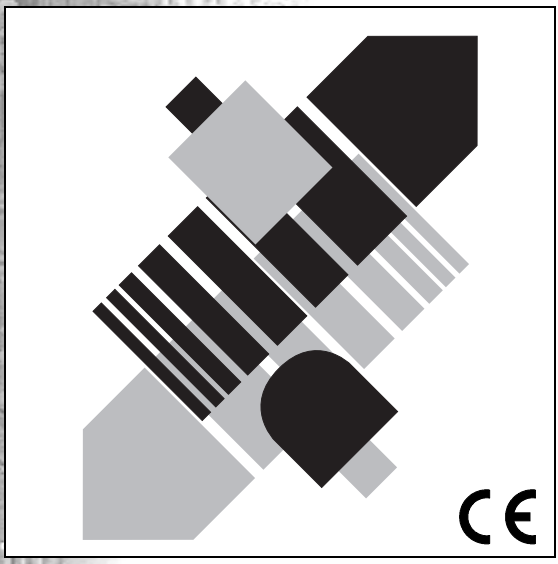
FACTORY AUTOMATION

MANUAL

IRI-KHD2-4HB1
IRI-KHA6-4HB1

CONTROL INTERFACE UNIT FOR

PROFIBUS-FMS



PEPPERL+FUCHS

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1 General Information

1.1 The symbols WARNING, ATTENTION, NOTE

Warning

This symbol warns the user of possible danger. Failure to heed this warning can lead to personal injury or death and/or damage to equipment.

Attention

This symbol warns the user of a possible failure. Failure to heed this warning can lead to total failure of the equipment or any other connected equipment.

Note

This symbol gives the user important hints.

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1.2 Declaration of conformity

PEPPERL+FUCHS

Konformitätserklärung / Declaration of Conformity
nach EN 45014:1989 / in accordance with EN 45014:1989

Diese Konformitätserklärung gilt für folgende Produktfamilien :
this Declaration of Conformity is valid for the following range of products

ICC..., IDC..., IMC..., IRH..., IRI..., IRT..., IRU..., IVH..., IVI..., IVD..., IWP..., IVS..., IVT..., IVZ..., IWD..., MVH..., MVI..., MVC..., MVK...

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We, Pepperl+Fuchs GmbH Mannheim, hereby declare under our sole responsibility that the beside-mentioned product is in accordance with the beside listed harmonised standards or normative documents and (where necessary) a competent body has been released.

zutreffende EG-Richtlinie : 89/336/EWG (EMV)
relevant EC-directive

Angewandte harmonisierte Normen :
applied harmonized standards

EN 50081-2
EN 50082-2

Angewandte nationale Normen oder normative Dokumente :
applied national standards or normative documents

nicht belegt / not used

zuständige Stelle : nicht notwendig / not necessary
competent body

Hersteller-Unterschrift: ppa Dr. Kegel i.V. H. Zayer
signature of manufacturer

Funktion des Unterzeichners: GB-Leiter Leiter Qualitätswesen
function of the signer Division Manager Quality Manager

Datum / date : März 1996

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2 Safety

2.1 Intended use

The control interface units IRI-KHD2-4HB1/IVI-KHA6-4HB1 serve as part of the inductive identification system Ident-I from Pepperl+Fuchs to connect to a high order computer (PLC, PC) with the PROFIBUS-FMS interface (DIN 19245 T1 + T2, pr EN 50170). The control interface units are only to be used with the read heads and the code carriers from Pepperl+Fuchs.

Warning

The protection of operating personnel and the system against possible danger is not guaranteed, if the control interface unit is not operated in accordance with its intended use.

The devices IRI-KHD2-4HB1/IRI-KHA6-4HB1 may only be operated by appropriately qualified personnel in accordance with this operating manual.

2.2 General safety information

Warning

Safety and correct functioning of the device cannot be guaranteed if any operation other than that described in this operating manual is performed.

The connection of the equipment and any maintenance work to be carried out with voltage applied to the equipment must only be performed by appropriately qualified electro-technical personnel.

In the case that a failure cannot be repaired, the device must be taken out of operation and protected against inadvertently being put back into operation.

Repair work may only be carried out by the manufacturer. Additions or modifications to the equipment are not allowed and void the warranty.

The responsibility for the observance to local safety standards lies with the operator.

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2.3 Functional safety / monitoring

The control interface units IRI-KHD2-4HB1/IRI-KHA6-4HB1 operate on a microprocessor basis. Functional disturbances and equipment errors/faults are signalled with the LED 'Run/Error' on the front of the device.

Next to the LED is a function controller for the PROFIBUS with which the device/ user status can be requested. Device failure or breakdown of a read head can be detected and indicated by the master unit.

Note

More detailed information can be found in Chapter 7 'Failure diagnostics'.

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3 Product Description

3.1 Scope of delivery

The following is included with the delivery of the device:

- 1 operating manual
- 1 device IRI-KHD2-4HB1/IRI-KHA6-4HB1

3.2 Range of application

Bus systems, especially the PROFIBUS, make the reduction of interconnection cabling possible and allow large data exchange over long distances. The control interface units IRI-KHD2-4HB1/IRI-KHA6-4HB1 with a PROFIBUS connection are unsurpassed when applied in large systems with many distant and distributed reading stations. Typical areas of application are:

- high-bay storage systems
- driverless transport systems
- interlinked production lines
- automatic container-identification

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3.3 System description

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 takes over the control of the connected read heads that implement the data transmission with the code carriers, prepares the read information and controls the communication and data transmission with a PROFIBUS master unit.

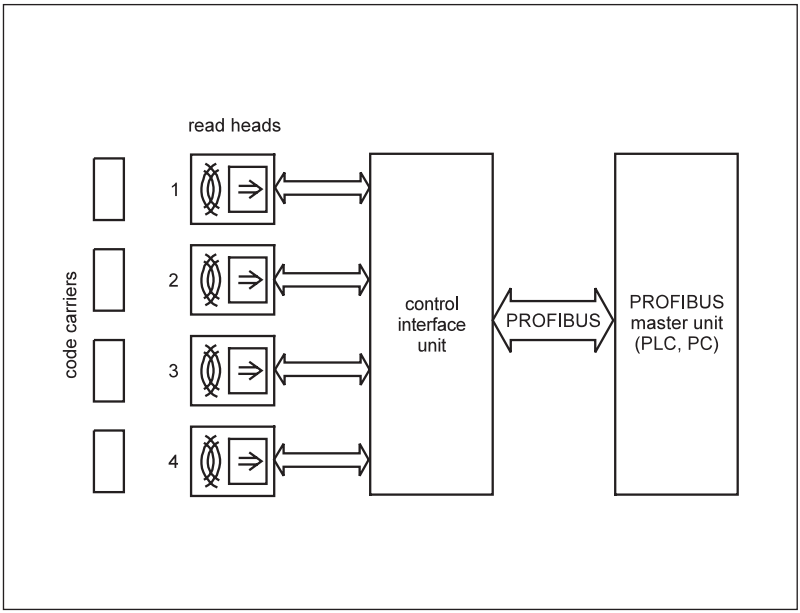

Fig. 3.1: Function of the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 in the Inductive Identification System R

It is possible to connect up to 4 read heads to a single IRI-KHD2-4HB1/IRI-KHA6-4HB1 unit.

With the PROFIBUS, the complete read functionality is available. The control interface unit operates as a passive subscriber of the system bus (slave).

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For communication with an active system bus subscriber (master), the following PROFIBUS services are supported:

Service	Function
• INITIATE	initialise connection
• ABORT	abort connection
• STATUS	read device/user status
• IDENTIFY	read subscriber identification
• GET-OV	read object list (short or long form)
• READ	read from objects (cyclic or acyclic)
• WRITE	write to objects (only acyclic)

The data traffic can be cyclic or acyclic for the communication between bus-master and the control interface unit.

Cyclic data traffic means that upon connection, a communication object will be continuously read.

Acyclic data traffic means that upon connection, different communication objects will come into action only upon operator demand.

Command overview

There is one command for reading data with the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1:

'buffered auto read fixcode'	The command serves to read from code carriers (ICC-...). All connected or active parameterised read heads will be continually activated.

Note

A detailed description of the command can be found in Chapter 6.

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3.4 Structure and functioning

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 is the link between the reading heads and the PROFIBUS master (PLC, PC, etc.). Two independently operating microprocessors, which are connected to each other via an interface, take over the data exchange of the read heads and the PROFIBUS master.

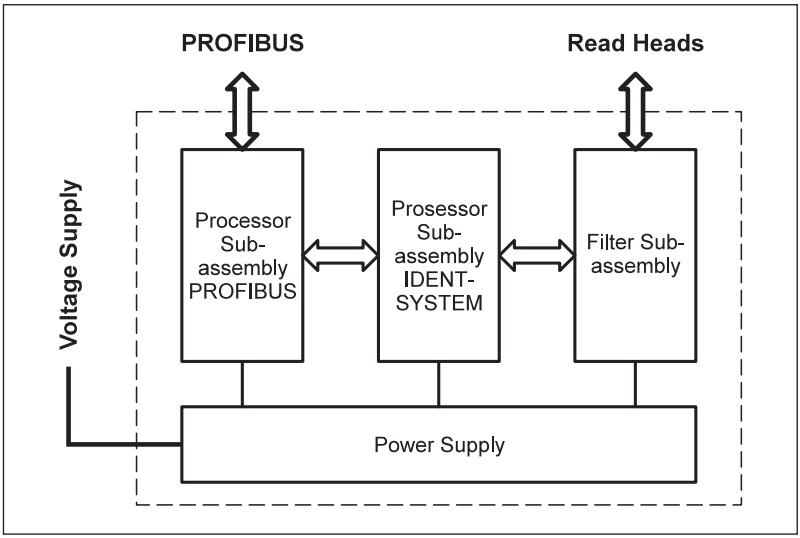

Fig. 3.2: Block diagram of the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1

Both the supply voltage and the RS485 interface of the PROFIBUS are galvanically isolated within the system.

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3.5 System variants

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 comes in two versions which vary only in their supply voltage:

Variant	Supply Voltage
IRI-KHD2-4HB1	20.4 VDC ... 27.6 VDC
IRI-KHA6-4HB1	85 VAC ... 253 VAC, 50 Hz ... 60 Hz

3.6 Accessories / product family

The inductive identification system Ident-I from Pepperl+Fuchs offers many different possibilities to combine single components.

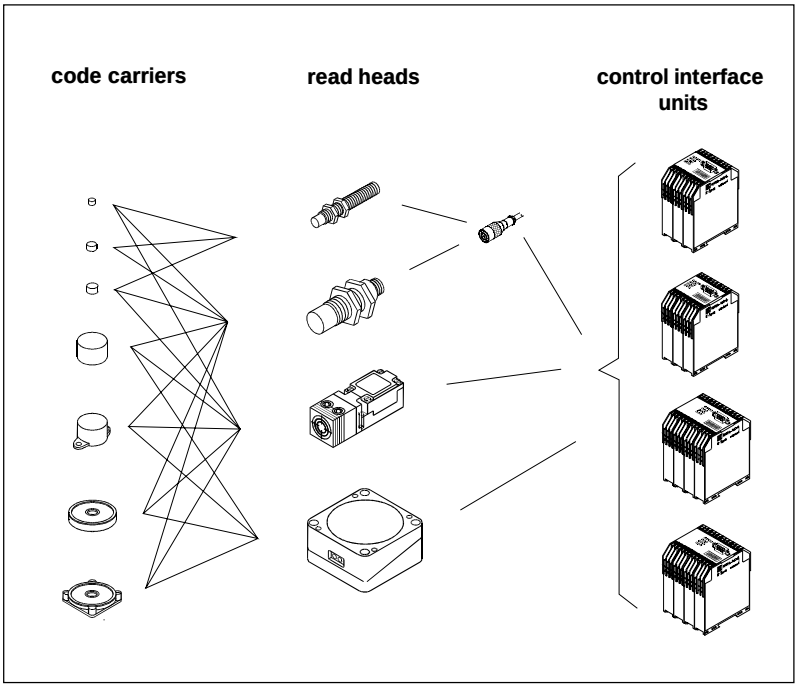

Fig. 3.3: Overview of the inductive identification system structure

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According to installation requirements, read distance and environmental conditions, one can select appropriate code carriers and read heads.

Note

Further information on the inductive identification system with read functioning (System R) can be found in the Sensor Systems 1 catalogue.

4 Installation

4.1 Storage and transport

The device must be packed for storage and transport so that it is shock-resistant and protected against humidity. The original packaging offers optimal protection. The necessary environmental conditions also must be satisfied (see Technical Data).

4.2 Unpacking

Check that the contents are not damaged. In case of damage, notify the postal service or the forwarding agent and inform the deliverer.

Check the contents of delivery with respect to your order and the delivery papers for:

- quantity delivered
- device type and version according to the name plate
- accessories
- handbook(s)

Keep the original packaging in case the device must be repacked and stored or reshipped.

For any further questions please contact Pepperl+Fuchs GmbH.

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4.3 Mounting

4.3.1 Mounting to a top-hat rail

As with all systems in K-system housings from Pepperl+Fuchs, the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 can be snapped onto the 35 mm standard top-hat rail according to DIN EN 50022.

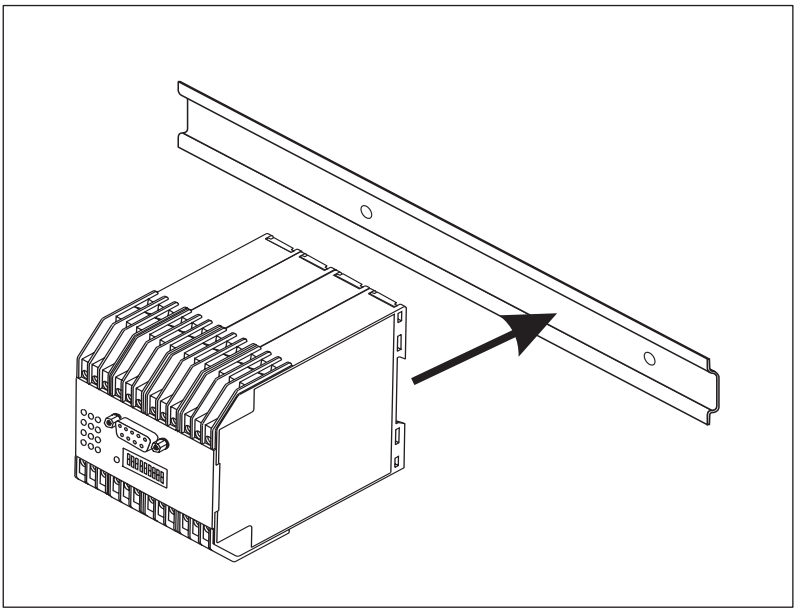

Fig. 4.1: Mounting to the top-hat rail according to DIN EN 50022

Hang the unit over the top part of the top-hat rail and press the bottom part of the housing against the rail until it snaps onto the railing. Check that the unit sits firmly on the railing.

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4.3.2 Wall mounting

The control interface unit can also be mounted on the wall using four screws. Simply pull out the four outer brackets on the back side of the unit. The unit can be easily screwed onto the wall through the holes in the brackets. The screw pair spacing is 90 mm (max. screw diameter M5).

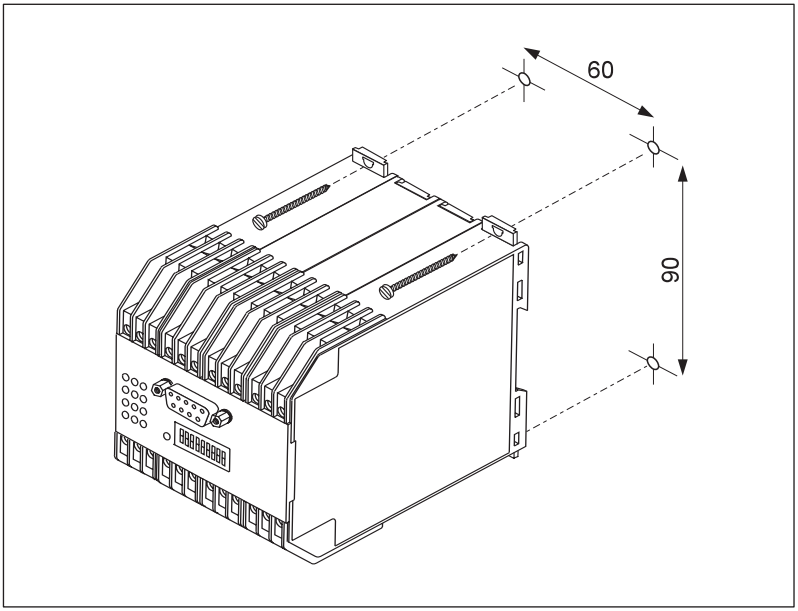

Fig. 4.2: Wall mounting

4.4 Electrical connection

Warning

Only qualified personnel are permitted to carry out work under voltage and make electrical connection to the mains.

Ensure that the correct voltage is applied according to the name plate of the unit.

A mains isolating device must be installed close to the device and labelled as such for the IRI-KHD2-4HB1/IRI-KHA6-4HB1.

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4.4.1 Equipment connection

The electrical connection of the control interface unit is made with the self-opening screw terminals on the top and bottom of the unit, max. cross section 2 x 2.5 mm².

The PROFIBUS connection must be carried out according to the PROFIBUS specification via the 9-pole Sub-D socket on the front of the device. Additionally, the bus connections (bus A, bus B, shield) are also available on the screw terminals.

Connect the read heads and the supply voltage according to the connection diagram and the labelled configuration of the terminals.

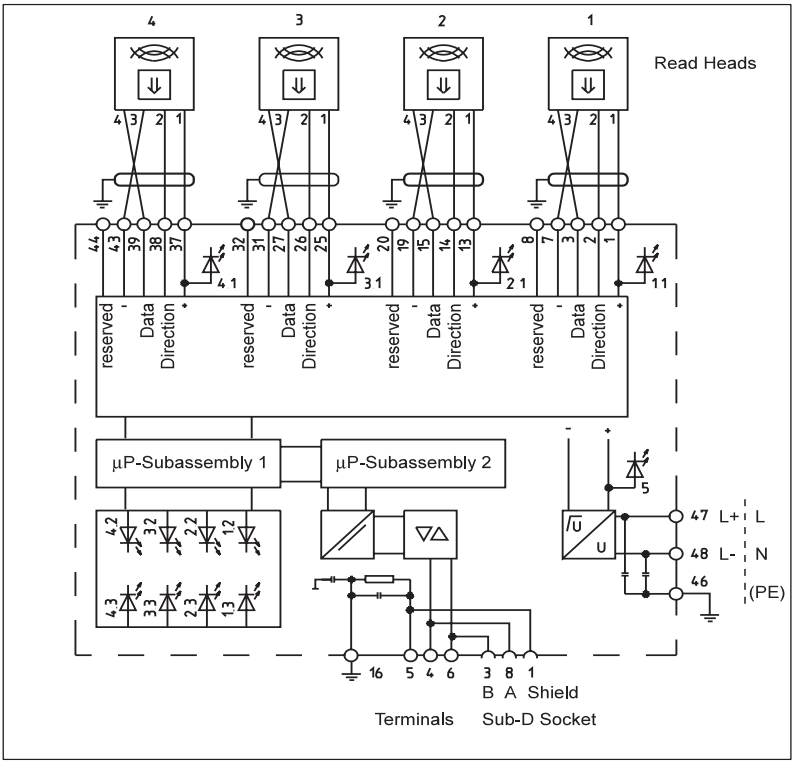

Fig. 4.3: Connection diagram for the control interface unit IRI-KHD2-4HB1/ IRI-KHA6-4HB1

Read head / cable lengths

The connecting cables to the read heads must be shielded. The cross section of the cables must be at least 0.14 mm².

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Read head cable lengths up to 50 m or 100 m are possible, if the following conditions are satisfied.

Up to 50 m read head cable:	cross sectional area of at least 4 x 0.25 mm^2 maximum resistance 78 Ohm/km maximum capacitance 90 pF/m (e.g. LIYC11C, Muckenhaut & Nusselt MUNFLEX C11Y)
Up to 100 m read head cable:	cross sectional area of at least 4 x 0.5 mm^2 maximum resistance 37 Ohm/km maximum capacitance 90 pF/m

Attention

With a cable length of 100 m, a series resistor of 82 Ohm must be fitted in the cable connected to the 'Direction' terminal of the control interface unit.

Since more EM interference can result with longer cable lengths, the maximum cable lengths given above might not be possible for some applications.

List of Terminal Assignments

1	supply voltage read head 1 positive
2	'direction' read head 1
3	'data' read head 1
4	bus A (RxD / TxD - P) PROFIBUS
5	shield PROFIBUS cable
6	bus B (RxD / TxD - N) PROFIBUS
7	supply voltage read head 1 negative
8	reserved
9	reserved
10	reserved
11	reserved
12	reserved
13	supply voltage read head 2 positive
14	'direction' read head 2
15	'data' read head 2
16	earth
17	reserved
18	reserved
19	supply voltage read head 2 negative
20	reserved
21	reserved
22	reserved
23	reserved
24	reserved

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25	supply voltage read head 3 positive
26	'direction' read head 3
27	'data' read head 3
28	reserved
29	reserved
30	reserved
31	supply voltage read head 3 negative
32	reserved
33	reserved
34	reserved
35	reserved
36	reserved
37	supply voltage read head 4 positive
38	'direction' read head 4
39	'data' read head 4
40	reserved
41	reserved
42	reserved
43	supply voltage read head 4 negative
44	reserved
45	reserved
46	protective earth lead PE
47	L+ (IRI-KHD2-4HB1) or L (IRI-KHA6-4HB1)
48	L- (IRI-KHD2-4HB1) or N (IRI-KHA6-4HB1)

Location of the connection terminals

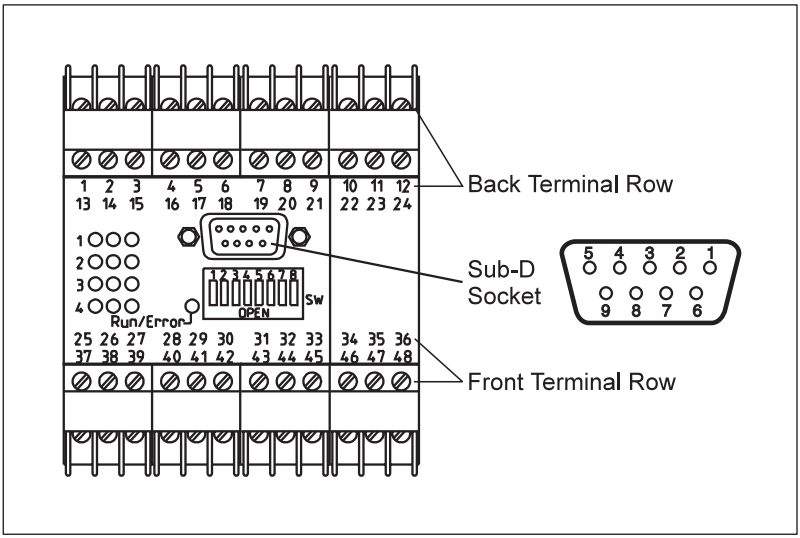

Fig. 4.4: Assignment of connection terminals

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Assignment of the of 9-pole Sub-D socket

1	shield PROFIBUS cable (with Metal casing Sub-D connector)
2	reserved
3	bus B (RxD / TxD - N) PROFIBUS
4	reserved
5	reserved
6	reserved
7	reserved
8	bus A (RxD / TxD - P) PROFIBUS
9	reserved

4.4.2 Special connection information for the PROFIBUS

Cable

The bus connecting cables must have the following characteristics:

- cable — two-wire twisted, shielded
- cross sectional area — ≥ 0.22 mm² (AWG 24)
- resistance — 100 ... 130 Ω
- capacitance — ≤ 60 pF/m
- DC resistance — ≤ 200 Ω/km

Attention

Use only twisted pair, shielded cable. In this case, the noise immunity will be optimised.

The following cables have been tested by Pepperl+Fuchs and are suitable for use with the field bus system VariNet-P (PROFIBUS):

Manufacturer	Type
• Kabelmetall electro	series type 5, Li2Y(St)+CY - AWG 24
• Belden Electronics	UL type 2919, 24 AWG, Part No. 9841
• Siemens	Sinec L2 bus connection
• Lapp	Unitronic BUS-LD 1x2x0.22
• Lapp	Unitronic BUS-L2/FIP 1x2x0.64

Length of leads

The reliable lengths of the transmission leads in a bus segment are determined from the following:

- type of bus cables used
- influence of external noise
- transmission rate
- number of bus subscribers

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The maximum total length of a bus segment with the maximum number of bus subscribers(32) is 200 m with a transmission rate of 500 kbits/s.

Note

By breaking into multiple bus segments and the application of repeaters, the transmission length can be increased. A maximum of three repeaters between two communicating bus subscribers can be used.

Bus termination

With the PROFIBUS, every bus segment must be terminated via terminating resistances at both ends of the bus leads.

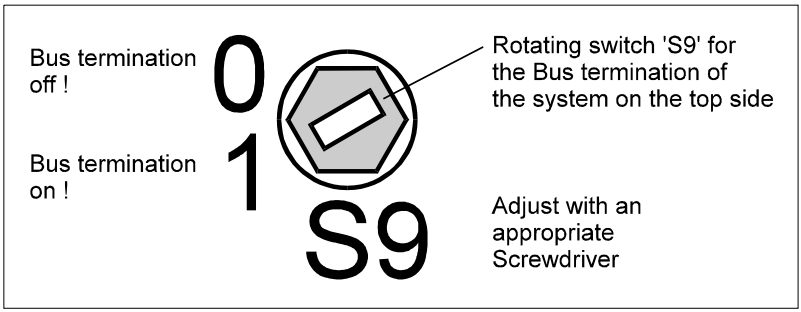

Fig. 4.5: Rotating switch S9 for the termination of the bus.

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 has built-in, switchable bus termination. The bus termination can be activated by turning the rotating switch S9 on the left hand side of the unit housing with an appropriate

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screwdriver.

4.4.3 EMI shielding concept

The shielding of the cables serves to protect against electromagnetic interference. One side of the shielding is connected to a low-impedance connection to the earth, whereas the other side is capacitively coupled. Both the device in the K-housing, as well as the IRI-KHD2-4HB1/IRI-KHA6-4HB1, have two earth terminals (16, 46).

When installing, connect these two terminals to earth. This is best carried out using large metallic objects with a galvanic earth connection, e.g. switching cabinets, high-bay storage posts, etc.

The connection leads of the read heads are shielded too. However, the shield is not connected to the head housing. Connect the shield directly to earth.

Note

If leads with double shielding are used, e.g. metallic wire mesh and metallic foil, they must be connected to each other using a low impedance connection at one end of the cable.

Many noise impulses come from the supply cables, e.g. switch-on current of a motor. For this reason, running the supply cables in parallel with the data/signal cables, especially in the same cable duct, should be avoided.

4.5 Disassembly, packing and disposal

Repacking

The unit must be protected against humidity and shock when packing for later use. The original packaging offers optimal protection.

Disposal

Note

Electronic waste can be hazardous. Pay attention to local regulations when disposing of this unit.

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 does not contain internal batteries which must be removed before disposal.

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5 Commissioning

Warning

Before proceeding with the commissioning, make sure that no danger to the system can arise from the device, e.g. due to uncontrolled control processes.

Attention

Check again all connections before proceeding with the commissioning.

Prepare for the commissioning by familiarising yourself with the communication between the PROFIBUS master and the control interface unit (Chapters 6 and 7 of this handbook). The commissioning requires a good knowledge of the PROFIBUS and the programming of the master unit.

5.1 Preparation

Due to the complexity of field bus programming with the PROFIBUS, it is unfortunately difficult to give a valid general description on how to perform the commissioning.

A very important aspect for the operation of an inductive identification system using the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 on the PROFIBUS is the response time of the total system. The question "How much time is required for data to be available in my computer once the code carrier is positioned in front of the read head?" cannot be correctly answered in a general.

The important factors in respect to response time are:

- type of high order host system, e.g. PLC or PC
- type of PROFIBUS master, e.g. pre-defined transmission rate
- communication between the PROFIBUS master and the host system
- the number of PROFIBUS subscribers
- the number of control interface units on the PROFIBUS
- the number and type of read heads connected
- type of code carriers used
- type of access of the communications objects of the control interface unit (cyclic, acyclic)
- structure of the user program

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For this reason, you should construct a test system for your particular application and check the transmission to the PROFIBUS master or host system, if you have little experience with the design of a PROFIBUS system.

Note

A complete series of design tools exist that allow a PROFIBUS user to plan and commission a network, even if he/she has no knowledge of the fundamental communication sequences.

There are PC programs and PROFIBUS PC connector cards which help determine the communication relationships and your parameters, and can clearly display bus telegrams on the screen.

The system software of programmable logic controllers (PLC) with a PROFIBUS communication processor often offer network configuration and management possibilities.

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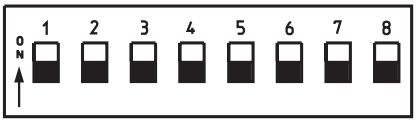
5.2 Main procedure

Before the commissioning, the system address of the control interface unit and, if necessary, of the bus termination (see Chapter 4.4.2 'Bus Termination') must be set.

Setting of the unit address

Select a device address not already occupied by another bus subscriber (between
0 and 126) and set this address using the DIP switch on the front of the device.



DIP-Switch 'SW' 1-7 on the front side of the unit to adjust the PROFIBUS device address

Device address	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	see below
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	see below
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	see below
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:
126	OFF	ON	ON	ON	ON	ON	ON	see below

Fig. 5.1: Setting the device address

Attention

The device address 127 is reserved for a special PROFIBUS service. If the address 127 is set on a slave unit, it will not function.

DIP switch **SW8**: Minimum Station Delay Time
Off corresponds to 500 bit interval
On corresponds to 200 bit interval

The transmission rate is 500 kbit/s.

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Configuration of the network master(s)

The network parameters and the FMS interconnection (FMS = Fieldbus Message Specification) of the master should be configured next. For the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1, the following entries must be made:

- transmission rate on the bus (500 kbit/s)
- connection type (see Chapter 6)
- service access point number (SAP)
- device address
- maximum protocol data unit length PDU = 128
- minimum station delay time (if adjustable)

Self test

After switching on the supply voltage, the control interface unit checks the internal memory area with a self test. If the error 'RAM failure' or 'ROM failure' occurs, or if an incorrect device address is set, communication will not be activated. The error is indicated with the LED 'Run/Error' (see Chapter 7.1 'LED error indicators').

Interconnection structure

The interconnection structure is achieved through the FMS service 'INITIATE'. Some masters carry out interconnection automatically, e.g. Simatic S5 with CP 5431 FMS.

Note

If the logic connection to the control interface unit is made, the LED 'Run/Error' will be green and permanently illuminated.

It is now possible to communicate with the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 using the PROFIBUS master.

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6 Operation with the PROFIBUS

6.1 General information on the PROFIBUS

The PROFIBUS is a standardised field bus that can exchange data between PLCs, PCs, operating and monitoring systems as well as sensors and actuators.

The framework of this operating manual can be considered as an extensive introduction to the PROFIBUS. For substantial information, one is referred to the PROFIBUS standard DIN 19245 and the relevant literature.

Note

Information brochures and a PROFIBUS product catalogue is available from the PROFIBUS User Organisation e.V. (PNO), Karlsruhe .

The important PROFIBUS performance features of the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 are as follows:

- slave function
- FMS services INITIATE, ABORT, STATUS, IDENTIFY, GET-OV, READ, WRITE
- open connection master slave, cyclic and acyclic, multicast, broadcast
- transmission rate 500 kbit/s
- max. process data lengths 128 bytes
- switchable bus termination
- adjustable system address 0 ... 126

6.2 PROFIBUS parameter/device identification

Communication parameters

Parameter	Abbreviation	Value
Minimal Station Delay Time	MIN_TSDR	200/500 bit intervals (SW8)
Maximum Protocol Data Unit	PDU LENGTH	128 bytes
Acyclic Control Interval	ACI	0 (disabled)
Send Confirmed Request Counter	SCC	1 (= max. 1 request per communication reference)
Receive Confirmed Request Counter	RCC	0
Send Acknowledge Request Counter	SAC	0
Receive Acknowledge Request Counter	RAC	0

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System identification

Parameter FMA7 Identify	Output
Vendor name	'Pepperl+Fuchs GmbH'
Controller type	'IRI-KHD2/KHA6-4HB1'
Hardware revision	'V 1.0' (latest version)
Software revision	'1801I017...', (Software-No. with index of the communication and Ident-Software)
Parameter FMS Identify	**Output**
Vendor name	'Pepperl+Fuchs'
Model name	'IRI-KHD2/KHA6-4HB1'
Revision	'V 1.02.' (latest version)

6.3 PROFIBUS services

The control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 supports the following services:

Service	Function
INITIATE	create connection
ABORT	terminate connection
STATUS	read device/user status
IDENTIFY	read the device identification
GET_OV	read object list (short or long form)
READ	reading of objects (cyclic/acyclic)
WRITE	write in objects (acyclic)


Attention

Not all masters support all of these services.

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6.4 Communication interconnections

The communication interconnection list (KBL) is fixed for the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1. The following are the different connection types listed by service access point (SAP):

SAP	Connection type	Function
Default (NIL)	MSZY	default SAP
1		**reserved for management services!**
2	MSAZ	open connection master-slave, acyclic
3	MSAZ	open connection master-slave, acyclic

6.5 Communication objects

The following is an overview of all communication objects:

Name	Inde	Access	Lengt (byte)	Description
LK_DAT	40	read	4 x 4	read data code carrier (head 1-4)
LK_STAT	41	read	1	read head status
Param	42	read / write	1	parameter

Issue date 03.08.1996

6.5.1 Object LK_DAT, index 40

When reading from the code carriers, the object LK_DAT, index 40 contains the read data of all 4 read heads.

Through evaluation of the bits E2/E3 (bit 7, byte 0, 4, 8 and 12) in the object LK_DAT, it is possible to determine which read head cannot find a code carrier in the read range of the head.

The read data of all heads can now be read at once from the object LK_DAT, index 40 of the master.

Length: 4 x 4 bytes
Data Type: OCTET STRING

Byte 0...3 data read head 1
Byte 4...7 data read head 2
Byte 8...11 data read head 3
Byte 12...15 data read head 4

The data for a read head are structured as follows:

Byte No.	0			1		2		3	
Bit No.	7	6...4	3...0	7...4	3...0	7...4	3...0	7...4	3...0
Designation	E2/E3	LNo.	C6	C5	C4	C3	C2	C1	C0

E2/E3 Bit: set = 'no Code carrier in the read range'
LNo. Read number (3 Bit)
C6 Fixcode data HEX 6 (4 Bit)
: :
C0 Fixcode data HEX 0 (4 Bit)

6.5.2 Object LK_STAT, index 41

simple variable (Octet String1)

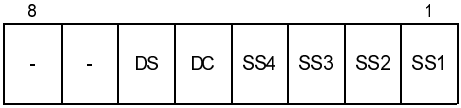
8							1
-	-	-	-	LK4	LK3	LK2	LK1

The bits LK1 to LK4 are set, if the corresponding heads are not connected or have failed.

Issue date 03.08.1996

6.5.3 Object Param, index 42

simple variable (Octet String1)



DS double-sided read of code carriers (DS = Double Sided Read)

If this bit is set (DS = 1), code carriers of the type ICC-50 are read from both sides. Otherwise code carriers are only read from the inscribed side. In the basic setting, after switch-on of the operating voltage, this operating mode is not active (DS = 0).

DC disabling of reading the data carriers with fixcode programming

If this bit is set (DC = 1), the data carriers with fixcode simulation cannot be read with the command 'buffered auto read fixcode'. In the basic setting, after switch-on of the operating voltage, this operating mode is not active (DC = 0).

Note

Data carriers can be programmed on demand with a bit pattern that corresponds to a code carrier. Therefore, multiple fixcodes with the same code or code sequence can be produced with ascending numbers.

SS1 ... SS4 read head selection

Through the setting of one or more of these bits, the control interface unit will be informed which read heads should respond during the command execution:

SS1 = 1:	read head 1 will respond
:	:
:	:
SS4 = 1:	read head 4 will respond

Issue date 04.02.1998

7 Fault Diagnostics

7.1 LED error indicators

The 'Run/Error' LED indicates the status of the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1:

Status of the 'Run/Error' LED	Description
permanent GREEN	ready for operation / communication active
permanent RED	communication/device error

7.2 Error indication with the device/user status

The device/user status can be queried with the PROFIBUS FMS services STATUS. The following status information will be transmitted:

- logical status
- local detail
- physical status

Logical status

The logical status of the control interface unit IRI-KHD2-4HB1/IRI-KHA6-4HB1 contains no information and is always zero.

Length: 1 byte

Local detail

The local detail contains failure information on both the internal processor subassemblies i.e. general error status indications.

Length: 3 bytes

Byte 0 status information of the Ident processor subassembly subassembly
Byte 1 status information of the communications processor subassembly
Byte 2 general error status indicators

Issue date 03.08.1996

Error status Ident processor subassembly

Byte No.	0							
Bit No.	7	6	5	4	3	2	1	0
Designation	0	0	0	0	EA	RA	IA	XA

XA = 1 external RAM of Ident processor faulty
IA = 1 internal RAM of Ident processor faulty
RA = 1 ROM of Ident processor faulty
EA = 1 EEPROM of Ident processor faulty
Bit 4 ... 7 reserved (value 0)

Error status of the communications processor subassembly

Byte No.	1							
Bit No.	7	6	5	4	3	2	1	0
Designation	0	0	0	NI	EK	0	0	XK

XK = 1 external RAM of communication processor faulty
Bit 1, 2 reserved (value 0)
EK = 1 EEPROM of communication processor faulty
NI = 1 interface between user processor and communications processor failed
Bit 5 ... 7 reserved (value 0)

General error status

Byte No.	2							
Bit No.	7	6	5	4	3	2	1	0
Designation	0	0	0	0	0	0	0	LK

LK = 1 read head(s) defect
Bit 1 ... 7 reserved (value 0)

Physical status

The physical status describes the operating status of the device.

Length: 1 byte

Issue date 03.08.1996

Value of the byte physical status	Operating status
0	Device is ready for operation.
1	Device is partly ready for operation.
2	Device is not ready for operation.

The physical status is formed from the contents of local detail:

Physical status = 0 all bits of local detail = 0

Physical status = 1 bit XA = 1 or EA = 1 or EK = 1

Physical status = 2 bit IA = 1 or RA = 1 or XK = 1 or NI = 1

Issue date 03.08.1996

8 Technical Data

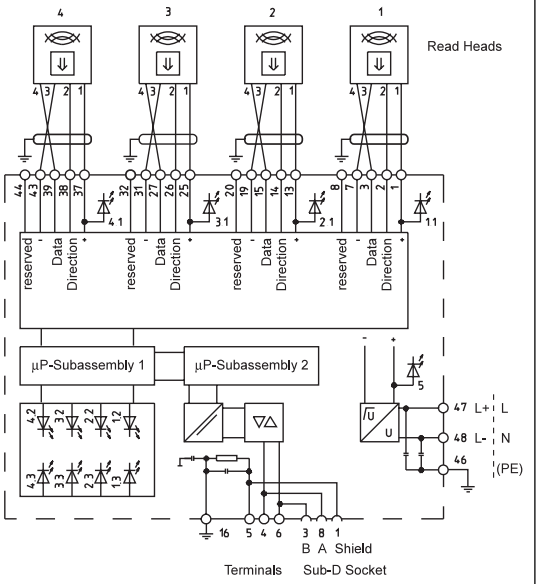
VariNet-P, Identification system for PROFIBUS

- **according to DIN 19 245, parts 1 + 2**
- **bus lines galvanically isolated from the system supply**
- **bus connection:**
  - **terminals**
  - **Sub-D socket**
- **power supply: terminals**
- **bus termination switchable (rotating switch)**
- **read heads: terminals**

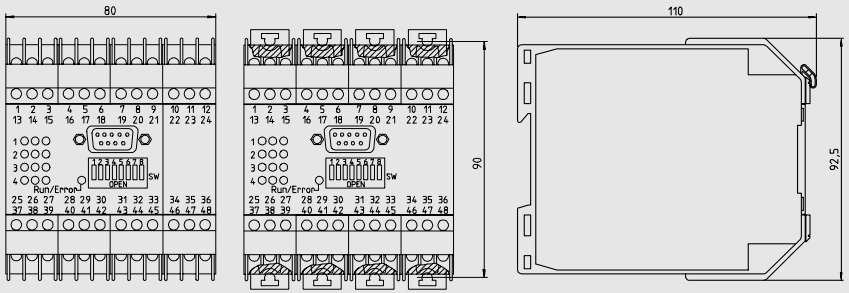
Function:

After connecting to the system supply voltage, all connected read heads are registered and cyclically read. Each read head has a corresponding 4 byte data field which contains the read code in 28 bit format. Additionally, each data field contains a 3 bit read number which is incremented with every new code read.

1 bit of the data field represents the code evaluation status (no code carrier detected or parity error of read data).



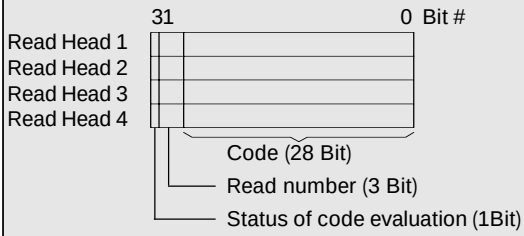
Dimensions



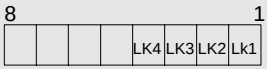
Issue date 03.08.1996

Object list:

Index 40 - input data
Array (4 x Octet String4) without sub-indexing

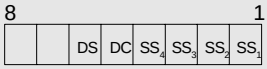


Index 41 - read head status
Simple variable (Octet String1)



LK1 to LK4 set corrsp. to read head failure or not connected

Index 42 - Parameter
Simple variable (Octet String1)



SS_1 to SS_4 means corrsp. to head activated / deactivated
DC is a security flag
DS means double sided read

Service access points and connection types:

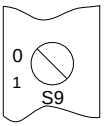
Default - SAP (NIL)	MSZY
SAP 0	MSZY
SAP 2	MSAZ
SAP 3	MSAZ
max. PDU - Length:	128

DIP-Switch:

Switches 1-7: subscriber address
Switch 8: minimum station delay time
Off corresponds to 500 bit interval
On corresponds to 200 bit interval

Bus termination:

Switch 9: bus termination
0 = Off
1 = On



Issue date 03.08.1996

Order code	IRI-KHD2-4HB1	IRI-KHA6-4HB1
Power supply		
Supply voltage	20.4 VDC ... 27.6 VDC	85 VAC ... 253 VAC, 50 Hz ... 60 Hz
Ripple	≤ 10%	
Current	max. < 450 mA	
Quiescent current	120 mA (typ)	
with active read/write head	190 mA (typ.)	
Indicators		
Ident	3 LEDs per read head status	
Read head active	- green	
Code carrier detected	- yellow	
Functional reserve	- red	
Bus	1 LED System status (double/coloured)	
Run/error green LED	system ready for operation / communication active	
Run/error red LED	device error / device status / transmission error	
Housing	K-system, 80 mm (4 TE)	
Bus connection	according to DIN 19 245 parts 1+2	
Transmission rate	500 kBd (187.5 kBd on request)	
Address adjustment	DIP switches	
Service extent	slave operation	
	- initiate - identify - write	
	- abort - get OV	
	- status - read	
Environmental conditions		
Operating temperature	248 Kelvin ... 343 Kelvin (-25 °C ... +70 °C)	
Storage temperature	248 Kelvin ... 358 Kelvin (-25 °C ... +85 °C)	
Humidity	max. 75% rel. humidity	
Protection class (EN 60529)	IP20	
Mechanical		
Housing	modular terminal housing made from Macrolon, fire protection class according to UL 94: V - 0	
Mounting	snaps onto 35 mm standard rail according to DIN EN 50 022 or screw-mountable with 4 screws through pull-out brackets in 90 mm spacing	
Connection possibilities	self-opening apparatus terminals, max. cross sectional area 2 x 2.5 mm^2	

Issue date 03.08.1996

9 Appendix

9.1 List of abbreviations

ACI	-	acyclic control interval
ALI	-	application layer interface
BRCT	-	PROFIBUS connection type: broadcast
CRC	-	cyclic redundancy check
DIP	-	dual In-line package, housing type
EEPROM	-	electronically erasable and programmable ROM
FMS	-	fieldbus message specification
HEX	-	hexadecimal
L	-	line, phase for mains connection (230 V AC)
LED	-	light emitting diode
MIN_TSDR	-	minimal station delay time
MSAZ	-	PROFIBUS connection type: master-slave acyclic
MSZY	-	PROFIBUS connection type: master-slave cyclic
MULT	-	PROFIBUS connection type: multicast
N	-	neutral for mains connection (230 V AC)
NC	-	not connected
PC	-	personal computer
PDU	-	protocol data unit
PE	-	protective earth
PNO	-	PROFIBUS User Organisation
RAC	-	read acknowledge request counter
RAM	-	random access memory
RCC	-	read confirmed request counter
ROM	-	read only memory
SAC	-	send acknowledge request counter
SAP	-	service access point
SCC	-	send confirmed request counter
PLC	-	programmable logic controller
VFD	-	virtual field device

Issue date 03.08.1996

9.2 Table of ASCII characters

hex	dec.	ASCII	hex	dec.	ASCII	hex	dec.	ASCII	hex	dec.	ASCII
00	0	NUL	20	32	Space	40	64	@	60	96	‘
01	1	SOH	21	33	!	41	65	A	61	97	a
02	2	STX	22	34	“	42	66	B	62	98	b
03	3	ETX	23	35	#	43	67	C	63	99	c
04	4	EOT	24	36	$	44	68	D	64	100	d
05	5	ENQ	25	37	%	45	69	E	65	101	e
06	6	ACK	26	38	&	46	70	F	66	102	f
07	7	BEL	27	39	‘	47	71	G	67	103	g
08	8	BS	28	40	(	48	72	H	68	104	h
09	9	HT	29	41	)	49	73	I	69	105	i
0A	10	LF	2A	42	*	4A	74	J	6A	106	j
0B	11	VT	2B	43	+	4B	75	K	6B	107	k
0C	12	FF	2C	44	,	4C	76	L	6C	108	l
0D	13	CR	2D	45	-	4D	77	M	6D	109	m
0E	14	SO	2E	46	.	4E	78	N	6E	110	n
0F	15	SI	2F	47	/	4F	79	O	6F	111	o
10	16	DLE	30	48	0	50	80	P	70	112	p
11	17	DC1	31	49	1	51	81	Q	71	113	q
12	18	DC2	32	50	2	52	82	R	72	114	r
13	19	DC3	33	51	3	53	83	S	73	115	s
14	20	DC4	34	52	4	54	84	T	74	116	t
15	21	NAK	35	53	5	55	85	U	75	117	u
16	22	SYN	36	54	6	56	86	V	76	118	v
17	23	ETB	37	55	7	57	87	W	77	119	w
18	24	CAN	38	56	8	58	88	X	78	120	x
19	25	EM	39	57	9	59	89	Y	79	121	y
1A	26	SUB	3A	58	:	5A	90	Z	7A	122	z
1B	27	ESC	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	|
1D	29	GS	3D	61	=	5D	93	]	7D	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	DEL

Issue date 03.08.1996

One Company, Two Divisions.

Factory Automation Division

Product Range

- Binary and analog sensors
- in different technologies
  - Inductive and capacitive sensors
  - Magnetic sensors
  - Ultrasonic sensors
  - Photoelectric sensors
- Incremental and absolute rotary encoders
- Counters and control equipment
- ID systems
- AS-Interface

Areas of Application

- Machine engineering
- Conveyor or transport
- Packaging and bottling
- Automobile industry

Process Automation Division

Product Range

- Signal conditioners
- Intrinsically safe interface modules
- Remote process interface
- Intrinsically safe field bus solutions
- Level control sensors
- Process measuring and control systems engineering at the interface level
- Intrinsic safety training

Areas of Application

- Chemical industry
- Industrial and community sewage
- Oil, gas and petrochemical industry
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