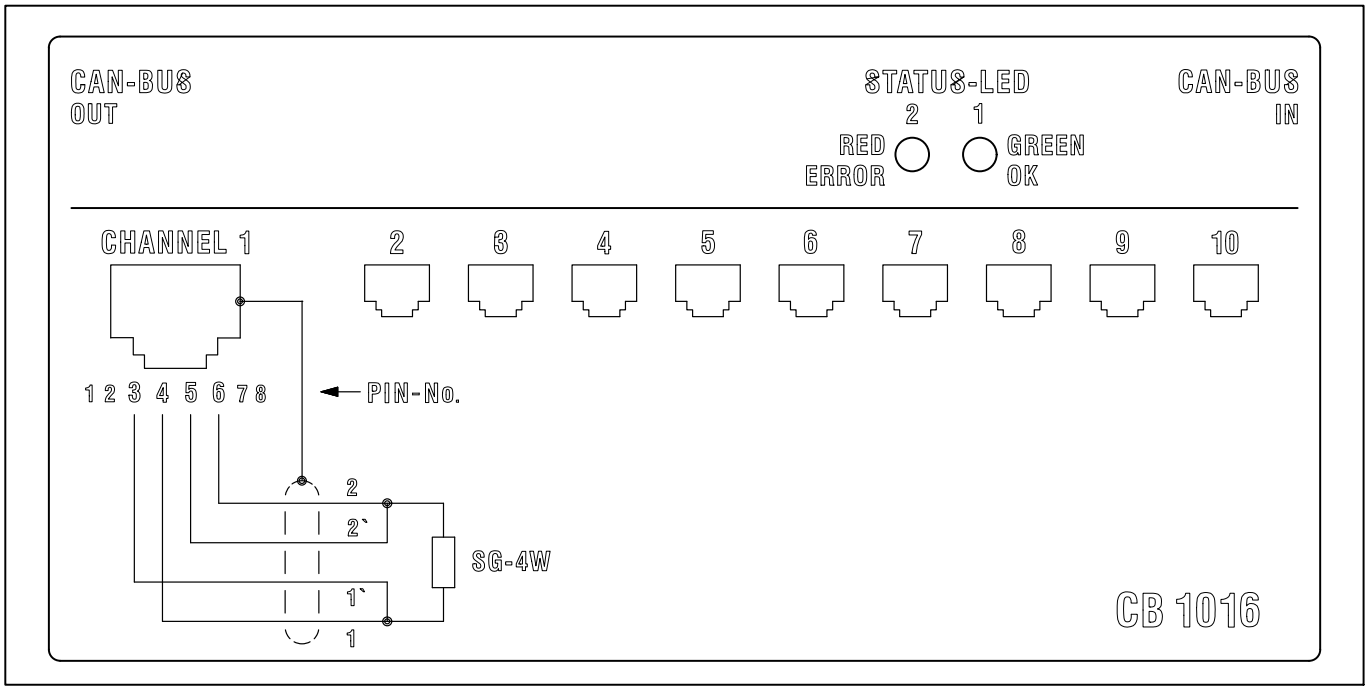


CB1014 assignment (three–wire circuit)



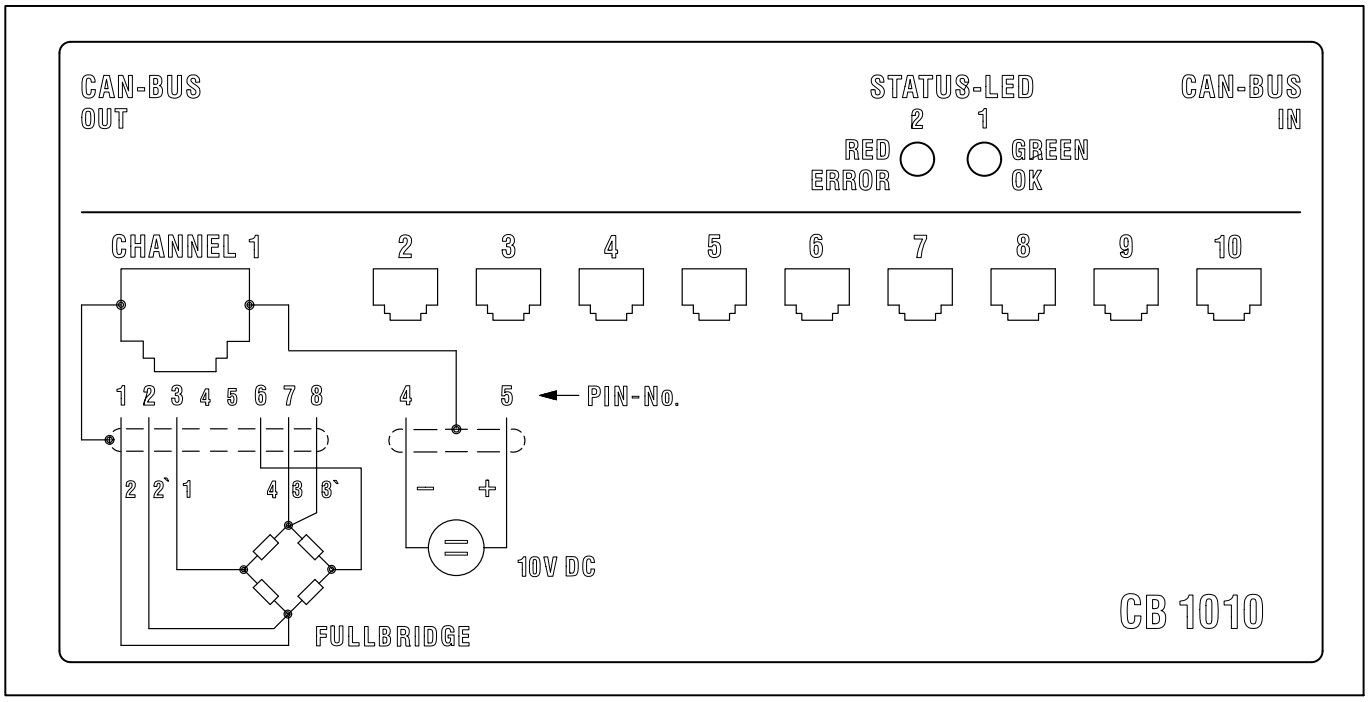
CB1015 assignment (four–wire circuit)

Pin assignment CB1016



CB1016 assignment (four-wire circuit)

Pin assignment CB1010



Full bridge and DC connector assignment[1)]

1) In a half–bridge configuration the same assignment applies as in a full–bridge configuration, though wire 4 is omitted, meaning pin 6 is disabled.

Table of types and scope of supply

Amplifier module: CA1030

Base module

Completion resistor (Ω)	Quarter bridge / 3-wire	Quarter bridge 4-wire	Quarter bridge 4-wire	Half and full bridges, DC voltage sources
	Terminal connector		RJ45 connector	
–	–	–	–	CB1010
120	CB1014–120	CB1015–120	CB1016–120	–
350	CB1014–350	CB1015–350	CB1016–350	–
700	CB1014–700	CB1015–700	–	–
1000	CB1014–1000	CB1015–1000	–	–

Scope of supply

Base or amplifier module

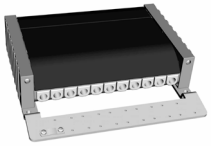
Mounting instructions

With CB1014 and CB1015: 11 cable bushings each Ø5.2 mm and 7.5 mm

Accessories, to be ordered separately**:**

	Order number:
CANBUS:	
T-piece	1–Canhead–M12–T
M12 male and female connector	1–Canhead–M12
M12 CAN termination resistor	1–Canhead–TERM
2 m connection cable	1–Kab267–2 (Devicenet cable, with integral connectors for setting up a CAN line)
Cable by the meter	4–3301.0180
ML74B	1– ML74B (see documentation for MGCplus)
AP74	1– AP74 (see documentation for MGCplus)
Mounting set	1–Canhead–MOUNT

consisting of 1 pc. adapter frame with strain relief for the measurement cable



and 2 pc. adapter lugs to be mounted on side

Measuring point connection for CB1010:

Connection cable with loose ends and 8–pin RJ45 connector, 3 m long	1–KAB156–3
Adapter cable (RJ45/DSUB 15–pin)	1–KAB417

IP65 housing on request

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