Coded hose couplings
with RFID technology

KC

Appliance information

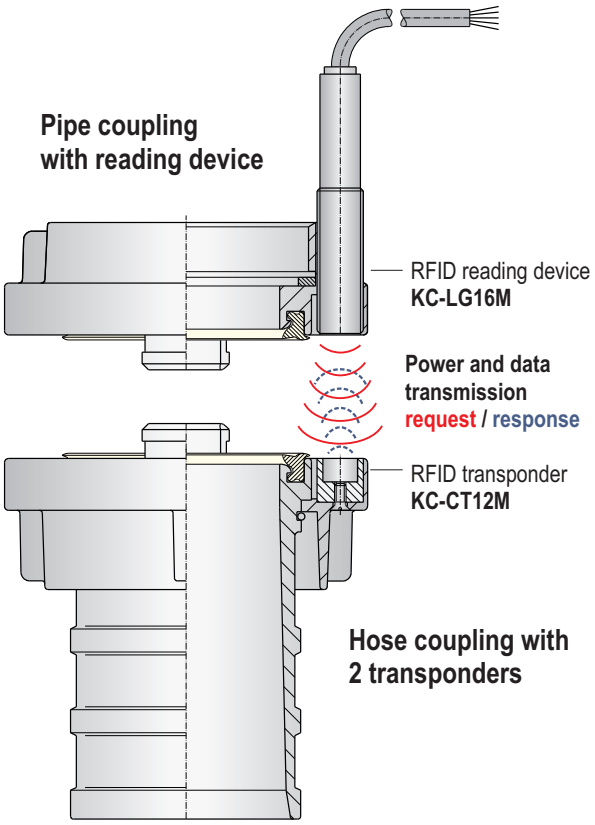
RFID system with separate power supply for 16 reading devices

Index

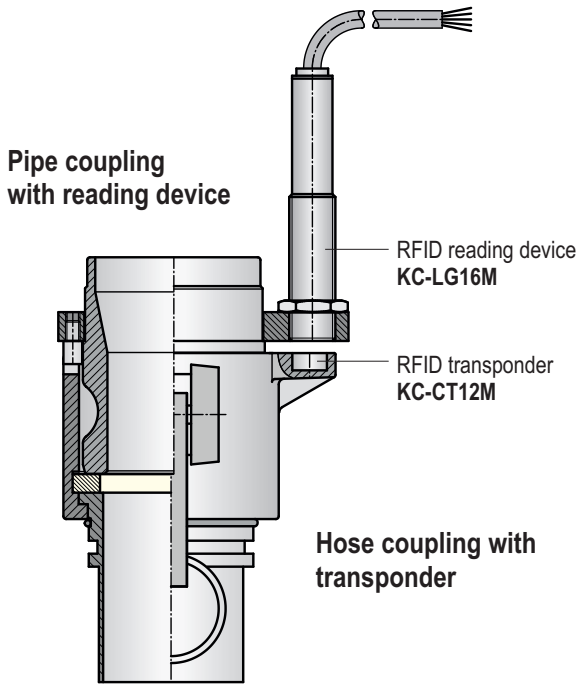
Appliance information

Coded couplings with RFID technology

Drawing (Storz couplings used as an example)



Drawing (KAMLOK couplings used as an example)



Application

- Identification of any distribution system like hose and tube lines as well as containers, boxes, sacks, barrels and pallets in the warehouse.
- Process control continuously informed about product flow.
- Good overview even for crossed and intertwined hoses.
- Higher product safety due to the mix up of hose connections by human error is no more possible.
- Complete plant internal product distribution shown online in the process control room.
- Avoiding of accidents caused by mix-up.
- Complete documentation and reproducibility of product distribution in the internal processes.
- Control of contamination of hoses, pumps, containers, etc.
- Control of maintenance periods of hoses and locking of conveying in case of exceeding.

MOLLET hose couplings are used in:

pharmacy, chemistry, petrochemicals, breweries, wine cellars, dairies, seeds, foodstuffs and animal feed, coatings, paint, rubber, plastics and building materials industry.

MOLLET plans and supplies complete coupling stations with all common couplings including evaluation and data transmission.

Function

- The RFID reading device functions as a transmitting and receiving unit and produces an electromagnetic field and emits radio waves.
- Should be a transponder in this electromagnetic area, the flux lines transmitted by the reading device will generate energy in the antenna coil of the transponder by induction over the antenna, thereby supplying the transponder with power. A signal of the reading device activates the transponder, so that the stored data will be transmitted to the reading device.
- The reading device checks the received data several times and forward them after this to the RS485 bus.

RFID

RFID means Radio Frequency Identification.

With this technology data are contact-free transmitted from the transponder to the RFID reading device without the need for visual contact.

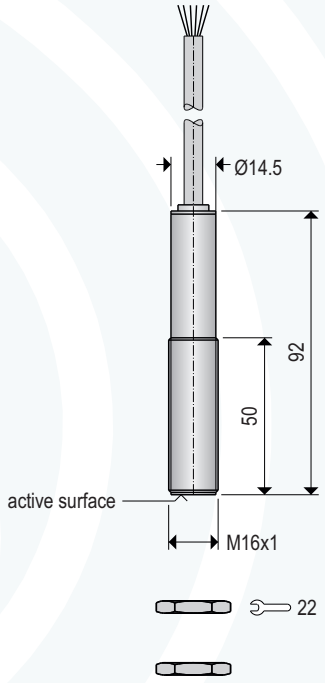
The term transponder is a combination of the english words transmitter and responder.

Appliance information

RFID reading device and transponder

Dimensions

RFID-Reading device **KC-LG16M-10**
KC-LG16M-HT-10



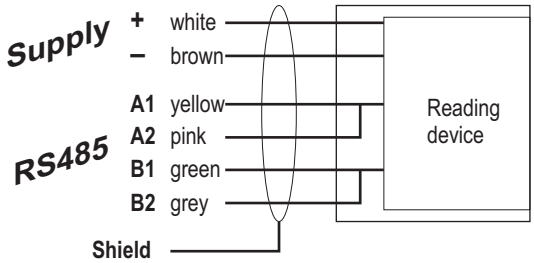
Technical data

Material	Housing	Stainless steel 1.4571 / 316 Ti
	active surface	PTFE
	end cap	PA
Supply voltage		7 ... 9 V DC (-10% / + 5%)
Power consumption		50 mA
Read distance		1 ... 5 mm
Interface		serial
Physical		RS485 (2-wire)
Transfer rate		9600 Baud 8 data bits, 1 stop bit, no parity
Ambient temperature		**KC-LG16M** -20 °C ... +60 °C **KC-LG16M-HT** -20 °C ... +85 °C
Mounting position		any
Type of protection		**IP66** acc. to DIN EN 60529
Maintenance		none

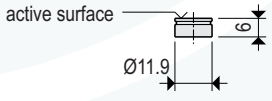
Electrical connection

Cable	LIYCY-O, 6 x 0.34 mm², potted in cable
Cable length (KL)	**10** = 10 m
Connection type	open cable end

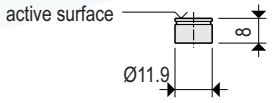
Wire



RFID-Transponder **KC-CT12M6**



RFID-Transponder **KC-CT12M8**



Technical data

Material	Housing	PTFE
Mounting position		any
Ambient temperature		-20 °C ... +85 °C
Type of protection		**IP66** acc. to DIN EN 60529
Memory retention		5 years after the last read-out

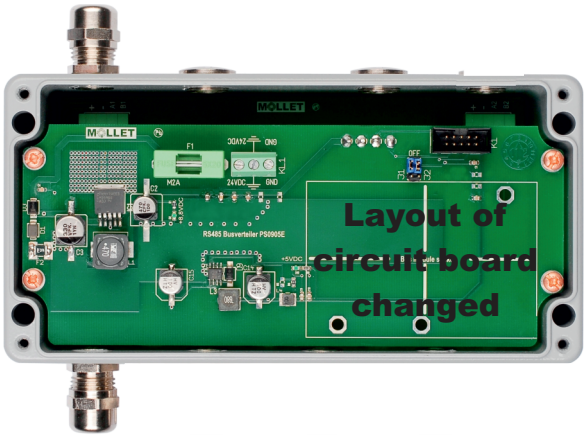
ATEX option

B0 Dust Ex II 3D Ex tc IIIB T95 °C Dc

Appliance information

RS485 bus power supply and bus distributor

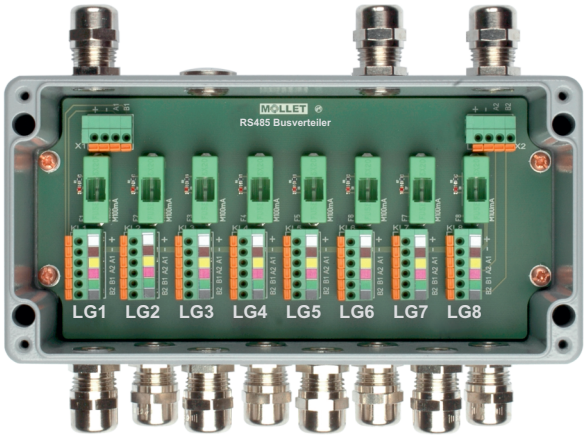
Bus power supply KC-NG02M-C5



Technical data

Material	Housing	Aluminium, RAL 7001
Supply voltage		12 V (-10%) ... 24 V DC (+5%) **for supply of 2 pieces KC-BV08M**
Fuse		M2.5 A
Power consumption		50 mA each affiliated reading device, maximum 0.8 A at 24 V DC
Output		8 V DC for KC-BV08M
Cable entry		2x metal cable gland M16x1.5
Ambient temperature		-20 °C ... +60 °C
Mounting position		any
Type of protection		**IP66** acc. to DIN EN 60529
Maintenance		none

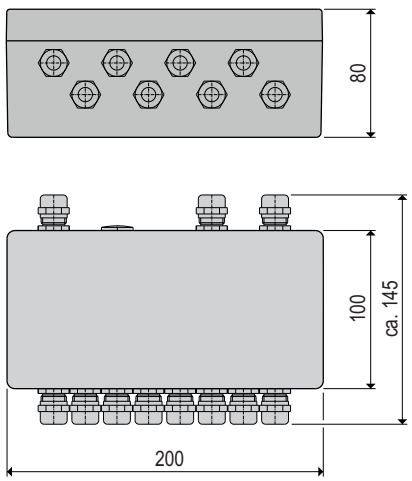
Bus distributor KC-BV08M-C0



Technical data

Material	Housing	Aluminium, RAL 7001
Supply voltage		7 V (-10%) ... 9 V DC (+5%)
Fuse		M100 mA for each single reading device
Power consumption		50 mA each affiliated reading device, maximum 0.4 A at 24 V DC
Cable entry		11x metal cable gland M16x1.5
Connections	Input	RS485 bus / power supply (2-wire + 3-wire or 1x 4-wire)
	Output	RS485 bus / power supply (4-wire)
	In- / Output	up to 8 reading devices KC-LG16M
Ambient temperature		-20 °C ... +60 °C
Mounting position		any
Type of protection		**IP66** acc. to DIN EN 60529
Maintenance		none

Dimensions



Electrical connection

Connection clamps
Bus power supply max. 1.5 mm²

Supply **24VDC (+)** ⏚ **GND (–)**

Connection clamps
Bus distributer max. 1.0 mm² (Supply 8 V, RS485 and reading device)

Supply 8 V DC **+** and **–** (1x supply line and 1x connection)

RS485 **A1 B1** and **A2 B2** (supply line and connection)

Reading device

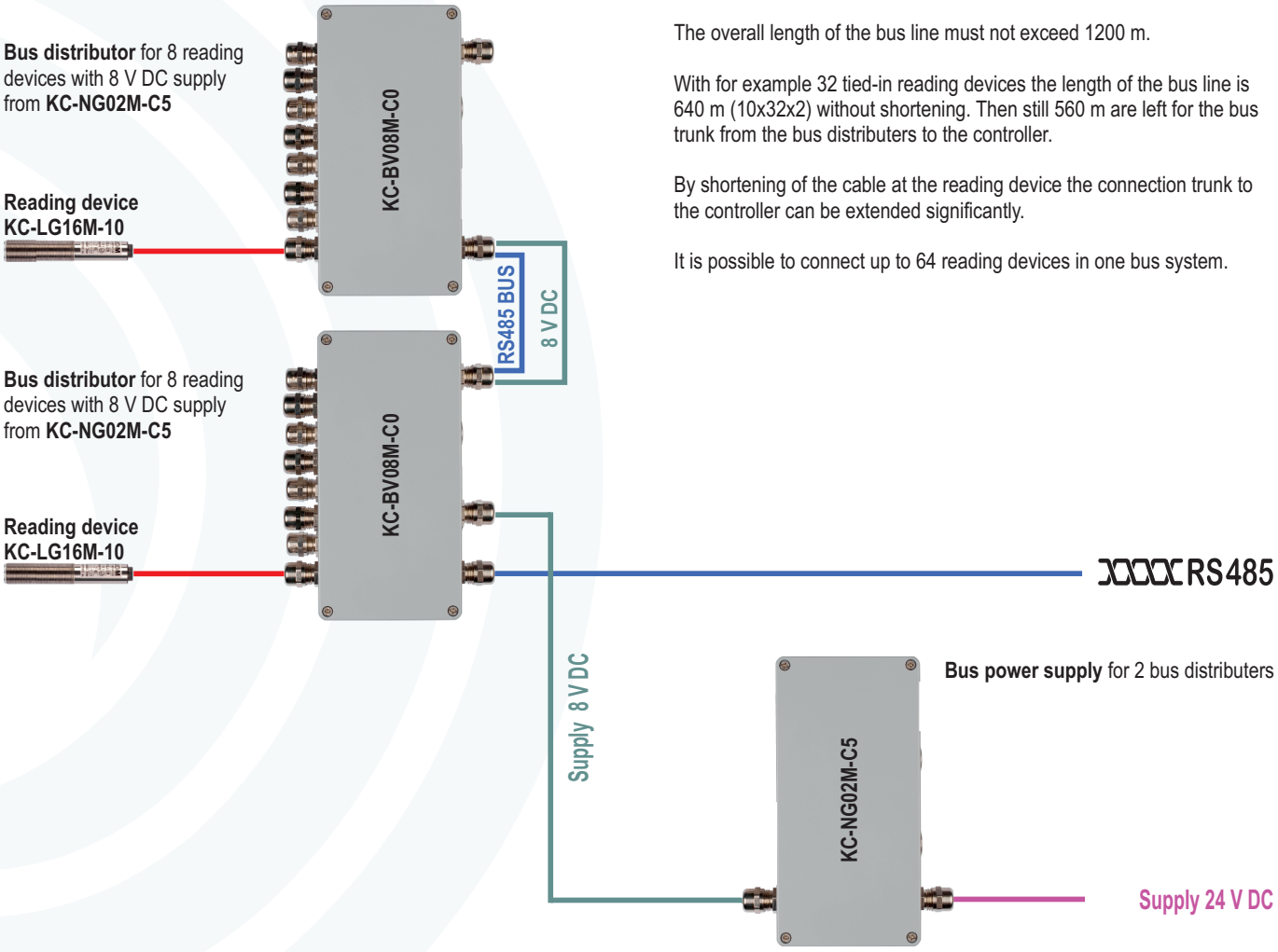
+	white
–	brown
A1	yellow
A2	pink
B1	green
B2	grey

Shield inside of the cable gland

Appliance information

Example of wiring for RS485 bus distributor

Example of wiring



RS485 bus line to the reading devices

The bus is leaded from the bus distributer to the reading devices and back.

The overall length of the bus line must not exceed 1200 m.

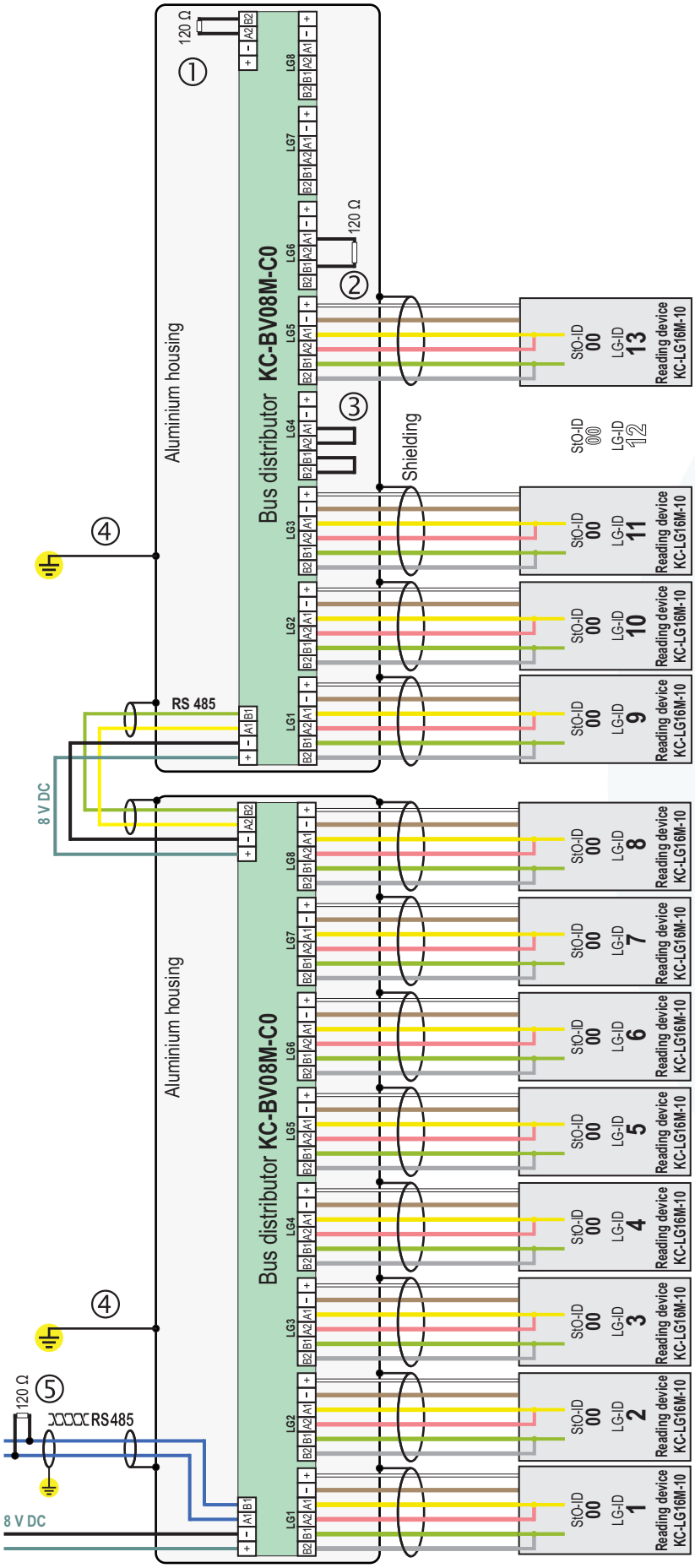
With for example 32 tied-in reading devices the length of the bus line is 640 m (10x32x2) without shortening. Then still 560 m are left for the bus trunk from the bus distributers to the controller.

By shortening of the cable at the reading device the connection trunk to the controller can be extended significantly.

It is possible to connect up to 64 reading devices in one bus system.

Appliance information

Wiring of RFID reading devices at bus distributor



Please insert the enclosed termination resistor 120 Ω at the end of the bus cable:

① at the leaving connection A2-B2,
in case that all LG connections are occupied.

② at the following connection A1-B1,
in case that **not** all LG connections are occupied.

③ In case that a LG connecting point is provided as back-up for a later installation, the bus has to be connected with two bridges from A1 to A2 and from B1 to B2.

④ Housings and shieldings have to be grounded.

Connect shieldings metallically with cable glands.
(see assembly instruction of cable glands)

⑤ At the beginning of the RS485 bus line a resistor with 120 Ω has to be insert.

In a **de-energised state**, a resistance of approx. 60 Ω can be measured between A and B after a successful installation.

Data protocol

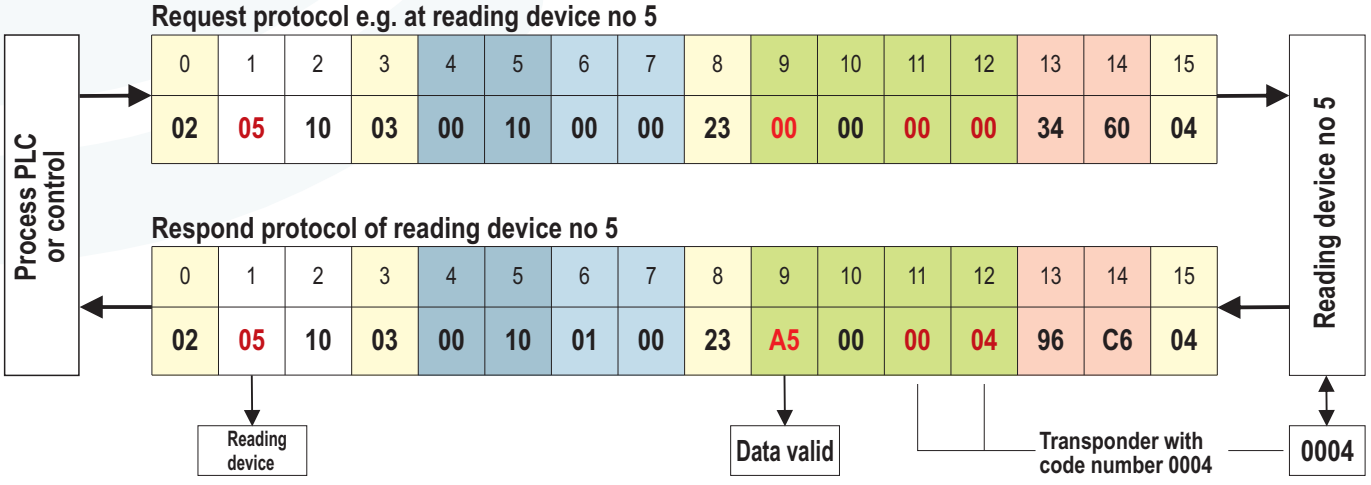
Protocol structure of signal transmission

Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fct	SOM 0x02	Slave ID	Länge 0x10	STX 0x03	IDX L	IDX H	SIDX L	SIDX H	# 0x23	Data [0]	Data [1]	Data [2] H	Data [3] L	BCC L	BCC H	ETX 0x04

Protocol description

0	**SOM**	Start Of Message			
1	**Slave ID**	Reading device no (**LG-ID**)	**Value**	0x01 ... 0xF0	for selection of a reading device **0xFF** only being carried out for test purposes, not allowed for real operation
2	**Length**	Length of telegramm	**Value**	0x10	
3	**STX]**	Constant	**Value**	0x03	insert in request protocol always **0x0**
4	**IDXL**	Order **index L**	**Values**	0x00	**0x1000** GETTAG requires the code number of the transponder **0xAFFE** RESET restart reading device
5	**IDXH**	Order **index H**	**Values**	0x10	
6	**SIDXL**	Order **subindex L**	**Values**	0x00 ... 0xFF	for programming of reading device, insert in request protocol always **0x00**
7	**SIDXH**	Order **subindex H**	**Values**	0x00 ... 0xFF	for programming of reading device, insert in request protocol always **0x00**
8	**#**	Constant	**Value**	0x23	insert in request protocol always **0x23**
9	**DATA[0]**	Constant check sum	**Value**	0xA5	insert in request protocol always **0x00**
10	**DATA[1]**	Location no (**StO-ID**)	**Values**	0x00 ... 0xFF	default **0x00**, possibility of programming a location ID
11	**DATA[2]H**	Code no **H** (**CT-ID**)	**Values**	0x00 ... 0xFF	H-code number of the transponder, insert in request protocol always **0x00**
12	**DATA[3]L**	Code no **L** (**CT-ID**)	**Values**	0x00 ... 0xFF	L-code number of the transponder, insert in request protocol always **0x00**
13	**BCCL**	Check sum L	**Values**	0x00....0xFF	(XOR)
14	**BCCH**	Check sum H	**Values**	0x00....0xFF	(XOR)
15	**ETX**	Constant	**Value**	0x04	insert in request protocol always **0x04**

Example of communication



Data protocol

Protocol structure of signal transmission

Example for calculation of XOR-check sum

Check sum is calculated out of the first 13 Bytes.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
02	05	10	03	00	10	00	00	23	00	00	00	00	??	??	04

Start value is 0x**4711**.

0x**4711** XOR 0x0205 =	0x	45	14
0x4514 XOR 0x0510 =	0x	40	04
0x4004 XOR 0x1003 =	0x	50	07
0x5007 XOR 0x0300 =	0x	53	07
0x5307 XOR 0x0010 =	0x	53	17
0x5317 XOR 0x1000 =	0x	43	17
0x4317 XOR 0x0000 =	0x	43	17
0x4317 XOR 0x0023 =	0x	43	34
0x4334 XOR 0x2300 =	0x	60	34
0x6034 XOR 0x0000 =	0x	60	34
0x6034 XOR 0x0000 =	0x	60	34
0x6034 XOR 0x0000 =	0x	**60**	**34**

Check sum is 0x**6034**.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
02	05	10	03	00	10	00	00	23	00	00	00	00	**34**	**60**	04

Error message in the response protocol

4	5	6	7	Error
FE	**FE**	**00**	**FE**	**System error**
FE	**FE**	**00**	**AD**	**Unknown order**
FE	**FE**	**00**	**CC**	**Check sum error**
FE	**FE**	**00**	**CD**	**Transponder nonlocal**