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Electromagnetic Identification Systems

1 Electromagnetic Identification Systems

1.1 Overview of Identification Systems

Introduction
Identification means to name a given product, with the goal being to locate this product again at a later point in time. In other words, identification involves creating a link between material flow and data flow.

The material to be transported is provided with a label which can be read by a read head.

Construction
Identification systems consist, basically, of three components:

- The code or data carrier, in which the data used for the identification are stored.
- The read or read/write heads, which perform the data transfer with the code or data carrier.
- The control interface unit, which prepares the information, controls the data transfer and communicates with the higher-order computer.

Overview
The systems offered by Pepperl+Fuchs can be divided into two main groups:

- **Inductive systems** which communicate via a magnetic field (near field), have frequencies of 125 or 300 kHz and a range less than 100 mm.
- **Microwave systems** which communicate via electromagnetic waves (far field), have a working frequency of 2.45 GHz and a range of up to 6 m.

Identification in SMD placement
When using a fixcode identification system which controls the entire SMD placement process, it is possible to nest several different manufacturing tasks. The inductive identification system detects the task and instructs the machine to load the correct placement program and the correct components.

Component selection
In this plant, precision clutch release stops are mounted. The pallet system pallets are fitted with inductive data carriers. The individual bearing parts are automatically measured and the data stored in the data carriers. At the mounting site, the parts are, using the data, automatically positioned in such a way that bearing play is minimized.
Electromagnetic Identification Systems

The microwave identification systems make possible, even under adverse environmental conditions, reliable, contact-free data transfer over long distances. These qualities are required particularly in the areas of traffic engineering, logistics, object reliability and installation applications. The data carriers are, in these cases, always equipped with batteries (far field).

Identification during automobile assembly
A data carrier is attached to each chassis as it enters the assembly line. Written to the data carrier are type-specific data. At the identification points of the individual installation stages, the test or installation computer requests the data from the higher-order controller. The data required for the remaining manufacturing processes are written on the data carrier.

Comparison of the identification systems
Each of these technologies has its special features as shown in the following table.

<table>
<thead>
<tr>
<th></th>
<th>Inductive</th>
<th>Microwave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>200-300 kHz</td>
<td>125 kHz</td>
</tr>
<tr>
<td>Read distance</td>
<td>≤ 100 mm</td>
<td>≤ 80 mm</td>
</tr>
<tr>
<td>Write distance</td>
<td>≤ 68 mm</td>
<td>≤ 45 mm</td>
</tr>
<tr>
<td>Memory (byte)</td>
<td>1 kbit (passive) 256 kbit (active)</td>
<td>928 bit R/W plus 64 bit R/O</td>
</tr>
<tr>
<td>Fixcode System</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Special features</td>
<td>Hazardous area approval</td>
<td>Low-cost data carrier</td>
</tr>
<tr>
<td></td>
<td>All important field-bus interfaces</td>
<td>Can read and write standard data carriers produced by other manufacturers</td>
</tr>
<tr>
<td></td>
<td>Large selection of read/write heads</td>
<td>Wide range of mechanical designs</td>
</tr>
<tr>
<td></td>
<td>Up to four heads per control interface unit</td>
<td>Compact read head with integrated control interface unit</td>
</tr>
</tbody>
</table>

Date of Issue 19.02.2002
Electromagnetic Identification Systems

Selection criteria

Distances

In most cases, the mechanical conditions present at the installation site determine the working distances and, thus to a certain extent, the identification technology:

<table>
<thead>
<tr>
<th>Distances</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 100 mm</td>
<td>Inductive systems</td>
</tr>
<tr>
<td>Up to 6 m</td>
<td>Microwave systems</td>
</tr>
</tbody>
</table>

Object temperature

An important selection criterion is the maximum code/data carrier temperature.

Some systems offer temperature-resistant code/data carriers:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. temperature of special code/data carriers</td>
<td>130 °C</td>
<td>160 °C</td>
<td>70 °C</td>
<td>85 °C</td>
</tr>
</tbody>
</table>

Interfaces

The identification systems offer the following interfaces for connecting to a higher-order computer:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RS 232</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>RS 422</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>RS 485</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>20 mA TTY</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>PROFIBUS</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>INTERBUS</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Remote I/O</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Ethernet TCP/IP</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

Code carrier or data carrier?

Whether or not a pure reader system is sufficient for this application must still be determined. This is the case when object-specific data are stored in a central computer and the code number of the object can be reassigned when necessary. This is almost always the case in systems with simple hierarchies (only one control computer or PLC). In such applications, a read-only system with appropriate code carrier is adequate (all systems except IDENT-M System V).

On the other hand, for installations which consist of several independent cells and communicate only via a sequenced network, this is seldom possible. In this case, data carriers with read/write functionality are necessary.
1.2 Housing materials

The physical resistance of housing materials is an important property for the use of identification systems.

The standard housing materials are:
- Stainless steel V2A
- Epoxy casting compound
- ABS (acrylon-butadiene-styrene)
- PBT (polybutyleneterephthalate, Crastin)
- PC (polycarbonate, Macrolon)
- POM (polyoxymethylene, polyacetal, Delrin)
- PP (polypropylene, Hostalen)
- PPS (polyphenylene sulfide, Ryton)
- PS (polystyrene)
- PVC (polyvinyl chloride)

### Material distribution

<table>
<thead>
<tr>
<th>IDENT-I System V</th>
<th>Head</th>
<th>Control interface unit</th>
<th>Code/data carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel + PBT</td>
<td>PBT</td>
<td>PC</td>
<td>Epoxy casting compound</td>
</tr>
<tr>
<td>Stainless steel + ABS</td>
<td>Epoxy casting compound</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IDENT-I System P</th>
<th>Head</th>
<th>Control interface unit</th>
<th>Code/data carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>POM</td>
<td>PBT</td>
<td>-</td>
<td>PS</td>
</tr>
<tr>
<td>PBT</td>
<td>Epoxy casting compound</td>
<td>PVC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IDENT-M System V</th>
<th>Head</th>
<th>Control interface unit</th>
<th>Code/data carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBT</td>
<td>PBT</td>
<td>PBT</td>
<td>PPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IDENT-M System T</th>
<th>Head</th>
<th>Control interface unit</th>
<th>Code/data carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>-</td>
<td></td>
<td>ABS</td>
</tr>
</tbody>
</table>
## Chemical resistance

+ : resistant  
0 : limited resistance  
- : NA

### Table: Chemical resistance

<table>
<thead>
<tr>
<th></th>
<th>V2A</th>
<th>ABS</th>
<th>Epoxy</th>
<th>PBT</th>
<th>PC</th>
<th>POM</th>
<th>PP</th>
<th>PPS</th>
<th>PS</th>
<th>PVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Formic acid</td>
<td>20 °C</td>
<td>40 %</td>
<td>+</td>
<td>10 %</td>
<td>-</td>
<td>-</td>
<td>85 %</td>
<td>0</td>
<td>40 %</td>
<td>50 %</td>
</tr>
<tr>
<td>Ammonia</td>
<td>+</td>
<td>25 %</td>
<td>0</td>
<td>10 %</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>+</td>
<td>25 %</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Brake fluid</td>
<td>0</td>
<td></td>
<td>-</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butane</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botanol</td>
<td>-</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>10 °C</td>
<td>10 %</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>60 °C</td>
<td></td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>20 °C</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel oil</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>60 °C</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetic acid</td>
<td>20 °C</td>
<td>25 %</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>30 %</td>
<td>50 %</td>
<td>30 %</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>37 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Freon 113</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit juice</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerine</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>60 °C</td>
</tr>
<tr>
<td>Heating oil</td>
<td>0</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>60 °C</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>60 °C</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caustic potash</td>
<td>50 %</td>
<td>0</td>
<td>3 %</td>
<td>-</td>
<td>+</td>
<td>50 %</td>
<td>50 %</td>
<td>60 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium chloride</td>
<td>+</td>
<td>60 °C</td>
<td>+</td>
<td>60 °C</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium hydroxide</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linseed oil</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methanol</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methylenecarbonate</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactic acid</td>
<td>20 °C</td>
<td>80 %</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>80 %</td>
<td>0</td>
</tr>
<tr>
<td>Mineral oils</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor oils</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>20 °C</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caustic soda</td>
<td>20 °C</td>
<td>50 %</td>
<td>3 %</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>50 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitric acid</td>
<td>66 %</td>
<td>-</td>
<td>-</td>
<td>10 %</td>
<td>-</td>
<td>25 %</td>
<td>10 %</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>10 %</td>
<td>20 %</td>
<td>-</td>
<td>+</td>
<td>10 %</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Lubricating oil</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon bisulfide</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td></td>
<td>50 %</td>
<td>-</td>
<td>28 %</td>
<td>50 %</td>
<td>-</td>
<td>80 %</td>
<td>50 %</td>
<td>50 %</td>
<td>70 %</td>
</tr>
<tr>
<td>Sea water (cold)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soap suds</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detergent</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terpine oil</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>+</td>
<td>+</td>
<td>68 °C</td>
<td>68 °C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>60 °C</td>
<td></td>
</tr>
<tr>
<td>Tartaric acid</td>
<td>20 °C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>10 %</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>60 °C</td>
<td></td>
</tr>
<tr>
<td>Xylene</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc sulfate</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric acid</td>
<td>20 °C</td>
<td>+</td>
<td>+</td>
<td>10 %</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unless specified otherwise, the analyses were performed at room temperature. The resistances may change if two different materials come into contact with one another. We cannot, for this reason, guarantee this information.
2.1 System Description

IDENT-I System V is an inductive read/write system which communicates with the code and data carriers in the frequency range from 200 ... 300 kHz. Data are transmitted between the code or data carriers and the read/write heads by means of an inductive coupling.

The IDENT-I System V offers a broad palette of both code or data carriers as well as read/write heads in housings suitable for applications.

Features
- Working frequency 200 ... 300 kHz
- Fixcode with 28 bit (total 64 bit)
- Data carrier with memory 1 kbit (passive) or up to 256 kbit (active)
- Read distance up to 100 mm
- Write distance up to 80 mm
- Data transmission rate 7.8 kbaud

Highlights
- Large read/write distances
- Fast system with high read/write speeds of up to 10 m/s
- Up to 4 read/write heads per control interface unit
- Large selection of code and data carriers and read/write heads in housings suitable for applications
- Possible to install the code or data carrier in metal
- Temperature range up to 130 °C
- Special code or data carrier and read/write heads for use in hazardous areas

Up to four read/write heads can be connected per control interface unit. Available are control interface units with serial interfaces, digital inputs and outputs as well as control interface units with direct field-bus connection.

Depending on the combination of read/write head and code or data carrier, read distances of up to 100 mm and write distances of up to 80 mm can be achieved.
2.1.1 Areas of application

The inductive identification system IDENT-I System V is particularly well suited for applications in the areas of automation, material flow control in manufacturing, acquisition of operating data or the identification of objects such as storage containers, pallets, workpiece carriers, tools and similar. The code and data carriers can also be read and written to even in metal surroundings. The embeddable installation in metal, which is necessary in many applications, is, thus possible.

Depending on the application, devices which group together individual functions are available in various designs.
2.1.2 System construction

The inductive identification system IDENT-I System V consists, in principle, of three functional components:

- Code or data carrier: these contain a code which cannot be changed or memory for data which may be changed.
- Read or read/write heads: these perform the data transmission between the code or data carriers and the control interface units.
- Control interface units: information preparation and communication with the higher-order computer (PC or PLC) take place here.

Depending on the application, devices which group together individual functions are available in various designs.

IDENT-I System V as fixcode system
Inductive Identification System IDENT-I System V

IDENT-I System V as read/write system
## Inductive Identification System IDENT-I System V

### 2.1.3 Distance table: code carriers - read heads

Read distance (mm) in air at 25 °C

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IRH-18GM-V1</th>
<th>IRH-30GM-V1</th>
<th>IRH-M1K</th>
<th>IRH-FP3</th>
<th>IRT-FP3-IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-8</td>
<td>0.3 ... 12.5</td>
<td>0.5 ... 15.0</td>
<td>0.5 ... 15.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICC-10</td>
<td>0.3 ... 12.5</td>
<td>0.5 ... 15.0</td>
<td>0.5 ... 15.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICC-12</td>
<td>0.3 ... 14.0</td>
<td>0.3 ... 19.0</td>
<td>1.0 ... 25.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICC-12-T1</td>
<td>0.5 ... 13.0</td>
<td>0.5 ... 18.0</td>
<td>0.5 ... 20.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICC-16GK</td>
<td>0.3 ... 14.0</td>
<td>0.3 ... 19.0</td>
<td>1.0 ... 25.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30</td>
<td>2.0 ... 34.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
<td>5.0 ... 50.0</td>
</tr>
<tr>
<td>ICC-30F</td>
<td>2.0 ... 34.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
<td>5.0 ... 50.0</td>
</tr>
<tr>
<td>ICC-30GK</td>
<td>2.0 ... 34.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
<td>5.0 ... 50.0</td>
</tr>
<tr>
<td>ICC-30GK-T1</td>
<td>2.0 ... 32.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 58.0</td>
<td>5.0 ... 50.0</td>
</tr>
<tr>
<td>ICC-30GK-T3</td>
<td>2.0 ... 32.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 58.0</td>
<td>5.0 ... 50.0</td>
</tr>
<tr>
<td>ICC-50</td>
<td>1.0 ... 42.0</td>
<td>2.0 ... 66.0</td>
<td>10.0 ... 80.0</td>
<td>10.0 ... 100.0</td>
<td>5.0 ... 100.0</td>
</tr>
<tr>
<td>ICC-50F</td>
<td>1.0 ... 42.0</td>
<td>2.0 ... 66.0</td>
<td>10.0 ... 80.0</td>
<td>10.0 ... 100.0</td>
<td>5.0 ... 100.0</td>
</tr>
</tbody>
</table>

Read distance (mm) in steel at 25 °C

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IRH-18GM-V1</th>
<th>IRH-30GM-V1</th>
<th>IRH-M1K</th>
<th>IRH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-8</td>
<td>1.0 ... 10.4</td>
<td>2.0 ... 6.5</td>
<td>2.0 ... 6.5</td>
<td>-</td>
</tr>
<tr>
<td>ICC-10</td>
<td>1.5 ... 9.0</td>
<td>1.0 ... 2.0</td>
<td>6.5 ... 11.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-12</td>
<td>0.5 ... 13.0</td>
<td>1.0 ... 12.0</td>
<td>1.0 ... 18.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-12-T1</td>
<td>1.0 ... 12.0</td>
<td>1.0 ... 11.0</td>
<td>1.0 ... 11.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-16GK</td>
<td>1.0 ... 12.0</td>
<td>1.0 ... 12.0</td>
<td>1.0 ... 18.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30</td>
<td>4.0 ... 26.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30F</td>
<td>4.0 ... 26.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30GK</td>
<td>4.0 ... 26.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30GK-T1</td>
<td>4.0 ... 24.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30GK-T3</td>
<td>4.0 ... 24.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Read distance (mm) on steel with 8 mm distance at 25 °C

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IRH-18GM-V1</th>
<th>IRH-30GM-V1</th>
<th>IRH-M1K</th>
<th>IRH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-50</td>
<td>2.0 ... 25.0</td>
<td>5.0 ... 43.0</td>
<td>15.0 ... 43.0</td>
<td>15.0 ... 70.0</td>
</tr>
<tr>
<td>ICC-50F</td>
<td>2.0 ... 25.0</td>
<td>5.0 ... 43.0</td>
<td>15.0 ... 43.0</td>
<td>15.0 ... 70.0</td>
</tr>
</tbody>
</table>
## 2.1.4 Distance table: data carrier - read/write heads

Read/write distances (mm) in air at 25 °C

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>IVH-18GM-V1</th>
<th>IVH-30GM-V1</th>
<th>IVH-M1K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
</tr>
<tr>
<td>IDC-8-1K</td>
<td>2.0 ... 8.5</td>
<td>2.0 ... 12.5</td>
<td>3.0 ... 9.0</td>
</tr>
<tr>
<td>IDC-10-1K</td>
<td>2.0 ... 8.5</td>
<td>2.0 ... 12.5</td>
<td>3.0 ... 9.0</td>
</tr>
<tr>
<td>IDC-12-1K</td>
<td>2.0 ... 12.0</td>
<td>2.0 ... 16.0</td>
<td>3.0 ... 15.0</td>
</tr>
<tr>
<td>IDC-15-1K</td>
<td>3.0 ... 17.0</td>
<td>3.0 ... 19.0</td>
<td>5.0 ... 18.0</td>
</tr>
<tr>
<td>IDC-16GK-1K</td>
<td>2.0 ... 12.0</td>
<td>2.0 ... 16.0</td>
<td>3.0 ... 15.0</td>
</tr>
<tr>
<td>IDC-24-1K</td>
<td>5.0 ... 23.0</td>
<td>5.0 ... 24.0</td>
<td>4.0 ... 28.0</td>
</tr>
<tr>
<td>IDC-30F-1K</td>
<td>5.0 ... 25.0</td>
<td>5.0 ... 27.0</td>
<td>5.0 ... 30.0</td>
</tr>
<tr>
<td>IDC-30GK-1K</td>
<td>5.0 ... 25.0</td>
<td>5.0 ... 27.0</td>
<td>5.0 ... 30.0</td>
</tr>
<tr>
<td>IDC-50F-1K</td>
<td>8.0 ... 34.0</td>
<td>8.0 ... 40.0</td>
<td>10.0 ... 42.0</td>
</tr>
<tr>
<td>IDC-50-1K</td>
<td>8.0 ... 34.0</td>
<td>8.0 ... 40.0</td>
<td>10.0 ... 42.0</td>
</tr>
<tr>
<td>IMC-40-256K</td>
<td>-</td>
<td>-</td>
<td>4.0 ... 52.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>IVH-F61</th>
<th>IVH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-8-1K</td>
<td>3.0 ... 9.0</td>
<td>3.0 ... 13.0</td>
</tr>
<tr>
<td>IDC-10-1K</td>
<td>3.0 ... 9.0</td>
<td>3.0 ... 13.0</td>
</tr>
<tr>
<td>IDC-12-1K</td>
<td>3.0 ... 15.0</td>
<td>3.0 ... 20.0</td>
</tr>
<tr>
<td>IDC-15-1K</td>
<td>5.0 ... 18.0</td>
<td>5.0 ... 23.0</td>
</tr>
<tr>
<td>IDC-16GK-1K</td>
<td>3.0 ... 15.0</td>
<td>3.0 ... 20.0</td>
</tr>
<tr>
<td>IDC-24-1K</td>
<td>4.0 ... 28.0</td>
<td>3.0 ... 31.0</td>
</tr>
<tr>
<td>IDC-30-1K</td>
<td>5.0 ... 30.0</td>
<td>5.0 ... 34.0</td>
</tr>
<tr>
<td>IDC-30GK-1K</td>
<td>5.0 ... 30.0</td>
<td>5.0 ... 34.0</td>
</tr>
<tr>
<td>IDC-50F-1K</td>
<td>10.0 ... 42.0</td>
<td>10.0 ... 52.0</td>
</tr>
<tr>
<td>IDC-50-1K</td>
<td>10.0 ... 42.0</td>
<td>10.0 ... 52.0</td>
</tr>
<tr>
<td>IMC-40-256K</td>
<td>4.0 ... 52.0</td>
<td>4.0 ... 52.0</td>
</tr>
</tbody>
</table>
## Distance table: data carrier - read/write heads

### Read/write distances (mm) in steel at 25 °C

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-18GM-V1</th>
<th>IVH-30GM-V1</th>
<th>IVH-M1K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-8-1K</td>
<td>2.0 ... 6.0</td>
<td>2.0 ... 9.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IDC-10-1K</td>
<td>2.0 ... 6.0</td>
<td>2.0 ... 9.0</td>
<td>3.0 ... 6.0</td>
<td>3.0 ... 12.0</td>
</tr>
<tr>
<td>IDC-12-1K</td>
<td>2.0 ... 9.0</td>
<td>2.0 ... 11.0</td>
<td>5.0 ... 12.0</td>
<td>5.0 ... 18.0</td>
</tr>
<tr>
<td>IDC-15-1K</td>
<td>3.0 ... 13.0</td>
<td>3.0 ... 14.0</td>
<td>7.0 ... 14.0</td>
<td>7.0 ... 20.0</td>
</tr>
<tr>
<td>IDC-16GK-1K</td>
<td>2.0 ... 9.0</td>
<td>2.0 ... 11.0</td>
<td>3.0 ... 12.0</td>
<td>3.0 ... 14.0</td>
</tr>
<tr>
<td>IDC-24-1K</td>
<td>5.0 ... 18.0</td>
<td>5.0 ... 19.0</td>
<td>4.0 ... 19.0</td>
<td>4.0 ... 22.0</td>
</tr>
<tr>
<td>IDC-30F-1K</td>
<td>5.0 ... 19.0</td>
<td>5.0 ... 21.0</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
</tr>
<tr>
<td>IDC-30GK-1K</td>
<td>5.0 ... 19.0</td>
<td>5.0 ... 21.0</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
</tr>
<tr>
<td>IMC-40-256K</td>
<td>-</td>
<td>-</td>
<td>4.0 ... 42.0</td>
<td>4.0 ... 42.0</td>
</tr>
</tbody>
</table>

### Data carrier - read/write head

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-F61</th>
<th>IVH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td></td>
</tr>
<tr>
<td>IDC-8-1K</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>IDC-10-1K</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>IDC-12-1K</td>
<td>3.0 ... 6.0</td>
<td>3.0 ... 12.0</td>
<td></td>
</tr>
<tr>
<td>IDC-15-1K</td>
<td>5.0 ... 12.0</td>
<td>5.0 ... 18.0</td>
<td></td>
</tr>
<tr>
<td>IDC-16GK-1K</td>
<td>3.0 ... 6.0</td>
<td>3.0 ... 12.0</td>
<td></td>
</tr>
<tr>
<td>IDC-24-1K</td>
<td>4.0 ... 19.0</td>
<td>4.0 ... 22.0</td>
<td></td>
</tr>
<tr>
<td>IDC-30F-1K</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
<td></td>
</tr>
<tr>
<td>IDC-30GK-1K</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
<td></td>
</tr>
<tr>
<td>IMC-40-256K</td>
<td>4.0 ... 42.0</td>
<td>4.0 ... 42.0</td>
<td></td>
</tr>
</tbody>
</table>

### Read/write distances (mm) on steel with 8 mm distance at 25 °C

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-18GM-V1</th>
<th>IVH-30GM-V1</th>
<th>IVH-M1K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-50F-1K</td>
<td>8.0 ... 27.0</td>
<td>8.0 ... 37.0</td>
<td>10.0 ... 34.0</td>
<td>10.0 ... 45.0</td>
</tr>
<tr>
<td>IDC-50-1K</td>
<td>8.0 ... 27.0</td>
<td>8.0 ... 37.0</td>
<td>10.0 ... 34.0</td>
<td>10.0 ... 45.0</td>
</tr>
</tbody>
</table>

### Data carrier - read/write head

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-F61</th>
<th>IVH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td></td>
</tr>
<tr>
<td>IDC-50F-1K</td>
<td>10.0 ... 34.0</td>
<td>10.0 ... 45.0</td>
<td></td>
</tr>
<tr>
<td>IDC-50-1K</td>
<td>10.0 ... 34.0</td>
<td>10.0 ... 45.0</td>
<td></td>
</tr>
</tbody>
</table>
Note:

The read distances for code carriers - read/write heads are identical to the read distances of code carriers - read heads. The values for the IVH-F61 read/write head correspond to the values of the IVH-30GM-V1.

2.1.5 Read/write speeds

The maximum possible speeds at which a code or data carrier can still be read are determined by the time required to read, the size of the acquisition range as well as the distance of the code or data carrier from the read/write head. The acquisition range is calculated from a combination of the used components: code or data carrier and read/write head.

Used as an example in the following observations is the combination of code carrier ICC-50 and read/write head IVH-FP. The acquisition range is shown in the following graphics.

At a distance of 65 mm, the width s of the acquisition range is at a maximum. The value s is thus equal to 125 mm in this case.

Generally, the maximum speed at which a code or data carrier can be moved past the read/write station is:

\[ V_{\text{max}} = \frac{s}{t} \]

From these times, the following maximum speeds \( V_{\text{max}} \) can be achieved:

<table>
<thead>
<tr>
<th>Command</th>
<th>Required time t</th>
<th>( V_{\text{max}} ) at s = 125 mm</th>
<th>( V_{\text{max}} ) at s = 100 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read fixcode (reading fixcode 64 bit)</td>
<td>40 ms</td>
<td>3.1 m/s</td>
<td>2.5 m/s</td>
</tr>
<tr>
<td>Read word (reading 2 bytes)</td>
<td>60 ms</td>
<td>2.1 m/s</td>
<td>1.6 m/s</td>
</tr>
<tr>
<td>Write word (writing 2 bytes)</td>
<td>350 ms</td>
<td>omitted</td>
<td>omitted</td>
</tr>
</tbody>
</table>

Comments:

Other combinations of code or data carriers and read/write heads have different acquisition ranges and, therefore, different attainable speeds.

Dynamic writing, or writing to a moving data carrier, is not recommended, as a successful write operation cannot be ensured if the data carrier exits the acquisition range before the write process has concluded.

Listed in the table are only the times required for writing; no maximum speeds are given.
2.2 ICC Inductive Code Carriers

Code carriers are available in various housings. The code carriers are hard coded. Their unique numbers - the codes - are mask-programmed during chip manufacture. The code can be used to reference a corresponding data record in a database. Of the 64 bits of the mask-programmed ROMs, 28 bits are used as code. An additional 20 bits are used for code security. The remaining 16 bits are not used. This manufacturing process results in complete counterfeiting protection.

2.2.1 Installation notes for code carriers

Installing code carriers ICC-8 ... ICC-30

The Pepperl+Fuchs logo must point towards the read head. The code carrier can be mounted embeddable in metal. However, this reduces the read distance (see distance tables).

Note:

The code carriers should not be mounted recessed in metal as the read distances could be affected.

Installing code carriers ICC-50 and ICC-50F

The Pepperl+Fuchs logo must point towards the read head. The code carrier must not be mounted embeddable in metal. If the code carrier is to be mounted on a metal surface, a 10 mm thick plastic disk should be placed between the code carrier and the metal. When using an 8 mm thick plastic separator, only the read distances given in the distance tables are obtained.
<table>
<thead>
<tr>
<th>Code carrier</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model number</strong></td>
<td><strong>Technical data</strong></td>
</tr>
<tr>
<td>ICC-8</td>
<td><strong>Memory</strong></td>
</tr>
<tr>
<td>• Battery-free code carrier</td>
<td>ROM 64 bit (28 bit code, 36 bit data security)</td>
</tr>
<tr>
<td>• 28 bit fix code</td>
<td>Read cycles</td>
</tr>
<tr>
<td>• Readable from the printed side</td>
<td>unlimited</td>
</tr>
<tr>
<td>• Embeddable mountable in metal</td>
<td>Ambient conditions</td>
</tr>
<tr>
<td>• Protection degree IP67</td>
<td>Ambient temperature</td>
</tr>
<tr>
<td></td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td></td>
<td>Storage temperature</td>
</tr>
<tr>
<td></td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td><strong>Material</strong></td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Encapsulation compound</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model number</strong></td>
<td><strong>Technical data</strong></td>
</tr>
<tr>
<td>ICC-10</td>
<td><strong>Memory</strong></td>
</tr>
<tr>
<td>• Battery-free code carrier</td>
<td>ROM 64 bit (28 bit code, 36 bit data security)</td>
</tr>
<tr>
<td>• 28 bit fix code</td>
<td>Read cycles</td>
</tr>
<tr>
<td>• Readable from the printed side</td>
<td>unlimited</td>
</tr>
<tr>
<td>• Embeddable mountable in metal</td>
<td>Ambient conditions</td>
</tr>
<tr>
<td>• Protection degree IP67</td>
<td>Ambient temperature</td>
</tr>
<tr>
<td>• Dimensions correspond to DIN 69873 for tool identification</td>
<td>Storage temperature</td>
</tr>
<tr>
<td></td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td></td>
<td>Mechanical specifications</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Material</td>
<td>Housing</td>
</tr>
<tr>
<td></td>
<td>PBT</td>
</tr>
<tr>
<td>Encapsulation compound</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>
Code carrier

**Model number**
ICC-12

- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- Protection degree IP67

**Technical data**

<table>
<thead>
<tr>
<th>Type/Size</th>
<th>ROM 64 bit (28 bit code, 36 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 356 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material: Epoxy moulding compound

---

Code carrier

**Model number**
ICC-12-T1

- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- Protection degree IP67
- With extended temperature range up to 130 °C

**Technical data**

<table>
<thead>
<tr>
<th>Type/Size</th>
<th>ROM 64 bit (28 bit code, 36 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

**General specifications**

- Life at high temperatures: operating (130 °C): 5000 h during storage (150 °C): 2500 h

**Ambient conditions**

- Ambient temperature: -25 ... 130 °C (248 ... 403 K)
- Storage temperature: -40 ... 150 °C (233 ... 356 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material: Ryton R4 Encapsulation compound CY 221/HY 2966
## Code carrier

**Model number**
ICC-16GK

- Battery-free code carrier
- Readable from the printed side
- 28 bit fix code
- Embeddable mountable in metal
- Protection degree IP67
- With thread M16 x 1

## Technical data

**Memory**
- Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
- Read cycles: unlimited

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966

## Dimensions

**Model number**
ICC-30

- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- Protection degree IP67

**Technical data**

**Memory**
- Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
- Read cycles: unlimited

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966
**Code carrier**

**Model number**

**ICC-30F**
- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- With mounting flange
- Protection degree IP67

**Dimensions**

![Dimensions Diagram]

**Technical data**

- **Memory**
  - Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
  - Read cycles: unlimited

- **Ambient conditions**
  - Ambient temperature: -25 ... 70 °C (248 ... 343 K)
  - Storage temperature: -40 ... 85 °C (233 ... 358 K)

- **Mechanical specifications**
  - Protection degree: IP67
  - Material:
    - Housing: PBT
    - Encapsulation compound: CY 221/HY 2966

**Code carrier**

**Model number**

**ICC-30GK**
- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- With thread M30 x 1.5
- Protection degree IP67
- Protective cap ICS-30GK available

**Dimensions**

![Dimensions Diagram]

**Technical data**

- **General specifications**
  - Lifetime: ≥ 5000 h

- **Memory**
  - Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
  - Read cycles: unlimited

- **Ambient conditions**
  - Ambient temperature: -25 ... 70 °C (248 ... 343 K)
  - Storage temperature: -40 ... 85 °C (233 ... 358 K)

- **Mechanical specifications**
  - Protection degree: IP67
  - Material:
    - Housing: PP
    - Encapsulation compound: CY 221/HY 2966
**Model number**

**ICC-30GK-T1**
- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- Mounting with thread M30x1.5
- Protection degree IP67
- With extended temperature range up to 130 °C
- Protective cap ICS-30GK available

**Model number**

**ICC-30GK-T3**
- Battery-free code carrier
- 28 bit fix code
- Readable from the printed side
- Embeddable mountable in metal
- Mounting with thread M30x1.5
- Protection degree IP68
- With extended temperature range up to 110 °C
- High chemical resistance
- Protective cap ICS-30GK available

**Dimensions**

- Code carrier
- Technical data

**General specifications**
- Life at high temperatures: operating (130 °C): 5000 h during storage (150 °C): 2500 h
- Memory
  - Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
  - Read cycles: unlimited
- Ambient conditions
  - Ambient temperature: -25 ... 130 °C (248 ... 403 K)
  - Storage temperature: -40 ... 150 °C (233 ... 423 K)
- Mechanical specifications
  - Protection degree: IP67 according to EN 60529
  - Material
    - Housing: PA

**Code carrier**

- Technical data

**General specifications**
- Life at high temperatures: ≥ 12000 h at 110 °C
- Memory
  - Type/Size: ROM 64 bit (28 bit code, 36 bit data security)
  - Read cycles: unlimited
- Ambient conditions
  - Ambient temperature: -25 ... 110 °C (248 ... 383 K)
  - Storage temperature: -40 ... 110 °C (233 ... 383 K)
- Mechanical specifications
  - Protection degree: IP68 in accordance with EN 60529 (1000 h in 1.5 m of water at room temperature)
  - Material
    - Housing: PP
## Code carrier

**Model number**

<table>
<thead>
<tr>
<th>Model number</th>
<th>ICC-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery-free code carrier</td>
<td></td>
</tr>
<tr>
<td>28 bit fix code</td>
<td></td>
</tr>
<tr>
<td>Reading is possible from both sides</td>
<td></td>
</tr>
<tr>
<td>Protection degree IP67</td>
<td></td>
</tr>
</tbody>
</table>

### Technical data

<table>
<thead>
<tr>
<th>Type/Size</th>
<th>ROM 64 bit (28 bit code, 36 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

### Ambient conditions

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>-25 ... 70 °C (248 ... 343 K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
</tbody>
</table>

### Material

- Housing: PBT
- Encapsulation compound: CY 221/HY 2966

## Code carrier

**Model number**

<table>
<thead>
<tr>
<th>Model number</th>
<th>ICC-50F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery-free code carrier</td>
<td></td>
</tr>
<tr>
<td>28 bit fix code</td>
<td></td>
</tr>
<tr>
<td>Reading is possible from both sides</td>
<td></td>
</tr>
<tr>
<td>Protection degree IP67</td>
<td></td>
</tr>
<tr>
<td>With mounting flange</td>
<td></td>
</tr>
</tbody>
</table>

### Technical data

<table>
<thead>
<tr>
<th>Type/Size</th>
<th>ROM 64 bit (28 bit code, 36 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

### Ambient conditions

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>-25 ... 70 °C (248 ... 343 K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
</tbody>
</table>

### Material

- Housing: PBT
- Encapsulation compound: CY 221/HY 2966

---

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2.3 IRH Inductive Read Heads

It is the task of the read head to supply the code carrier with power and to receive and prepare the signals from the code carrier. Read heads are available in a wide range of housings. Of these, select the best-suited product for the given application.
**Read head**

**Model number**

**IRH-18GM-V1**

- Small read head with thread M18x1
- Connection via plug connection V1 (M12 x 1)
- Dual-LED for function display
- Protection degree IP67

**Accessories**

**V1-G-IVH-5M-PUR-ABG**

Cable connector for read heads with V1 plug connection 5 m screened

**V1-G-IVH-15M-PUR-ABG**

Cable connector for read heads with V1 plug connection 15 m screened

**Dimensions**

**Technical Data**

**General specifications**

Distance: distance tables, see introduction

**Indicators/operating means**

LED green/yellow: power on
yellow: code carrier detected

**Electrical specifications**

Power consumption $P_0$: 1.1 W

**Ambient conditions**

Ambient temperature: -25 ... 70 °C (248 ... 343 K)
Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

Protection degree: IP67 according to EN 60529
Connection type: plug connection V1

**Material**

Housing: high grade steel (stainless), PTB

**Installation**

In metal: not embeddable, overshoot at least 10 mm
Distance between two heads: $\geq 300$ mm

**Electrical connection**

![Diagram of electrical connection]
### Read head

**Model number**

IRH-30GM-V1

- With thread M30 x 1.5
- Connection via plug connection V1 (M12 x 1)
- Dual-LED for function display
- Protection degree IP67

**Accessories**

**V1-G-IVH-5M-PUR-ABG**

Cable connector for read heads with V1 plug connection 5 m screened

**V1-G-IVH-15M-PUR-ABG**

Cable connector for read heads with V1 plug connection 15 m screened

### Dimensions

![Dimensions Diagram](image)

### Technical Data

**General specifications**

- Distance tables, see introduction

**Indicators/operating means**

- LED green/yellow: power on
- Yellow: code carrier detected

**Electrical specifications**

- Power consumption $P_0$: 1.1 W

**Ambient conditions**

- Ambient temperature: $-25 \ldots 70 \, ^\circ C (248 \ldots 343 \, K)$
- Storage temperature: $-40 \ldots 85 \, ^\circ C (233 \ldots 358 \, K)$

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Connection type: plug connection V1

**Material**

- Housing: high grade steel (stainless), PTB

**Installation**

- Not embeddable, overshoot at least 10 mm
- Distance between two heads: $\geq 300 \, mm$

**Electrical connection**

![Electrical Connection Diagram](image)
**Model number**

IRH-M1K

- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67

---

**Technical Data**

**General specifications**

- Distance: distance tables, see introduction

**Indicators/operating means**

- LED green/yellow: power on
- Yellow: code carrier detected

**Electrical specifications**

- Power consumption $P_0$: 1.1 W

**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Connection type: terminal compartment, ≤2.5 mm² conductor csa

**Material**

- Housing: PBT

**Installation**

- In metal: not embeddable, overshoot at least 10 mm
- Distance between two heads: ≥ 300 mm

**Electrical connection**

- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67
### Read head

**Model number**

IRH-FP3

- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67

### Technical Data

#### General specifications

| Distance | distance tables, see introduction |

#### Indicators/operating means

| LED green/yellow | green: power on<br>yellow: code carrier detected |

#### Electrical specifications

| Power consumption $P_0$ | 1.3 W |

#### Ambient conditions

| Ambient temperature | -25 ... 70 °C (248 ... 343 K) |
| Storage temperature   | -40 ... 85 °C (233 ... 358 K) |

#### Mechanical specifications

| Protection degree | IP67 according to EN 60529 |
| Connection type    | terminal compartment, ≤ 2.5 mm² conductor csa |

#### Material

| Housing | PBT |
| Lower section | metal |

#### Installation

| In metal | not embeddable, overshoot at least 10 mm |
| Distance between two heads | ≥ 500 mm |

### Dimensions

![Dimensions Diagram](image)

#### Electrical connection

![Electrical Connection Diagram](image)
2.4 Control Interface Units for the IRI Fixcode System

The control interface units are encased in the time-tested terminal housing (K-system) for cabinet installation. Variants with serial interfaces (RS 232, RS 422, RS 485, 20 mA TTY) and with direct field-bus connections (PROFIBUS, INTERBUS) are available for connecting to the higher-order control system.

Up to four IRH-... read heads can be connected per control interface unit.

The IRT-FP3-IS read station is a special variant, consisting of a read head with integrated control interface unit. The device can be directly connected to the higher-order PLC via the TTY serial interface (20 mA current loop). This can be, for example, an S5-115U automation device with CPU 943 as well as a CP525 interface module for the connection of the stations. The 3964R computer coupling procedure with interpreter RK512 is supported for the communication. Up to 4 read stations can be connected in one current loop.
Control interface unit with serial interface

**Model number**
- IRI-KHA6-4.RX
- IRI-KHD2-4.RX

**Features**
- Serial interface RS 232, RS 422, RS 485 or TTY
- 4 read heads can be connected
- Operating modes fixcode, protocol 3964R selectable with or without interpreter RK512
- 3 LEDs per read head for function indication
- LED for power on

**Electrical Connection**

**Dimensions**

**Indicating/operating means**
## Technical data

### General specifications
- Number of read heads: max. 4

### Interface
- **Physical**: RS 232, RS 422, RS 485, TTY (20 mA current loop)
- **Protocol**: ASCII, 3964R with interpreter, 3964R without interpreter
- **Transfer rate**: 300 ; 600 ; 1200 ; 2400 ; 4800 ; 9600 ; 19200 Bit/s

### Indicators/operating means
- **LED green**: read head active (4 LEDs, 1 per head)
- **LED yellow**: code carrier detected (4 LEDs, 1 per head)
- **LED red**: reserved (4 LEDs, 1 per head)
- **LED green 5**: power on
- **DIP-switch**: setting the operating mode and interface

### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75 %

### Mechanical specifications
- **Protection degree**: IP20 in accordance with DIN 40050
- **Connection type**: self-opening connection terminals, max. core cross-section 2 x 2.5 mm², 9-pin Sub-D built-in connector
- **Construction type**: K-system, 60 mm (3 TE)
- **Material**: Housing Makrolon 6485

### Electrical specifications
- **Rated operational voltage **$U_e$**: 90 ... 253 V AC , 50 ... 60 Hz 18 ... 30 V DC , ripple 10 %
- **Current consumption**: 40 mA 170 mA
- **Power consumption $P_0$**: 8 W 4 W

## Model number
- IRI-KHA6-4.RX
- IRI-KHD2-4.RX

## Documentation
- Handbuch IRI-KHD2(A6)-4.RX

## Software
- Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

## Function
- The control interface unit is connected via the serial interface to a higher-order control system.
- The control interface unit receives the commands for reading the code carriers via this interface.
- Up to 4 read heads can be connected to the control interface unit. The read heads can be queried individually or cyclically.
- By means of a DIP-switch three different operating modes can be chosen at the control interface unit: fixcode, 3964R protocol with RK512 interpreter or 3964R protocol without RK512 Interpreter.
- With the "fixcode" operating mode, serial communication takes place via ASCII characters. All commands consist of multiple ASCII characters.
- The control interface unit supports the computer coupling procedure 3964R, which was developed for programmable logic controllers; the commands are inserted into the telegram frame of the procedure.
- In addition, the RK512 interpreter can be used in combination with fetch telegrams.
Control interface unit with 4 relay outputs

Features
- Serial interface RS 232, RS 422, RS 485 or TTY
- 4 read heads can be connected
- Operating modes fixcode, protocol 3964R selectable with or without interpreter RK512
- 4 relay outputs
- 3 LEDs per read head for function indication
- LED for power on

Model number
IRI-KHA6-4.4M
IRI-KHD2-4.4M

Electrical Connection

Indicating/operating means
### Technical data

#### General specifications
- Number of read heads: max. 4

#### Interface
- Physical: RS 232, RS 422, RS 485, TTY (20 mA current loop)
- Protocol: ASCII, 3964R with interpreter, 3964R without interpreter
- Transfer rate: 300 ; 600 ; 1200 ; 2400 ; 4800 ; 9600 ; 19200 Bit/s

#### Indicators/operating means
- LED green: read head active (4 LEDs, 1 per head)
- LED yellow: Code / data carrier detected (4 LEDs, 1 per head)
- LED red: reserved (4 LEDs, 1 per head)
- LED green 5: power on
- DIP-switch: setting the operating mode and interface

#### Output
- Output type: 4 relays with changeover contacts
- Test voltage: contact/coil 3000 V
- Retention time/hold time: ≥ 1 ms ± 10
- Contact loading: AC: 1 A/250 V, DC: 1 A/250 V
- Lifetime: mechanical relay: 1 x 10⁵ operating cycles at max. contact loading
  5 x 10⁷ operating cycles at 1 A / 30 V DC

#### Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -25 ... 85 °C (248 ... 358 K)
- Climatic conditions: max. 75 %

#### Mechanical specifications
- Protection degree: IP20 in accordance with EN 60529
- Connection type: self-opening connection terminals, max. core cross-section
  2 x 2.5 mm², 9-pin Sub-D built-in connector
- Construction type: K-system, 80 mm (4 TE)
- Material: Housing Makrolon 6485

#### Electrical specifications
- Rated operational voltage $U_e$: 90 ... 253 V AC , 50 ... 60 Hz
- Ripple 10 %<sub>RS</sub>
- Current consumption: 40 mA
- Power consumption $P_0$: 8 W

---

### Model number
- IRI-KHA6-4.4M
- IRI-KHD2-4.4M

### Documentation
- Handbuch IRI-KHD2(A6)-4.4M
- Manual IRI-KHD2(A6)-4.4M

### Software
Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

### Function
The control interface unit is connected via the serial interface to a higher-order control system.

The control interface unit receives the commands for reading the code carriers via this interface.

Up to 4 read heads can be connected to the control interface unit. The read heads can be queried either individually or through cyclic switching. When a code carrier is detected, a relay contact remains closed for a specified amount of time.

Using the DIP switches, it is possible to select between various operating modes on the control interface unit: fixcode, protocol 3964R with interpreter RK512, protocol 3964R without interpreter RK512 and 4-bit identification system.

With the “fixcode” operating mode, serial communication takes place via ASCII characters. All commands consist of multiple ASCII characters.

The control interface unit supports the computer coupling procedure 3964R, which was developed for programmable logic controllers; the commands are inserted into the telegram frame of the procedure. In addition, the RK512 interpreter can be used in combination with fetch telegrams.

The “4-bit-ID-system” operating mode is designed especially for simple control tasks. In this operating mode, activation via the serial interface is not necessary. The control interface unit cyclically activates all connected read heads.

The first 4 bits of a data carrier programmed for this operating mode are projected onto the relay outputs for an adjustable period of time. In this way, up to 16 different states can be coded.

With the relay outputs, pneumatic valves or comparable control devices can be directly connected. Thus, the path via a higher-order control system is made superfluous.
Control interface unit for INTERBUS

Model number

IRI-KHA6-4HB5
IRI-KHD2-4HB5

Features

- INTERBUS-remote bus subscriber
- 4 read heads can be connected
- Transmission of all read fix codes in one cycle
- 3 LEDs per read head for function indication
- LED for power on / bus communication

Electrical Connection

Indicating/operating means

Date of Issue 19.02.2002
### Technical data

#### General specifications
- **Number of read heads**: max. 4

#### Interface
- **Physical**: RS 485
- **Protocol**: INTERBUS-remote bus
- **ID code**: 03

#### Indicators/operating means
- **LED green**: read head active (4 LEDs, 1 per head)
- **LED yellow**: code carrier detected (4 LEDs, 1 per head)
- **LED red**: reserved (4 LEDs, 1 per head)
- **LED red/green**: device status (permanent green: device operational / bus communication active)
- **Rotary switch**: ring termination
  - 0 = closed
  - 1 = bus continued

#### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75%

#### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: self-opening connection terminals, max. core cross-section
  - 2 x 2.5 mm², 9-pin Sub-D built-in connector
- **Construction type**: K-system, 80 mm (4 TE)
- **Material**: Housing Makrolon 6485

#### Electrical specifications
- **Rated operational voltage $U_e$**:
  - 90 ... 253 V AC, 50 ... 60 Hz
  - 18 ... 30 V DC, ripple 10 %
- **Current consumption**:
  - 50 mA
  - 200 mA
- **No-load supply current $I_0$**: < 110 mA / 24 V DC (typ.)
- **Power consumption $P_0$**: 10 W

### Model number
- IRI-KHA6-4HB5
- IRI-KHD2-4HB5

### Documentation
- Handbuch IRI-KHD2(A6)-4HB5
- Manual IRI-KHD2(A6)-4HB5

### Software
The unit description for the commissioning software "IBS CMD G4" of the INTERBUS is included in the scope of delivery.

### Function
The control interface unit is operated as an INTERBUS remote bus subscriber. The control interface unit uses 16 bytes in the INTERBUS frame protocol. When communicating from the master to the control interface unit, 8 bytes are used for the command data. 16 bytes are available for the transmission of the read head data from the control interface unit to the master. Here, only the cyclically transmitted process-data channel is used; the parameter channel is not used.

Up to 4 read heads can be connected to the control interface unit. 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. In addition, each data field contains a 3 bit read number which is incremented with every new code read. The read number makes it possible to manage, in the higher-order control system, the codes which have been read. In this way it is possible, for example, to determine whether a new code is pending or if the same code has been read multiple times. An additional status bit indicates whether or not a code carrier is currently in the acquisition range.
Control interface unit for PROFIBUS-DP

**Model number**
IRI-KHA6-4HB6
IRI-KHD2-4HB6

**Features**
- PROFIBUS-DP acc. to EN 50170
- 4 read heads can be connected
- Transmission of all read fix codes in one cycle
- Address adjustment via DIP switches
- Connectable bus termination
- 3 LEDs per read head for function indication
- LED for power on / bus communication

**Electrical Connection**

**Indicating/operating means**

Subject to reasonable modifications due to technical advances.

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**Technical data**

### General specifications
- Number of read heads: max. 4

### Interface
- **Physical**: RS 485
- **Protocol**: PROFIBUS-DP acc. to EN 50170
- **Transfer rate**: 9.6 ; 19.2 ; 44.44 ; 93.75 ; 187.5 ; 500 ; 1500 kBit/s all self synchronising

### Indicators/operating means
- **LED green**: read head active (4 LEDs, 1 per head)
- **LED yellow**: code carrier detected (4 LEDs, 1 per head)
- **LED red**: reserved (4 LEDs, 1 per head)
- **LED red/green**: device status
  - permanent green: device operational / bus communication active
  - red-green flashing: device operational / bus communication faulty
  - permanent red: device errors
- **DIP-switch**: setting the station address
- **Rotary switch**: bus termination
  - 0 = not active
  - 1 = active

### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75 %

### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: self-opening connection terminals, max. core cross-section 2 x 2.5 mm²; 9-pin Sub-D built-in connector
- **Construction type**: K-system, 80 mm (4 TE)
- **Material**: Housing Makrolon 6485

### Electrical specifications
- **Rated operational voltage** $U_e$
  - IRI-KHA6-4HB6: 85 ... 253 V AC , 50 ... 60 Hz
  - IRI-KHD2-4HB6: 18 ... 30 V DC , ripple 10 %
- **Current consumption**
  - IRI-KHA6-4HB6: 60 mA, ≤ 35 mA , with active read head 45 mA
  - IRI-KHD2-4HB6: 250 mA, ≤ 120 mA , with active read head 190 mA
- **No-load supply current** $I_0$
  - IRI-KHA6-4HB6: 12 W
  - IRI-KHD2-4HB6: 6 W

### Model number
- IRI-KHA6-4HB6
- IRI-KHD2-4HB6

### Documentation
- Handbuch IRI-KHD2(A6)-4HB6
- Manual IRI-KHD2(A6)-4HB6

### Software
- The GSD file is included in the scope of delivery.

### Function
- The control interface unit is operated as a slave on the PROFIBUS-DP. Up to 4 read heads can be connected to the control interface unit. All read heads connected to the device are detected and the codes which are read in transmitted in a cycle.
- The address is set via DIP switches, and the terminating resistor for the bus is connected via a rotary switch.
2.5 IDC and IMC Inductive Data Carriers

The IDENT-I System V read/write system functions with battery-free and battery-operated data carriers. The battery-free data carriers contain a 1 kbit EEPROM memory; the battery-operated data carriers are available with up to 256 kbits of memory.

With the battery-free data carriers, the same housing sizes as with the code carriers can be achieved. With the battery-operated models, the number of write cycles is limited only by the life span of the battery.

2.5.1 Installation notes for data carriers

Installing the data carriers IDC-8-1K .... IDC-30xx-1K

The Pepperl+Fuchs logo must point towards the read/write head. The data carrier can be mounted embeddable in metal. However, this reduces the read or write distance (see distance tables).

Note:

The data carrier should not be mounted recessed in metal as the read and write distances could be affected.
Inductive Identification System IDENT-I System V

Installing data carriers IDC-50-1K and IDC-50F-1K

The Pepperl+Fuchs logo must point towards the read/write head. The data carrier must not be mounted embeddable in metal. If the data carrier is to be mounted on a metal surface, a 10 mm thick plastic disk should be placed between the data carrier and metal. When using an 8 mm thick plastic separator, only the read and write distances given in the distance tables are obtained.

Installing data carrier IMC-40-256K

The Pepperl+Fuchs logo must point towards the read/write head. The data carrier can be mounted embeddable in metal. However, this reduces the read or write distance (see distance tables).

Note:

The data carriers should not be mounted recessed in metal as the read and write distances could be affected.
**Technical data**

<table>
<thead>
<tr>
<th><strong>Model number</strong></th>
<th><strong>Dimensions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IDC-6-1K</strong></td>
<td></td>
</tr>
<tr>
<td><strong>IDC-10-1K</strong></td>
<td></td>
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</tbody>
</table>

### Model number

<table>
<thead>
<tr>
<th><strong>IDC-6-1K</strong></th>
<th><strong>IDC-10-1K</strong></th>
</tr>
</thead>
</table>

### Data carrier

- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67

### Model number

<table>
<thead>
<tr>
<th><strong>IDC-6-1K</strong></th>
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### Technical data

#### Memory

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<tr>
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<th>EEPROM 1</th>
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<tr>
<td>Read cycles</td>
<td>unlimited</td>
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<td>Write cycles</td>
<td>&gt; 500000</td>
</tr>
<tr>
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#### Ambient conditions

- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -40 ... 85 °C (233 ... 358 K)

#### Mechanical specifications

- **Protection degree**: IP67 according to EN 60529
- **Material**
  - **Housing**: Epoxy moulding compound

### Dimensions

#### IDC-12-1K

- **Ø12** x 6

#### IDC-15-1K

- **Ø15** x 9

### Model number

#### IDC-12-1K

- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67

#### IDC-15-1K

- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67

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**Data carrier**

**Model number**
IDC-16GK-1K

- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67
- Mounting with thread M16x1

**Technical data**

<table>
<thead>
<tr>
<th>Memory</th>
<th></th>
</tr>
</thead>
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<tr>
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</table>

**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966

**Dimensions**

**Data carrier**

**Model number**
IDC-24-1K

- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67

**Technical data**

<table>
<thead>
<tr>
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<th></th>
</tr>
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<tr>
<td>Type/Size</td>
<td>EEPROM 1</td>
</tr>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
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<td>Write cycles</td>
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**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966
### Model number
**IDC-30F-1K**
- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67
- With mounting flange

### Model number
**IDC-30GK-1K**
- Battery-free data carrier
- 1 kBit memory
- Embeddable mountable in metal
- Readable and writeable from the printed side
- Protection degree IP67
- Mounting with thread M30x1.5
- Protective cap ICS-30GK available

### Technical data
**Memory**
- **Type/Size**: EEPROM 1
- **Read cycles**: unlimited
- **Write cycles**: > 500000
- **Data retention period**: 110 years at 25 °C, 10 years at 50 °C

**Ambient conditions**
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- **Protection degree**: IP67 according to EN 60529

<table>
<thead>
<tr>
<th>Material</th>
<th>Housing</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>PBT</td>
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</tr>
</tbody>
</table>

### Technical data
**Memory**
- **Type/Size**: EEPROM 1
- **Read cycles**: unlimited
- **Write cycles**: > 500000
- **Data retention period**: 110 years at 25 °C, 10 years at 50 °C

**Ambient conditions**
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- **Protection degree**: IP67 according to EN 60529

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<tr>
<td></td>
<td>PP</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>
## Data carrier

### Model number
**IDC-50-F-1K**
- Battery-free data carrier
- 1 kBit memory
- Reading and writing is possible from both sides
- Protection degree IP67

### Technical data
**Memory**
- Type/Size: EEPROM 1
- Read cycles: unlimited
- Write cycles: > 500000
- Data retention period: 110 years at 25 °C, 18 years at 50 °C

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966

### Dimensions

---

## Data carrier

### Model number
**IDC-50-F-1K**
- Battery-free data carrier
- 1 kBit memory
- Reading and writing is possible from both sides
- Protection degree IP67
- With mounting flange

### Technical data
**Memory**
- Type/Size: EEPROM 1
- Read cycles: unlimited
- Write cycles: > 500000
- Data retention period: 110 years at 25 °C, 18 years at 50 °C

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966

### Dimensions
### Data carrier

**Model number**

IMC-40-256K

- Data carrier with battery
- Memory 32 kByte
- Readable and writeable from the printed side
- Protection degree IP67

### Technical Data

<table>
<thead>
<tr>
<th>Data carrier with battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMC-40-256K</td>
</tr>
<tr>
<td>PBT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM 32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type/Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>15000000 at 16 bytes/access</td>
</tr>
<tr>
<td>7500 at 32768 bytes/access</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of access events</th>
</tr>
</thead>
<tbody>
<tr>
<td>15000000</td>
</tr>
<tr>
<td>7500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage loss in 6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>19% at 25 °C, 46% at 70 °C</td>
</tr>
</tbody>
</table>

### Dimensions

- **Model number**: IMC-40-256K
- **Protection degree**: IP67
- **Memory**: 32 kByte
- **Data carrier**: IMC-40-256K
- **Material**: PBT
- **Encapsulation compound**: CY 221/HY 2966

### Technical Data

<table>
<thead>
<tr>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM 32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type/Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>15000000 at 16 bytes/access</td>
</tr>
<tr>
<td>7500 at 32768 bytes/access</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage loss in 6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>19% at 25 °C, 46% at 70 °C</td>
</tr>
</tbody>
</table>

### Ambient conditions

- **Ambient temperature**: 0 ... 70 °C (273 ... 343 K)
- **Storage temperature**: -40 ... 70 °C (233 ... 343 K)

### Mechanical specifications

- **Protection degree**: IP67 according to EN 60529
- **Material**: PBT
- **Encapsulation compound**: CY 221/HY 2966
2.6 IVH Inductive Read/Write Heads

It is the task of the read/write head to supply the data carrier with power and to receive and prepare the signals from the data carrier. Read/write heads are available in a wide range of housings. Of these, select the best-suited product for the given application.
Read/write head

**Model number**

IVH-18GM-V1

- Small read/write head with thread M18x1
- Connection via plug connection V1 (M12 x 1)
- Dual-LED for function display
- Protection degree IP67

**Accessories**

V1-G-IVH-5M-PUR-ABG

Cable connector for read heads with V1 plug connection 5 m screened

V1-G-IVH-15M-PUR-ABG

Cable connector for read heads with V1 plug connection 15 m screened

---

**Dimensions**

![Dimensions Diagram]

**Technical Data**

**General specifications**

Distance

**Indicators/operating means**

LED green/yellow: power on

**Electrical specifications**

Power consumption $P_0$ 1.1 W

**Ambient conditions**

Ambient temperature -25 ... 70 °C (248 ... 343 K)

Storage temperature -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

Protection degree IP67 according to EN 60529

Connection type plug connection V1

Material Housing PBT/stainless steel

Installation In metal

Distance between two heads ≥ 300 mm

**Electrical connection**

![Electrical Connection Diagram]
### Model number

**IVH-30GM-V1**

- With thread M30 x 1.5
- Connection via plug connection V1 (M12 x 1)
- Dual-LED for function display
- Protection degree IP67

### Accessories

**V1-G-IVH-5M-PUR-ABG**
Cable connector for read heads with V1 plug connection 5 m screened

**V1-G-IVH-15M-PUR-ABG**
Cable connector for read heads with V1 plug connection 15 m screened

### Technical Data

#### General specifications
- Distance
distance tables, see introduction

#### Indicators/operating means
- LED green/yellow: green: power on
- yellow: Data carrier detected

#### Electrical specifications
- Power consumption $P_0$: 1.1 W

#### Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

#### Mechanical specifications
- Protection degree: IP67 according to EN 60529
- Connection type: plug connection V1
- Material
  - Housing: PBT/stainless steel

#### Installation
- In metal: not embeddable, overshoot at least 10 mm
- Distance between two heads: ≥ 300 mm

### Electrical connection

![Electrical Connection Diagram]
## Model number

**IVH-F61**

- Particularly flat construction
- 2 m connection cable
- Protection degree IP67
- Can be mounted on metal

## Technical Data

### General specifications

<table>
<thead>
<tr>
<th>Distance</th>
<th>distance tables, see introduction</th>
</tr>
</thead>
</table>

### Electrical specifications

<table>
<thead>
<tr>
<th>Power consumption $P_0$</th>
<th>1.1 W</th>
</tr>
</thead>
</table>

### Ambient conditions

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>-25 °C to 70 °C (248 ... 343 K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>-40 °C to 85 °C (233 ... 358 K)</td>
</tr>
</tbody>
</table>

### Mechanical specifications

<table>
<thead>
<tr>
<th>Protection degree</th>
<th>IP67 according to EN 60529</th>
</tr>
</thead>
</table>

### Connection type

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>CY 221/HY 2966</td>
</tr>
<tr>
<td>Encapsulation compound</td>
</tr>
<tr>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>

### Installation

<table>
<thead>
<tr>
<th>Distance between two heads</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 300 mm</td>
</tr>
</tbody>
</table>

### Electrical connection

1. YE (yellow)
2. WH (white)
3. BN (brown)
4. GN (green)

- Screen

### Distance between two heads

- 300 mm

---

**Note:** Subject to reasonable modifications due to technical advances.
### Technical Data

#### General specifications
- Distance: distance tables, see introduction

#### Indicators/operating means
- LED green/yellow:
  - green: power on
  - yellow: Data carrier detected

#### Electrical specifications
- Power consumption $P_0$: 1.1 W

#### Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

#### Mechanical specifications
- Protection degree: IP67 according to EN 60529
- Material: Housing: PBT
- Connection type: terminal compartment, $\leq 2.5 \text{ mm}^2$ conductor CSA
- Installation: In metal: not embeddable, overshoot at least 10 mm
- Distance between two heads: $\geq 300$ mm

#### Electrical connection
- DATA
- +1
- -1
- DIR
- C
- V

---

### Dimensions

- **Y-Axis**: 15° grid
- **X-Axis**: 90°
- **Extended hole**: 4.3 x 5.3
- **Dimensions**: 30 x 91 x 41

---

### Model number

**IVH-M1K**

- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67
### Model number

**IVH-FP3**
- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67

### Technical Data

<table>
<thead>
<tr>
<th>General specifications</th>
<th>Distance tables, see introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicators/operating means</strong></td>
<td></td>
</tr>
<tr>
<td>LED green/yellow</td>
<td>green: power on</td>
</tr>
<tr>
<td></td>
<td>yellow: Data carrier detected</td>
</tr>
<tr>
<td><strong>Electrical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Power consumption $P_0$</td>
<td>1.3 W</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Connection type</td>
<td>terminal compartment, $\leq 2.5 \text{ mm}^2$ conductor csa</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Lower section</td>
<td>aluminium die casting</td>
</tr>
<tr>
<td>Installation</td>
<td>not embeddable, overshoot at least 10 mm</td>
</tr>
<tr>
<td>Distance between two heads</td>
<td>$\geq 500 \text{ mm}$</td>
</tr>
</tbody>
</table>

### Dimensions

```
+-------+-------+----------+----------+----------+
|       |       |          | LED      |
| 40    | 7     | 11       | Pg13.5   |
| 80    | 65    | 65       | ø5.3     |
```

### Electrical connection

```
1  + 2  + 3  + 4
  + 3  + 2  + 1
  + 4  + 3  + 2
  + 1  + 2  + 3
```

**IVH-FP3**
- Connection via terminal compartment
- Dual-LED for function display
- Protection degree IP67
2.7 IVI Control Interface Units

The control interface units are encased in the time-tested terminal housing (K-system) for cabinet installation. Variants with serial interfaces (RS 232, RS 422, RS 485, 20 mA TTY) and with direct field-bus connections (PROFIBUS, INTERBUS) are available for connecting to the higher-order control system.

Up to four read/write heads can be connected per control interface unit.
Control interface unit with serial interface

Dimensions

Model number

IVI-KHA6-4HRX
IVI-KHD2-4HRX

Features

- Selectable serial interface RS232, RS422 or RS485
- 4 read/write heads connectable
- 3 LEDs as function indicators for each read/write head
- Operating modes fixcode, read/write, protocol 3964R selectable with or without interpreter RK512

Electrical Connection

Indicating/operating means
## Technical data

### General specifications
- Number of read/write heads: max. 4

### Interface
- Physical: RS 232, RS 422, RS 485, TTY (20 mA current loop) selection of interface type (can be selected via S7 and S8)
- Protocol: ASCII, 3964R with interpreter, 3964R without interpreter
- Transfer rate: 300; 600; 1200; 2400; 4800; 9600; 19200 Bit/s

### Indicators/operating means
- LED green: read/write head active (4 LEDs, 1 per head)
- LED yellow: Code / data carrier detected (4 LEDs, 1 per head)
- LED red: reserved (4 LEDs, 1 per head)
- LED green 5: power on
- DIP-switch: setting the operating mode and interface

### Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -25 ... 85 °C (248 ... 358 K)
- Climatic conditions: air humidity max. 75 %

### Mechanical specifications
- Protection degree: IP20 in accordance with EN 60529
- Connection type: self-opening connection terminals, max. core cross-section 2 x 2.5 mm², 9-pin Sub-D built-in connector
- Material
  - Housing: Makrolon 6485
  - Construction type: K-system, 60 mm (3 TE)

### Electrical specifications
- Rated operational voltage $U_e$: 90 ... 253 V AC, 50 ... 60 Hz, 18 ... 30 V DC, ripple 10 %
- Current consumption: 40 mA, 170 mA
- Power consumption $P_0$: 8 W, 4 W

## Model number
- IVI-KHA6-4HRX
- IVI-KHD2-4HRX

## Documentation
- Handbuch IVI-KHD2(A6)-4HRX
- Handbuch IVI-KHD2(A6)-4HRX
- Manual IVI-KHD2(A6)-4HRX

## Software
Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

## Function
The control interface unit is connected via the serial interface to a higher-order control system. The control interface unit receives the commands to read and/or write the code or data carriers via this interface. Up to 4 read/write heads can be connected to the control interface unit. The read/write heads can be queried either individually or through cyclic switching.

Using the DIP switches, it is possible to select between various operating modes on the control interface unit: fixcode, read/write, protocol 3964R with interpreter RK512 or protocol 3964R without interpreter RK512. For the operating modes "fixcode" and "read/write" the serial communication occurs via ASCII characters. All commands consist of multiple ASCII characters. In the operating mode "fixcode", the control interface unit functions as a reader system and is compatible with an IRI-KHD2-4.RX or IRI-KHA6-4.RX control interface unit. In the "read/write" operating mode, the read/write commands are available which, in addition to reading code carriers, make it possible to access the memory on the data carriers.

The control interface unit supports the computer coupling procedure 3964R, which was developed for programmable logic controllers; the commands are inserted into the telegram frame of the procedure. In addition, the RK512 interpreter can be used in combination with FETCH and SEND telegrams.
Control interface unit for INTERBUS

**Model number**

IVI-KHA6-4HB5  
IVI-KHD2-4HB5

**Features**

- INTERBUS-remote bus subscriber
- Complete read/write functionality via the INTERBUS
- 4 read/write heads connectable
- Transmission of 2 words, 16 bit each, in one cycle
- 3 LEDs as function indicators for each read/write head
- LED for power on / bus communication
- Simple commissioning possible with CMD-tools INTERBUS software

**Electrical Connection**

**Indicating/operating means**
### Technical data

#### General specifications
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of read/Write heads</td>
<td>max. 4</td>
</tr>
</tbody>
</table>

#### Interface
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>RS 485</td>
</tr>
<tr>
<td>Protocol</td>
<td>INTERBUS-remote bus</td>
</tr>
<tr>
<td>ID code</td>
<td>03</td>
</tr>
</tbody>
</table>

#### Indicators/Operating means
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED green</td>
<td>read/write head active (4 LEDs, 1 per head)</td>
</tr>
<tr>
<td>LED yellow</td>
<td>Code / data carrier detected (4 LEDs, 1 per head)</td>
</tr>
<tr>
<td>LED red</td>
<td>reserved (4 LEDs, 1 per head)</td>
</tr>
<tr>
<td>LED red/green</td>
<td>device status</td>
</tr>
<tr>
<td></td>
<td>permanent green: device operational / bus communication active</td>
</tr>
<tr>
<td></td>
<td>red-green flashing: device operational / bus communication faulty</td>
</tr>
<tr>
<td></td>
<td>permanent red: device errors</td>
</tr>
<tr>
<td>Rotary switch</td>
<td>ring termination</td>
</tr>
<tr>
<td></td>
<td>0 = closed</td>
</tr>
<tr>
<td></td>
<td>1 = bus continued</td>
</tr>
</tbody>
</table>

#### Ambient conditions
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 ... 85 °C (248 ... 358 K)</td>
</tr>
<tr>
<td>Climatic conditions</td>
<td>air humidity max. 75 %</td>
</tr>
</tbody>
</table>

#### Mechanical specifications
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
<td>IP20 in accordance with EN 60529</td>
</tr>
<tr>
<td>Connection type</td>
<td>self-opening connection terminals, max. core cross-section</td>
</tr>
<tr>
<td></td>
<td>2 x 2.5 mm², 9-pin Sub-D built-in connector</td>
</tr>
<tr>
<td>Material</td>
<td>Housing Makrolon 6485</td>
</tr>
<tr>
<td>Construction type</td>
<td>K-system, 80 mm (4 TE)</td>
</tr>
</tbody>
</table>

#### Electrical specifications
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operational voltage $U_e$</td>
<td>85 ... 253 V AC , 50 ... 60 Hz</td>
</tr>
<tr>
<td></td>
<td>18 ... 30 V DC , ripple 10 % BS</td>
</tr>
<tr>
<td>Current consumption</td>
<td>50 mA</td>
</tr>
<tr>
<td></td>
<td>200 mA</td>
</tr>
<tr>
<td>No-load supply current $I_0$</td>
<td>50 mA ≤ 110 mA</td>
</tr>
<tr>
<td>Power consumption $P_0$</td>
<td>10 W</td>
</tr>
<tr>
<td></td>
<td>5 W</td>
</tr>
</tbody>
</table>

### Model number
- IVI-KHA6-4HB5
- IVI-KHD2-4HB5

### Documentation
- Handbuch IVI-KHD2(A6)-4HB5
- Manual IVI-KHD2(A6)-4HB5

### Software
The unit description for the commissioning software “IBS CMD G4” of the INTERBUS is included in the scope of delivery.

### Function
The control interface unit is operated as an INTERBUS remote bus subscriber. The control interface unit uses 16 bytes in the INTERBUS frame protocol; 4 words, each with 16 bits in both directions of communication. Of these, 2 words are available to the user for user data. Only the cyclically transmitted process data channel is used; the parameter channel is not used.

Up to 4 read heads can be connected to the control interface unit.

The subscriber description for the INTERBUS software CMD-tools is supplied, making it possible to easily insert the control interface unit into the CMD subscriber database.
Control interface unit for PROFIBUS-DP

Model number
IVI-KHA6-4HB6
IVI-KHD2-4HB6

Features
- PROFIBUS-DP acc. to EN 50170
- Complete read/write functionality via the PROFIBUS-DP
- Transmission of up to 14 words, 16 bit each, in one cycle
- Variable module length
- 4 read/write heads connectable
- Address adjustment via DIP switches
- Connectable bus termination
- 3 LEDs as indicators for each read/write head
- LED for power on / bus communication

Electrical Connection

Indicating/operating means
### Technical data

#### General specifications
- Number of read/Write heads: max. 4

#### Interface
- **Physical**: RS 485
- **Protocol**: PROFIBUS-DP acc. to EN 50170
- **Transfer rate**: 9.6; 19.2; 44.44; 93.75; 500; 1500 kBit/s all self synchronising

#### Indicators/operating means
- **LED green**: read/write head active (4 LEDs, 1 per head)
- **LED yellow**: code / data carrier detected (4 LEDs, 1 per head)
- **LED red**: reserved (4 LEDs, 1 per head)
- **LED red/green**: device status
  - permanent green: device operational / bus communication active
  - red-green flashing: device operational / bus communication faulty
  - permanent red: device errors
- **DIP-switch**: setting the station address
- **Rotary switch**: bus termination
  - 0 = not active
  - 1 = active

#### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75 %

#### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: self-opening connection terminals, max. core cross-section 2 x 2.5 mm², 9-pin Sub-D built-in connector
- **Material**
  - **Housing**: Makrolon 6485
  - **Construction type**: K-system, 80 mm (4 TE)

#### Electrical specifications
- **Model number**
  - IVI-KHA6-4HB6
  - IVI-KHD2-4HB6
- **Rated operational voltage** $U_e$
  - 85 ... 253 V AC , 50 ... 60 Hz
  - 18 ... 30 V DC , ripple 10 %
- **Current consumption** $I_{0}$
  - 60 mA
  - 250 mA
- **No-load supply current** $I_{0}$
  - ≤ 35 mA with active read head 45 mA
  - ≤ 120 mA with active read head 190 mA
- **Power consumption** $P_{0}$
  - 12 W
  - 6 W

### Model number
- IVI-KHA6-4HB6
- IVI-KHD2-4HB6

### Documentation
- **Handbuch IVI-KHD2(A6)-4HB6**
- **Manual IVI-KHD2(A6)-4HB6**

### Software
- The GSD file is included in the scope of delivery.

### Function
The control interface unit is operated as a slave on the PROFIBUS-DP. The device makes available the complete read/write functionality. Up to 32 bytes are transmitted per cycle. Of these, up to 16 words, each with 16 bits, are available to the user. The size of the input and output modules is variable. As a result, it is possible, by means of appropriate selections in the GSD file, to optimize the quantity of transmitted data for the given application.

Up to 4 read heads can be connected to the control interface unit.

The address is set via DIP switches, and the terminating resistor for the bus is connected via a rotary switch.
Control interface unit with 16 inputs/outputs

Model number

IVI-KHD2-4HD1

Features

- 4 read/write heads connectable
- 16 inputs/outputs
- Programming or reading of 16 bits in data carriers
- Control inputs and error output
- LEDs as function indicators

Electrical Connection

Indicating/operating means
### Technical data

#### General specifications
- **Number of read/write heads**: max. 4

#### Indicators/operating means
- **LED green**: mains supply 24 V (2 unit), supply of the inputs and outputs 5 V (2 units), read head active (4 units, 1 per head)
- **LED yellow**: read/write head operation successful (4 units, 1 per head), inputs/outputs (16 units, 1 per input/output), direction control input (1 unit) I/O CTRL, programming input (1 unit) PGM, acknowledgement input ACK
- **LED red**: error (4 LEDs, 1 per head)

#### Electrical specifications
- **Rated operational voltage** $U_e$: 18 ... 32 V DC, ripple $\leq 10\%$ (terminals 59 and 60, 47 and 48, 50 and 51)
- **Current consumption**: max. 200 mA, load currents at the outputs flow via terminals 47/48 and 50/51
- **No-load supply current** $I_0$: 70 mA, with active read head 150 mA (outputs activated)
- **Power consumption** $P_0$: 5 W

#### Inputs/Outputs
- **Output rated operating current** $I_e$: 150 mA per data output (average), max. 600 mA per group of 4 outputs; groups 1/2/3/16; 17/18/31/32; 4/5/6/19; 20/21/34/35; $\leq 20$ mA per control output
- **Data lines**: 16 binary inputs/outputs (I/O)
- **Input level**: logic 1: 13 ... 30 V; logic 0: 0 ... 7 V
- **Output level**: logic 1: $U_e-1$ V; logic 0: switched high (at OFF, the output potential is undetermined; short-circuit proof, disconnection of all outputs on overload)
- **Control lines**: 1 direction control input (I/O CNTL), 1 programming input (PGM), 1 acknowledgement input (ACK), 1 error output (ERROR)

#### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75 %

#### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: self-opening connection terminals, max. core cross-section 2 x 2.5 mm²
- **Material**: Housing Makrolon 6485
- **Construction type**: K-system, 100 mm (5 TE)

### Function

With this control interface unit, 16-bit bit patterns can be programmed or read in the data carrier. In addition, the device is equipped with 16 inputs/outputs for this bit pattern as well as various control lines. Up to 4 read heads can be connected to the control interface unit. The programming and read procedures are controlled via the various control inputs. Error conditions are indicated by the error output. During programming, the inputs and outputs are switched as inputs onto which the bit pattern which is to be programmed is applied. The programming procedure is started via the programming input. The data carrier must be located in front of one of the connected read/write heads. No distinction is made between the heads, i.e. make certain that only one data carrier is located in front of a head. While reading, the inputs/outputs are switched as outputs. If a data carrier is placed in front of a head, the data carrier is read and the 16 bits of the bit pattern are switched to the outputs.
Control interface unit with 8 inputs/outputs

Model number
IVI-KHD2-4HD3

Features
- 4 read/write heads connectable
- 8 inputs/outputs
- Programming or reading of 8 bits in data carriers
- 2 inputs for read head numbers
- Control inputs and error output
- LEDs as function indicators

Dimensions

Electrical Connection

Indicating/operating means
### Technical data

#### General specifications
- Number of read/write heads: max. 4

#### Indicators/operating means
- **LED green**
  - mains supply 24 V (2 unit)
  - supply of the inputs and outputs 5 V (2 units)
  - read head active (4 units, 1 per head)
- **LED yellow**
  - read/write head operation successful (4 units, 1 per head)
  - inputs/outputs (16 units, 1 per input/output)
  - direction control input (1 unit) I/O CTRL
  - programming input (1 unit) PGM
  - acknowledgement input ACK
- **LED red**
  - error (4 LEDs, 1 per head)

#### Electrical specifications
- **Rated operational voltage** $U_e$
  - $18 \ldots 32 \text{ V DC}$, ripple $\leq 10 \%$ (terminals 59 and 60, 47 and 48, 50 and 51)
  - $18 \ldots 30 \text{ V DC}$, ripple $\leq 10 \%$ (terminals 47 and 48)
  - $18 \ldots 30 \text{ V DC}$, ripple $\leq 10 \%$ (terminals 50 and 51)
- **Current consumption**
  - max. 200 mA
  - load currents at the outputs flow via terminals 47/48 and 50/51
- **Power consumption** $P_0$
  - 5 W

#### Inputs/Outputs
- **Output rated operating current** $I_e$
  - 150 mA per data output (average), max. 600 mA per group of 4 outputs; groups 1/2/3/16; 17/18/31/32; 4/5/6/19; 20/21/34/35 ≤ 20 mA per control output
- **8 binary inputs/outputs** (I/O 1 ... 8), switchable 1 output
  - "Instruction executed" (I/O 9)
- **Input level**
  - logic 1: $13 \ldots 30 \text{ V}$
  - logic 0: $0 \ldots 7 \text{ V}$
- **Output level**
  - logic 1: $U_e - 1 \text{ V}$
  - logic 0: switched high (at OFF, the output potential is undetermined; short-circuit proof, disconnection of all outputs on overload
- **Read head number**
  - 2 Inputs/Outputs "Read head number" (I/O 15 and 16)
- **Control lines**
  - 1 direction control input (I/O CNTL),
  - 1 programming input (PGM),
  - 1 acknowledgment input (ACK),
  - 1 error output (ERROR)

#### Ambient conditions
- **Ambient temperature**
  - $-25 \ldots 70 \degree C$ (248 ... 343 K)
- **Storage temperature**
  - $-25 \ldots 85 \degree C$ (248 ... 358 K)
- **Climatic conditions**
  - air humidity max. 75 %

#### Mechanical specifications
- **Protection degree**
  - IP20 in accordance with EN 60529
- **Connection type**
  - self-opening connection terminals, max. core cross-section $2 \times 2.5 \text{ mm}^2$

#### Material
- **Housing**
  - Makrolon 6485
- **Construction type**
  - K-system, 100 mm (5 TE)

### Model number
- **IVI-KHD2-4HD3**

### Documentation
- **Handbuch IVI-KHD2-4HD3**

### Function

With this control interface unit, 8-bit bit patterns can be programmed or read in the data carrier. For this purpose the device has 8 inputs and outputs for this bit pattern, 2 inputs and outputs for the read head number as well as various control leads.

Up to 4 read heads can be connected to the control interface unit. The programming and read procedures are controlled via the different control inputs. Error conditions are indicated by the error output.

During programming, the inputs and outputs are switched as inputs onto which the bit pattern which is to be programmed is applied. The read head number is prescribed via two inputs and outputs. The programming is started via the programming input at the selected read/write head.

While reading, the inputs and outputs are switched as outputs. When a data carrier is located in front of a head the data carrier is read and the 8 bit of the bit pattern as well as the read head number are switched onto the outputs.
The bus coupler product series is a modular concept for connecting the identification systems to standard field buses. For this purpose, the serial interface of the bus coupler is connected to the control interface unit of the identification system and the field bus connection of the bus coupler is connected to the field bus.

The KHD2-IVI-AB1 bus coupler is encased in the time-tested terminal housing (K-system) for cabinet installation. This coupler facilitates the connection of the identification system to an Allen Bradley Remote I/O.

In addition, control interface units with direct field bus connection to PROFIBUS-DP and INTERBUS are available for IDENT-I System V.
Bus coupler for Allen Bradley Remote I/O

Model number
KHD2-IVI-AB1

Features
- 100 % compatible to Allen-Bradley Remote I/O
- Eight simple commands
- Configurable as 1/4, 1/2, or 1/1 rack
- Can be adapted to the available memory capacity or to the desired functionality
- Communication via block transfer or "Discrete I/O"

Dimensions

Electrical Connection

Subject to reasonable modifications due to technical advances.
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## Technical data

<table>
<thead>
<tr>
<th><strong>Interface 1</strong></th>
<th><strong>Connection of</strong></th>
<th>identification system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
<td>RS 232</td>
<td></td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>ASCII</td>
<td></td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>19200 Bit/s</td>
<td></td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td>15 m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Interface 2</strong></th>
<th><strong>Connection of</strong></th>
<th>control system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
<td>Allen Bradley RIO</td>
<td></td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>Allen Bradley RIO &quot;Block Transfer&quot; or &quot;discrete I/O&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>≥ 1.2; ≤ 38.4 kBit/s</td>
<td>default setting: 9.6 kBit/s</td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td>3000 m at 57.6 kBit/s</td>
<td>1000 m at 115.2 kBit/s</td>
</tr>
<tr>
<td></td>
<td>at 230.4 kBit/s on request</td>
<td></td>
</tr>
</tbody>
</table>

### Indicators/operating means

| **DIP-switch** | setting the configuration |

### Electrical specifications

| **Rated operational voltage** | Uₑ | 21 ... 27 V DC |
| **Power consumption** | P₀ | max. 5 W |

### Ambient conditions

| **Ambient temperature** | 0 ... 60 °C (273 ... 333 K) |
| **Storage temperature** | -25 ... 85 °C (248 ... 358 K) |
| **Climatic conditions** | air humidity max. 75 % |

### Mechanical specifications

| **Protection degree** | IP20 in accordance with EN 60529 |
| **Connection type** | self-opening connection terminals, max. core cross-section 2 x 2.5 mm², 9-pin Sub-D built-in connector |

### Material

| **Housing** | Makrolon 6485 |
| **Construction type** | K-system, 40 mm (2 TE) |

## Model number

KHD2-IVI-AB1

## Documentation

Manual KHD2-IVI-AB1

## Matching system components

IVI-KHD2-4HRX

IVI-KHA6-4HRX

### Function

With this bus coupler, the identification system can be directly coupled to the Allen-Bradley Remote I/O field bus. The device functions as a bus subscriber which behaves as a remote-rack from Allen-Bradley. As a result, communication components in the control system are no longer needed and the amount of cabling required is reduced.

The serial interface of the device is connected to the IVI-KHD2-4HRX control interface unit of the identification system and the bus connection is connected to the field bus.

Eight commands are available for simple operation through the control system. The device can be configured as a 1/4-, 1/2- or 1/1-rack and can be adapted to the available memory size or the desired scope of functionality.

Communication takes place via block transfer or "Discrete I/O" (1/2- and 1/1-rack only).

The necessary settings are made using DIP switches.
Inductive Identification System IDENT-I System V

2.9 IDENT-I System V for Hazardous Areas

As the importance of identification systems in industry increases, so too does the need for solutions for automation in explosive atmospheres. Such solutions can be achieved using the intrinsically safe code or data carriers which are certified for use in hazardous areas and the read/write head which is constructed according to protection class "Encapsulation". The read/write head can be operated in all control interface units of the IDENT-I System V which are not located in the hazardous area.

Zener barriers are not necessary. The specified limitations of 50 and 100 m for standard devices apply to the line lengths between head and control interface unit. The cable outlet of the read/write head is prepared for the installation of an insulating tube.

2.9.1 Distance table: Ex code carrier - Ex read head or standard read head

Read distances (mm) in air at 25 °C

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IVH-30GM-EXM</th>
<th>IRH-18GM</th>
<th>IRH-30GM-V1</th>
<th>IRH-M1K</th>
<th>IRH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-30-EXIA</td>
<td>1.0 ... 17.0</td>
<td>2.0 ... 32.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
</tr>
<tr>
<td>ICC-30F-EXIA</td>
<td>1.0 ... 17.0</td>
<td>2.0 ... 32.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
</tr>
<tr>
<td>ICC-30GK-EXIA</td>
<td>1.0 ... 17.0</td>
<td>2.0 ... 32.0</td>
<td>2.0 ... 41.0</td>
<td>2.0 ... 46.0</td>
<td>1.0 ... 53.0</td>
</tr>
</tbody>
</table>

Read distances (mm) in metal at 25 °C

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IVH-30GM-EXM</th>
<th>IRH-18GM-V1</th>
<th>IRH-30GM-V1</th>
<th>IRH-M1K</th>
<th>IRH-FP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-30-EXIA</td>
<td>0.5 ... 12.0</td>
<td>4.0 ... 24.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30F-EXIA</td>
<td>0.5 ... 12.0</td>
<td>4.0 ... 24.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
<tr>
<td>ICC-30GK-EXIA</td>
<td>0.5 ... 12.0</td>
<td>4.0 ... 24.0</td>
<td>2.0 ... 26.0</td>
<td>2.0 ... 27.0</td>
<td>-</td>
</tr>
</tbody>
</table>
## 2.9.2 Distance table: Ex data carrier - Ex read/write heads or standard read/write head

Read/write distances (mm) in air at 25 °C

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-30GM-EXM</th>
<th>IVH-18GM</th>
<th>IVH-30GM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-30-EXIA-1K</td>
<td>1.0 ... 9.0</td>
<td>1.0 ... 10.0</td>
<td>5.0 ... 25.0</td>
<td>5.0 ... 27.0</td>
</tr>
<tr>
<td>IDC-30F-EXIA-1K</td>
<td>1.0 ... 9.0</td>
<td>1.0 ... 10.0</td>
<td>5.0 ... 25.0</td>
<td>5.0 ... 27.0</td>
</tr>
<tr>
<td>IDC-30GK-EXIA-1K</td>
<td>1.0 ... 9.0</td>
<td>1.0 ... 10.0</td>
<td>5.0 ... 25.0</td>
<td>5.0 ... 27.0</td>
</tr>
</tbody>
</table>

Read/write distances (mm) in metal at 25 °C

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-30GM-EXM</th>
<th>IVH-18GM</th>
<th>IVH-30GM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-30-EXIA-1K</td>
<td>5.0 ... 36.0</td>
<td>5.0 ... 43.0</td>
<td>5.0 ... 30.0</td>
<td>5.0 ... 34.0</td>
</tr>
<tr>
<td>IDC-30F-EXIA-1K</td>
<td>5.0 ... 36.0</td>
<td>5.0 ... 43.0</td>
<td>5.0 ... 30.0</td>
<td>5.0 ... 34.0</td>
</tr>
<tr>
<td>IDC-30GK-EXIA-1K</td>
<td>5.0 ... 36.0</td>
<td>5.0 ... 43.0</td>
<td>5.0 ... 30.0</td>
<td>5.0 ... 34.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-30GM-EXM</th>
<th>IVH-18GM</th>
<th>IVH-30GM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-30-EXIA-1K</td>
<td>0.6 ... 7.0</td>
<td>1.0 ... 7.0</td>
<td>5.0 ... 19.0</td>
<td>5.0 ... 21.0</td>
</tr>
<tr>
<td>IDC-30F-EXIA-1K</td>
<td>0.6 ... 7.0</td>
<td>1.0 ... 7.0</td>
<td>5.0 ... 19.0</td>
<td>5.0 ... 21.0</td>
</tr>
<tr>
<td>IDC-30GK-EXIA-1K</td>
<td>0.6 ... 7.0</td>
<td>1.0 ... 7.0</td>
<td>5.0 ... 19.0</td>
<td>5.0 ... 21.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write head</th>
<th>IVH-M1K</th>
<th>IVH-F61</th>
<th>IVH-FP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>IDC-30-EXIA-1K</td>
<td>5.0 ... 24.0</td>
<td>5.0 ... 29.0</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
</tr>
<tr>
<td>IDC-30F-EXIA-1K</td>
<td>5.0 ... 24.0</td>
<td>5.0 ... 29.0</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
</tr>
<tr>
<td>IDC-30GK-EXIA-1K</td>
<td>5.0 ... 24.0</td>
<td>5.0 ... 29.0</td>
<td>5.0 ... 20.0</td>
<td>5.0 ... 25.0</td>
</tr>
</tbody>
</table>
## Code carrier hazardous area

**Model number**

**ICC-30-EXIA**
- Battery-free code carrier for use in hazardous areas
- 28 bit fix code
- Intrinsically safe
- Protection degree IP67
- Readable from the printed side
- Certificate of conformity

### Dimensions

| Ø30 | 17 |

## Technical Data

### ATEX

- **Marking**: II 2G EEx ia IIC T4
- **EG Declaration of conformity**: DMT 00 ATEX E007

### Memory

- **Type/Size**: ROM 64 bit (28 bit code, 36 bit data security)
- **Read cycles**: unlimited

### Ambient conditions

- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 100 °C (248 ... 373 K)

### Mechanical specifications

- **Protection degree**: IP67 according to EN 60529
- **Material**
  - Housing: PBT
  - Encapsulation compound: CY 221/HY 2966

### Note

**Operating instructions for use in hazardous areas**

**Installation, commissioning**

This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020. The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with.

Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH.

The device must be protected from strong electromagnetic fields and mechanical damage.

**Maintenance and repairs**

Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
**Code carrier hazardous area**

**Model number**

ICC-30F-EXIA

- Battery-free code carrier for use in hazardous areas
- 28 bit fix code
- Protection degree IP67
- Readable from the printed side
- Certificate of conformity
- With mounting flange

**Technical Data**

<table>
<thead>
<tr>
<th><strong>ATEX</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td>II 2G Ex ia IIC T4</td>
</tr>
<tr>
<td>EG Declaration of conformity</td>
<td>DMT 00 ATEX E007</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Memory</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type/Size</td>
<td>ROM 64 bit (28 bit code, 36 bit data security)</td>
</tr>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ambient conditions</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 ... 100 °C (248 ... 373 K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mechanical specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Material</td>
<td>PBT</td>
</tr>
<tr>
<td>Housing</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>

**Note**

Operating instructions for use in hazardous areas

**Installation, commissioning**

This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020. The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with.

Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH.

The device must be protected from strong electromagnetic fields and mechanical damage.

**Maintenance and repairs**

Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
### Code carrier hazardous area

**Model number**

**ICC-30GK-EXIA**

- Battery-free code carrier for use in hazardous areas
- 28 bit fix code
- Intrinsically safe
- Protection degree IP67
- Readable from the printed side
- Certificate of conformity
- Mounting with thread M30x1.5
- Protective cap ICS-30GK available

---

### Technical Data

<table>
<thead>
<tr>
<th>ATEX</th>
<th>II 2G Ex ia IIC T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
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</tr>
<tr>
<td>EG Declaration of conformity</td>
<td>DMT 00 ATEX E007</td>
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<table>
<thead>
<tr>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type/Size</td>
</tr>
<tr>
<td>Read cycles</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Ambient conditions</th>
</tr>
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<tbody>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>Storage temperature</td>
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<table>
<thead>
<tr>
<th>Mechanical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>Encapsulation compound</td>
</tr>
</tbody>
</table>

### Note

**Operating instructions for use in hazardous areas**

**Installation, commissioning**

This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020. The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with.

Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH.

The device must be protected from strong electromagnetic fields and mechanical damage.

**Maintenance and repairs**

Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
**Data carrier hazardous area**

**Dimensions**

---

**Model number**

IDC-30-EXIA-1K

- Battery-free data carrier for use in hazardous areas
- 1 kBit memory
- Readable and writeable from the printed side
- Intrinsically safe
- Certificate of conformity
- Embeddable mountable in metal
- Protection degree IP67

---

**Technical Data**

<table>
<thead>
<tr>
<th>ATEX</th>
<th>EG Declaration of conformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td>DMT 00 ATEX E007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type/Size</td>
<td>EEPROM 1 kBit</td>
</tr>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
<tr>
<td>Write cycles</td>
<td>&gt; 500000</td>
</tr>
<tr>
<td>Data retention period</td>
<td>110 years at 25 °C, 10 years at 50 °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 ... 85 °C (248 ... 358 K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Material</td>
<td>PBT</td>
</tr>
<tr>
<td>Housing</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>

**Note**

Operating instructions for use in hazardous areas

Installation, commissioning
This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020. The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with. Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH. The device must be protected from strong electromagnetic fields and mechanical damage.

Maintenance and repairs
Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
### Technical Data

<table>
<thead>
<tr>
<th>ATEX</th>
<th>II 2G EEx ia IIC T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td></td>
</tr>
<tr>
<td>EG Declaration of conformity</td>
<td>DMT 00 ATEX E007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type/Size</td>
<td>EEPROM 1 kBit</td>
</tr>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
<tr>
<td>Write cycles</td>
<td>&gt; 500000</td>
</tr>
<tr>
<td>Data retention period</td>
<td>110 years at 25 °C, 10 years at 50 °C</td>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Encapsulation compound</td>
<td>CY 221/HY 2966</td>
</tr>
</tbody>
</table>

### Note

**Operating instructions for use in hazardous areas**

**Installation, commissioning**

This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020. The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with. Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH. The device must be protected from strong electromagnetic fields and mechanical damage.

**Maintenance and repairs**

Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
### Model number

IDC-30GK-EXIA-1K

- Battery-free data carrier for use in hazardous areas
- 1 kBit memory
- Intrinsically safe
- Readable and writeable from the printed side
- Certificate of conformity
- Embeddable mountable in metal
- Protection degree IP67
- Mounting with thread M30x1.5
- Protective cap ICS-30GK available

### Technical Data

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model number</td>
<td>IDC-30GK-EXIA-1K</td>
</tr>
<tr>
<td>Ø</td>
<td>2.5 mm</td>
</tr>
<tr>
<td>H</td>
<td>10 mm</td>
</tr>
<tr>
<td>M30x1.5</td>
<td></td>
</tr>
</tbody>
</table>

### ATEX

- **Marking**: II 2G Ex ia IIC T4
- **EG Declaration of conformity**: DMT 00 ATEX E007

### Memory

- **Type/Size**: EEPROM 1 kBit
- **Read cycles**: unlimited
- **Write cycles**: > 500000
- **Data retention period**: 110 years at 25 °C, 10 years at 50 °C

### Ambient conditions

- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)

### Mechanical specifications

- **Protection degree**: IP67 according to EN 60529
- **Material**: PP
- **Housing**: CY 221/HY 2966

### Note

**Operating instructions for use in hazardous areas**

**Installation, commissioning**

This product, which is categorised as intrinsically-safe, has been developed and approved for use in hazardous areas in accordance with EN 50014 and EN 50020.

The prototype test certificate and the national regulations relating to the installation of such equipment must be complied with.

Appropriate associated apparatus can be found in the Sensor Systems 1/Identification Systems catalogue from Pepperl+Fuchs GmbH.

The device must be protected from strong electromagnetic fields and mechanical damage.

**Maintenance and repairs**

Devices, which are operated in hazardous areas, must not be modified in any way. It is not possible to carry out repairs on these devices.
## Technical Data

### ATEX
- EG Declaration of conformity No. BVS 94.C.2024

### Electrical specifications
- Rated operational voltage $U_e$: 17 V DC
- Power consumption $P_0$: max. 1 W
- Ignition protection: encapsulated, EEx m II T4

### Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -25 ... 85 °C (248 ... 358 K)

### Mechanical specifications
- Protection degree: IP67 according to EN 60529
- Connection type: 15 m, Munflex-PUR Special (11 Y), black, screened, 4 x 0.5 mm²

### Material
- Housing: high grade steel, PC

### Installation
- In metal: not embeddable, overshoot at least 10 mm
- Distance between two heads: ≥ 300 mm

### Electrical connection

```
(YE) + 17 V
(WH) Dir
(BN) Data
(GN) GND
Screen
```

## Note
Available to 30.06.2003
2.10 System Accessories
Model number
ICS-30GK
- Protective cover with thread M30x1.5
- For temperatures up to 150 °C

Technical Data
Ambient conditions
Storage temperature -40 ... 150 °C (233 ... 423 K)

Mechanical specifications
Material Delrin

Note
The protective cap is screwed over the inductive code carrier ICC-30GK-T1/T3. The code carrier can be read through the protective cap.
Cable connector

Dimensions

Model number

V1-G-IVH-15M-PUR-ABG
V1-G-IVH-5M-PUR-ABG

• Cable socket for read/write heads with V1 plug connection

Technical Data

<table>
<thead>
<tr>
<th>Mechanical specifications</th>
<th>V1-G-IVH-15M-PUR-ABG</th>
<th>V1-G-IVH-5M-PUR-ABG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection type</td>
<td>cable LIFYC11Y, 4 x 0.25 mm², 65 x 0.07, screened, black</td>
<td>cable LIFYC11Y, 4 x 0.25 mm², 65 x 0.07, screened, black</td>
</tr>
<tr>
<td>Material</td>
<td>PUR</td>
<td>PUR</td>
</tr>
<tr>
<td>Cable length</td>
<td>15 m</td>
<td>5 m</td>
</tr>
</tbody>
</table>

Electrical connection

Other read head leads
The read head leads should be screened and have a conductor cross section of at least 0.14 mm².
Read head cables up to 50 m and 100 m long can be used, provided certain conditions are fulfilled.
Read head cable up to 50 m:
Minimum conductor cross-section 4x 0.25 mm²
Maximum resistance, screened 78 Ohm/km
Maximum capacitance 90 pF/m
(e.g. LIYC11C, Muckenhaupt & Nusselt MUNFLEX C11Y)
Read head cable up to 100 m:
Minimum conductor cross-section 4x 0.5 mm²
Maximum resistance 37 Ohm/km
Maximum capacitance 90 pF/m

Important note:
Since the possibility of electromagnetic interference increases with cable length, in some applications it may not be possible to use the cable lengths specified above.
**Technical Data**

**Mechanical specifications**
- Protection degree
- Connection type: Screw connection, 4 x 0.75 mm² and cramped screen, max. cable diameter 6 mm

**Electrical connection**

![Diagram of electrical connection]

**Note**

**Other read head leads**
The read head leads should be screened and have a conductor cross section of at least 0.14 mm².
Read head cables up to 50 m and 100 m long can be used, provided certain conditions are fulfilled.

Read head cable up to 50 m:
- Minimum conductor cross-section 4x 0.25 mm²
- Maximum resistance, screened 78 Ohm/km
- Maximum capacitance 90 pF/m
(e.g. LIYC11C, Muckenhaupt & Nußelt MUNFLEX C11Y)

Read head cable up to 100 m:
- Minimum conductor cross-section 4x 0.5 mm²
- Maximum resistance 37 Ohm/km
- Maximum capacitance 90 pF/m

**Important note:**
Since the possibility of electromagnetic interference increases with cable length, in some applications it may not be possible to use the cable lengths specified above.
## Screw-in tool

*Screw-in tool for code and data carriers with M16x1 thread*

## Dimensions

<table>
<thead>
<tr>
<th>ø13.2</th>
<th>ø14.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>40</td>
</tr>
</tbody>
</table>

## Technical Data

### Mechanical specifications

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>metal</td>
</tr>
</tbody>
</table>

### Note

The threading tool is made for screwing or releasing of a code or data carrier with threading M16 x 1.

For this purpose, the pin of the tool is set in the cavity of the code or data carrier.

The tool can be used with the following types: ICC-16GK, IDC-16GK-1K.
### Model number

**IVZ-30G-EW**

- Screw-in tool for code and data carriers with M30x1.5 thread.

### Technical Data

**Mechanical specifications**

| Material | metal |

**Note**

The threading tool is made for screwing or releasing of a code or data carrier with threading M30 x 1.5.

For this purpose, the pin of the tool is set in the cavities of the code or data carrier.

The tool can be used for following types: ICC-30GK, ICC-30GK-T1, ICC-30GK-T3, IDC-30GK-1K.
3.1 System Description

IDENT-I System P is an inductive read/write system which communicates with code and data carriers by means of amplitude-modulated signals in the 125 kHz range.

There is a read/write station in the FP housing and one handheld reader device. The control interface unit is integrated in the devices. The IPH-350-R2 handheld reader wand is equipped with an RS 232 interface and is designed to be operated with a portable computer. The IPT-HH6-R5 read/write head can be directly operated from a PSION Workabout.

The IPT-FP read/write station can be combined with various interface-bases. Thus, the interface can be selected by the choice in base. Available are serial interfaces for simple point-to-point connections, an addressable RS 485 interface for setting up a simple bus system as well as field-bus interfaces for directly connecting a field bus, e.g. PROFIBUS-DP. All components are constructed according to protection class IP67 and are, therefore, designed for use in demanding industrial applications.

IDENT-I System P is characterized by a very simple system construction and is the ideal solution for applications with a high number of code or data carriers.

Features
- Working frequency 125 kHz, amplitude modulated
- Battery-free code and data carriers
- Fixcode with 40 bits (64 bits total)
- Memory capacity up to 116 bytes
- Read distance up to 80 mm
- Write distance up to 45 mm
- Data transmission rate 3.9 kbaud

Highlights
- Read/write stations with integrated control interface unit
- Protection class IP67
- Economical code and data carriers
- Large selection of code and data carrier housings
- Simple and affordable system solution
- Ideal for applications with large numbers of tags
3.1.1 Areas of application

The system is suitable for automation, material flow control in manufacturing, acquisition of operating data, access control, identification of, e.g. storage containers, pallets, work-piece carriers, waste containers, tanks, containers and similar.
3.1.2 System construction

The inductive identification system consists, in principle, of two functional components:

Code or data carriers:
These contain a code which cannot be changed or memory for data which may be changed.

Read/write stations:
These are read/write heads with integrated control interface unit and can be connected directly to a higher-order computer via an interface on the base.
3.1.3 Distance table: code carrier - read/write heads

Read distance (mm) at 25 °C IDENT-I System P in air

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>IPT-FP</th>
<th>IPH-HH6</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC02-20W</td>
<td>0 ... 40.0</td>
<td>0 ... 40.0</td>
</tr>
<tr>
<td>IPC02-30W</td>
<td>0 ... 50.0</td>
<td>0 ... 50.0</td>
</tr>
<tr>
<td>IPC02-50W</td>
<td>0 ... 80.0</td>
<td>0 ... 80.0</td>
</tr>
<tr>
<td>IPC02-C1</td>
<td>0 ... 80.0</td>
<td>0 ... 80.0</td>
</tr>
<tr>
<td>IPC02-68-T7</td>
<td>0 ... 50.0</td>
<td>0 ... 50.0</td>
</tr>
</tbody>
</table>

3.1.4 Distance table: data carrier - read/write heads

Read/write distances (mm) at 25 °C in air

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Writing</th>
<th>Reading</th>
<th>Writing</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC03-20W IPC03-20K1</td>
<td>0 ... 25.0</td>
<td>0 ... 30.0</td>
<td>0 ... 25.0</td>
<td>0 ... 30.0</td>
</tr>
<tr>
<td>IPC03-30W</td>
<td>0 ... 30.0</td>
<td>0 ... 35.0</td>
<td>0 ... 30.0</td>
<td>0 ... 35.0</td>
</tr>
<tr>
<td>IPC03-50W</td>
<td>0 ... 45.0</td>
<td>0 ... 60.0</td>
<td>0 ... 45.0</td>
<td>0 ... 60.0</td>
</tr>
<tr>
<td>IPC03-C1</td>
<td>0 ... 45.0</td>
<td>0 ... 60.0</td>
<td>0 ... 45.0</td>
<td>0 ... 60.0</td>
</tr>
<tr>
<td>IPC10-20W</td>
<td>0 ... 25.0</td>
<td>0 ... 30.0</td>
<td>0 ... 25.0</td>
<td>0 ... 30.0</td>
</tr>
</tbody>
</table>

3.1.5 Read/write speeds

The maximum possible speeds at which a code or data carrier can still be read are determined by the time required to read, the size of the response curve as well as the distance of the code or data carrier from the read/write head. The response curve is calculated from a combination of the used components: code or data carrier and read/write head.

Used as an example in the following observations is the combination of code carrier IPC02-50W and read/write station IPT-FP. The response curve is shown in the following graphic.

At a distance of 65 mm, the width s of the response range is at a maximum. The value s is thus equal to 100 mm in this case.

At a distance of 35 mm - 95 mm, the value s is equal to 80 mm.
Inductive Identification System IDENT-I System P

Generally, the maximum speed at which a code or data carrier can be moved past the read/write station is:

\[ V_{\text{max}} = \frac{s}{t} \]

The times which may theoretically be achieved using the data transmission rate of 3.9 kbit/s between code or data carrier and read/write head are exceeded in actual use due to various influencing factors such as interference. Listed in the table are times which can be achieved in actual use.

From these times, the following maximum speeds \( V_{\text{max}} \) can be achieved:

<table>
<thead>
<tr>
<th>Command</th>
<th>Required time</th>
<th>( V_{\text{max}} ) at ( s = 100 \text{ mm} )</th>
<th>( V_{\text{max}} ) at ( s = 80 \text{ mm} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read fixcode (read fixcode 40 bit)</td>
<td>100 ms</td>
<td>1.25 m/s</td>
<td>0.8 m/s</td>
</tr>
<tr>
<td>Read word (reading 4 bytes)</td>
<td>350 ms</td>
<td>0.32 m/s</td>
<td>0.24 m/s</td>
</tr>
<tr>
<td>Write word (writing 4 bytes)</td>
<td>500 ms</td>
<td>omitted</td>
<td>omitted</td>
</tr>
</tbody>
</table>
3.2 IPC02 Inductive Code Carriers

Code carriers are available in a wide range of housings. The code carriers are provided with a 40 bit fixcode (64 bits total). All code carriers are battery-free and constructed according to protection class IP67.

**Note:**

When installing the code carriers, metal should be least 10 mm away, as the read distances may otherwise be affected.
### Code carrier

**Model number**
- IPC02-20W
  - Battery-free code carrier
  - 40 bit fix code
  - Readable from both sides
  - Protection degree IP67

**Model number**
- IPC02-30W
  - Battery-free code carrier
  - 40 bit fix code
  - Readable from both sides
  - Protection degree IP67
  - Mounting holes for simple installation

### Technical data

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IPC02-20W</strong></td>
<td><strong>IPC02-30W</strong></td>
</tr>
<tr>
<td>Battery-free code carrier</td>
<td>Battery-free code carrier</td>
</tr>
<tr>
<td>40 bit fix code</td>
<td>40 bit fix code</td>
</tr>
<tr>
<td>Readable from both sides</td>
<td>Readable from both sides</td>
</tr>
<tr>
<td>Protection degree IP67</td>
<td>Protection degree IP67</td>
</tr>
<tr>
<td>Mounting holes for simple installation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Type/Size</strong></th>
<th><strong>ROM 64 Bit (40 Bit code, 24 bit data security)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Read cycles</strong></td>
<td><strong>unlimited</strong></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td><strong>-25 ... 70 °C (248 ... 343 K)</strong></td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td><strong>-40 ... 90 °C (233 ... 363 K)</strong></td>
</tr>
<tr>
<td><strong>Protection degree</strong></td>
<td><strong>IP67 according to EN 60529</strong></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td><strong>PC</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Memory</strong></th>
<th><strong>Type/Size</strong></th>
</tr>
</thead>
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<tr>
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<td><strong>unlimited</strong></td>
</tr>
<tr>
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<tr>
<td><strong>Storage temperature</strong></td>
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</tr>
<tr>
<td><strong>Protection degree</strong></td>
<td><strong>IP67 according to EN 60529</strong></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td><strong>PC</strong></td>
</tr>
</tbody>
</table>
Code carrier

Model number
IPC02-50W

- Battery-free code carrier
- 40 bit fix code
- Readable from both sides
- Protection degree IP67
- Mounting holes for simple installation

Dimensions

Technical data

Memory
Type/Size: ROM 64 Bit (40 Bit code, 24 bit data security)
Read cycles: unlimited

Ambient conditions
Ambient temperature: -25 ... 70 °C (248 ... 343 K)
Storage temperature: -40 ... 90 °C (233 ... 363 K)

Mechanical specifications
Protection degree: IP67 according to EN 60529
Material
Housing: PC

Code carrier

Model number
IPC02-16

- Battery-free code carrier
- 40 bit fix code
- Readable from both sides
- Protection degree IP68

Dimensions

Technical data

Memory
Type/Size: ROM 64 Bit (40 Bit code, 24 bit data security)
Read cycles: unlimited

Ambient conditions
Ambient temperature: -25 ... 85 °C (248 ... 348 K)
Storage temperature: -40 ... 90 °C (233 ... 363 K)

Mechanical specifications
Protection degree: IP68 according to EN 60529
Material
Housing: Epoxy (black)
### Code carrier

#### Model number

**IPC02-C1**
- Battery-free code carrier
- 40 bit fix code
- Readable from both sides
- Protection degree IP67
- ISO credit card format

#### Dimensions

![Dimensions Diagram]

### Code carrier

#### Model number

**IPC02-26-T6**
- Protection degree IP67
- Battery-free high temperature code carrier
- 40 bit fix code
- Readable from both sides
- Mounting holes for simple installation

#### Technical data

<table>
<thead>
<tr>
<th>Memory</th>
<th>ROM 64 Bit (40 Bit code, 24 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>Storage temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
</tr>
</tbody>
</table>

### Technical data

<table>
<thead>
<tr>
<th>Memory</th>
<th>ROM 64 Bit (40 Bit code, 24 bit data security)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read cycles</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>Storage temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
</tr>
</tbody>
</table>
**Code carrier**

**IPC02-68-T7**

- Protection degree IP67
- Battery-free high temperature code carrier
- 40 bit fix code
- Readable from both sides
- Mounting holes for simple installation
- Temperature cycles up to 200 °C

**Dimensions**

<table>
<thead>
<tr>
<th>Ø68</th>
<th>Ø62</th>
<th>11.5</th>
<th>4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>065</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Technical Data**

**Memory**

- Type/Size: ROM 64 Bit (40 Bit code, 24 bit data security)
- Read cycles: unlimited

**Ambient conditions**

- Ambient temperature:
  - -40 ... 140 °C (233 ... 413 K)
  - 200 °C (473 K) for 60 min
  - 250 °C (523 K) for 10 min
  - 300 °C (573 K) for 5 min
  - -40 ... 200 °C (233 ... 473 K), 100 cycles 1000 °C/ min, 10 min 200 °C (473 K)

- Storage temperature:
  - -40 ... 140 °C (233 ... 413 K) -40 ... 160 °C (233 ... 433 K) for 1000 h

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: LCP

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3.3 IPC03/IPC10 Inductive Data Carriers

Data carriers are available in a wide range of housings. All data carriers are battery-free and constructed according to protection class IP67.

The IPC03 data carriers are provided with a 32 bit permanent fixcode in addition to a freely accessible 928 bit memory.

The IPC10 data carriers offer the user 96 bits of memory. These data carriers can be programmed in such a way that they behave as an IPC02 code carrier.

Note:
When installing the data carriers, metal should be least 10 mm away, as the read/write distances may otherwise be affected.
**Model number**

IPC03-20W

- Battery-free data carrier
- 32 bit fixcode
- Readable and writeable from both sides
- Protection degree IP67
- 928 bits computer memory available

**Model number**

IPC03-30W

- Battery-free data carrier
- 32 bit fixcode
- 928 bits computer memory available
- Readable and writeable from both sides
- Protection degree IP67
- Mounting holes for simple installation

**Technical data**

**Memory**

- Type/Size: EEPROM 928 Bit, ROM 32 Bit
- Read cycles: unlimited
- Write cycles: > 100000
- Data retention period: 10 years at 55 °C

**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 90 °C (233 ... 363 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material: PC

**Dimensions**

- Ø20
- 2
Data carrier

Model number
IPC03-50W
- Battery-free data carrier
- 32 bit fixcode
- 928 bits computer memory available
- Readable and writeable from both sides
- Protection degree IP67
- Mounting holes for simple installation

Dimensions

Technical data
Memory
Type/Size | EEPROM 928 Bit
ROM 32 Bit
Read cycles | unlimited
Write cycles | >100000
Data retention period | 10 years at 55 °C

Ambient conditions
Ambient temperature | -25 ... 70 °C (248 ... 343 K)
Storage temperature | -40 ... 90 °C (233 ... 363 K)

Mechanical specifications
Protection degree | IP67 according to EN 60529
Material
Housing | PC

Data carrier

Model number
IPC03-C1
- 32 bit fixcode
- Battery-free data carrier
- 928 bits computer memory available
- Readable and writeable from both sides
- Protection degree IP67
- ISO credit card format

Dimensions

Technical data
Memory
Type/Size | EEPROM 928 Bit
ROM 32 Bit
Read cycles | unlimited
Write cycles | >100000
Data retention period | 10 years at 55 °C

Ambient conditions
Ambient temperature | 0 ... 50 °C (273 ... 323 K)
Storage temperature | -40 ... 70 °C (233 ... 343 K)

Mechanical specifications
Protection degree | IP67 according to EN 60529
Material
Housing | PVC
Data carrier

**Model number**
IPC10-20W

- Battery-free data carrier
- 96 bit memory available
- Can be programmed as a code carrier
- Readable and writeable from both sides
- Protection degree IP67

**Data carrier**

**Model number**
IPC03-20K1

- Battery-free data carrier
- 32 bit fixcode
- Readable and writeable from both sides
- Protection degree IP67
- 928 bits computer memory available

**Dimensions**

**Technical data**

**Memory**
- Type/Size: EEPROM 128 Bit, 96 bits available
- Read cycles: unlimited
- Write cycles: > 100000
- Data retention period: 10 years at 55 °C

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 90 °C (233 ... 363 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material: PC

**Dimensions**

**Technical data**

**Memory**
- Type/Size: EEPROM 928 Bit, ROM 32 Bit
- Read cycles: unlimited
- Write cycles: > 100000
- Data retention period: 10 years at 55 °C

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 90 °C (233 ... 363 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material: PC
There is a read/write station in the FP-housing and handheld reader devices. The control interface unit is integrated into the devices.

The IPH-HH6-R5 read/write head can be directly operated from a PSION Workabout. The IPT-FP read/write station can be combined with various interface bases.

Thus, the interface can be selected by the choice in base. Available are serial interfaces for simple point-to-point connections, addressable RS 485 interfaces for setting up a simple bus system as well as field-bus interfaces for directly connecting a field bus, e.g. PROFIBUS-DP.
Technical Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>distance tables, see introduction</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>TTL</td>
</tr>
<tr>
<td>Transfer rate</td>
<td>1200; 2400; 4800; 9600; 19200; 38400 Bit/s</td>
</tr>
<tr>
<td><strong>Indicators/operating means</strong></td>
<td></td>
</tr>
<tr>
<td>LED green/yellow</td>
<td>power on / IPC detected</td>
</tr>
<tr>
<td><strong>Electrical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Rated operational voltage $U_e$</td>
<td>4.8 ... 5.2 V DC</td>
</tr>
<tr>
<td>Power consumption $P_0$ max.</td>
<td>1 W</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 60 °C (248 ... 333 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 ... 60 °C (233 ... 333 K)</td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP54 in accordance with EN 60529</td>
</tr>
<tr>
<td>Connection type</td>
<td>coiled cable with sub-D connector</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>PA</td>
</tr>
</tbody>
</table>

**Function**

The control interface unit is integrated in the read/write head. It is equipped with a TTL-interface and can be connected directly to a PSION-Workabout.

The read/write head receives the commands to read and/or write the code or data carriers via this interface.
### Read/write station

**Model number**

IPT-FP

- With integrated control interface unit
- Serial interfaces and field-bus interfaces selectable through lower part
- Read distance up to 80 mm
- Writing distance up to 45 mm
- 3 LEDs for function indication
- Protection degree IP67

**Documentation**

Handbuch IPT-FP mit U-P3-RX
Handbuch IPT-FP mit U-P...-R4
Handbuch IPT-FP mit U-P6-B5
Handbuch IPT-FP mit U-P6-B6
Manual IPT-FP mit U-P3-RX
Manual IPT-FP mit U-P...-R4
Manual IPT-FP mit U-P6-B5
Manual IPT-FP mit U-P6-B6

**Matching system components**

U-P3-RX
lower section with serial interfaces RS 232 and RS 485

U-P3-R4
lower section with addressable serial interface RS 485

U-P6-B5
lower section for INTERBUS

U-P6-B6
lower section for PROFIBUS-DP

**Function**

The IPT-FP read/write station is used in combination with a base which contains the interface for connecting to a computer. Through the choice of base, either serial interfaces or field-bus interfaces may be selected.

The analysis system is integrated in the device and simplifies the system construction. Protection class IP67 allows the device to be installed directly in the field.

### Dimensions

#### Technical Data

<table>
<thead>
<tr>
<th><strong>General specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>distance tables, see introduction</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>Type of interface depends on base</td>
</tr>
<tr>
<td><strong>Indicators/operating means</strong></td>
<td></td>
</tr>
<tr>
<td>LED green</td>
<td>power on</td>
</tr>
<tr>
<td>LED yellow</td>
<td>IPC detected</td>
</tr>
<tr>
<td>LED red</td>
<td>bus fault (when using fieldbus interfaces)</td>
</tr>
<tr>
<td><strong>Electrical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Rated operational voltage $U_e$</td>
<td>20 ... 30 V DC , ripple $10 %_{SS}$ , PELV</td>
</tr>
<tr>
<td>Power consumption $P_0$</td>
<td>max. 5 W , in connection with the lower section</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td></td>
</tr>
<tr>
<td>Operating voltage/interface</td>
<td>function insulation acc. to DIN EN 50178, design isolation voltage 50 $V_{eff}$</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 ... 70 °C (248 ... 343 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td></td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP67 in accordance with EN 60529, with lower section</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>PBT</td>
</tr>
</tbody>
</table>

### System P

[Diagram of dimensions]

[Image of technical data table]
Model number
U-P3-RX
• With serial interfaces RS232 and RS485
• Protection degree IP67

Documentation
Handbuch IPT-FP mit U-P3-RX
Manual IPT-FP with U-P3-RX

Matching system components
IPT-FP
Read/write station

Software
Communication with the identification system is very easy with the demo program IDENT 98 via the RS 232 interface. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

Function
The base is used in combination with an upper part, the IPT-FP read/write station. Either an RS 232- or an RS 485-interface is available.
The read/write station is connected to a higher-order control system via the serial interface and receives the commands for writing and/or reading code or data carriers via this interface.

Technical Data

<table>
<thead>
<tr>
<th>Interface</th>
<th>Physical</th>
<th>RS 232/RS 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>ASCII</td>
<td></td>
</tr>
<tr>
<td>Transfer rate</td>
<td>1200; 2400; 4800; 9600; 19200; 38400 Bit/s</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>≤ 15 m at RS 232</td>
<td>≤ 1200 m at RS 485</td>
</tr>
</tbody>
</table>

Electrical specifications
- Rated operational voltage $U_e$: $20 \ldots 30$ V DC with ripple 10% SS, PELV
- Power consumption $P_0$: max. 4 W with read/write head IPT-FP
- Galvanic isolation: operating voltage/interface function insulation acc. to DIN EN 50178, design isolation voltage 50 Veff

Ambient conditions
- Ambient temperature: $-25 \ldots 70$ °C (248 ... 343 K)
- Storage temperature: $-40 \ldots 85$ °C (233 ... 358 K)

Mechanical specifications
- Protection degree: IP67 in accordance with EN 60529 with IPT-FP
- Connection type: screw terminals
- Interface cable: 3 conductor, accord. to RS 232 or 2 accord. to RS 485
- Supply: up to 3 x 1.5 mm²

Material
- Housing: aluminium die casting

Electrical connection
- Connection diagram
- RS 485
- RS 232
- PE
- RXD
- TXD
- 24 V DC

Matching system components
IPT-FP
Read/write station

Software
Communication with the identification system is very easy with the demo program IDENT 98 via the RS 232 interface. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

Function
The base is used in combination with an upper part, the IPT-FP read/write station. Either an RS 232- or an RS 485-interface is available.
The read/write station is connected to a higher-order control system via the serial interface and receives the commands for writing and/or reading code or data carriers via this interface.
Lower part for read/write station

Dimensions

Technical Data

Model number

U-P3-R4

- Protection degree IP67
- Simple bus system with up to 30 units
- Serial interface RS 485, addressable

Documentation

Handbuch IPT-FP mit U-P...-R4
Manual IPT-FP with U-P...-R4

Matching system components

IPT-FP
Read/write station

Function

The base is used in combination with an upper part, the IPT-FP read/write station. An addressable RS 485 interface is available. It is thus possible to create a simple bus connection with up to 30 subscribers. The address is set and the terminating resistor for the bus is connected via DIP switches. The read/write station is connected to a higher-order control system via the serial interface and receives the commands for writing and/or reading code or data carriers via this interface.
Model number

U-P3V4A-R4

- Protection degree IP67
- Simple bus system with up to 30 units
- Serial interface RS 485, addressable
- High grade steel
- Resistant against cleaning material

Documentation

Handbuch IPT-FP mit U-P...R4
Manual IPT-FP with U-P...R4

Matching system components

IPT-FP
Read/write station

Function

The base is used in combination with an upper part, the IPT-FP read/write station. An addressable RS-485 interface is available. It is thus possible to create a simple bus connection with up to 30 subscribers. The address is set and the terminating resistor for the bus is connected via DIP switches. The read/write station is connected to a higher-order control system via the serial interface and receives the commands for writing and/or reading code or data carriers via this interface.

Technical Data

Interface
- Physical: RS 485, addressable, up to 30 lower parts, address 1 ... 30
- Protocol: ASCII
- Transfer rate: 1200; 2400; 4800; 9600; 19200; 38400 Bit/s
- Cable length: ≤ 1200 m

Indicators/operating means
- DIP-switch: Setting the station address bus connection ON = active OFF = non-active

Electrical specifications
- Rated operational voltage $U_e$: 20 ... 30 V DC, ripple 10 %, PELV
- Power consumption $P_0$: max. 4 W with read/write head IPT-FP
- Galvanic isolation: Operating voltage/interface function insulation acc. to DIN EN 50178, design isolation voltage 50 V eff

Ambient conditions
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

Mechanical specifications
- Protection degree: IP67 in accordance with EN 60529 with IPT-FP
- Connection type: screw terminals
- Interface cable: 2 conductor, accord. to RS 485
- Supply: up to 3 x 1.5 mm²
- Material: high grade steel V4A

Electrical connection

DIP-switch address
Terminating resistor
Cable gland

24 V DC
RS 485
Lower part for read/write station

Model number
U-P6-R4
- Protection degree IP67
- Simple bus system with up to 30 units
- Serial interface RS 485, addressable
- 2 PG screw fittings for IN and OUT supply
- 2 EMV PG screw fittings for BUS IN and OUT

Documentation
Handbuch IPT-FP mit U-P...-R4
Manual IPT-FP with U-P...-R4

Matching system components
IPT-FP
Read/write station

Function
The base is used in combination with an upper part, the IPT-FP read/write station. An addressable RS 485 interface is available. It is thus possible to create a simple bus connection with up to 30 subscribers. The address is set and the terminating resistor for the bus is connected via DIP switches.
The read/write station is connected to a higher-order control system via the serial interface and receives the commands for writing or reading code or data carriers via this interface.

Dimensions

Technical Data

| Interface | Physical | RS 485, addressable, up to 30 lower parts, address 1 ... 30 |
| Protocol  | ASCII    |                                                       |
| Transfer rate | 1200; 2400; 4800; 9600; 19200; 38400 Bit/s |
| Cable length | ≤ 1200 m |

Indicators/operating means
DIP-switch
Setting the station address
bus connection
ON = active OFF = non-active

Electrical specifications
Rated operational voltage $U_a$
20 ... 30 V DC, ripple 10 %SS, PELV
Power consumption $P_0$
max. 4 W with read/write head IPT-FP

Galvanic isolation
Operating voltage/interface function insulation acc. to DIN EN 50178, design isolation voltage $50 V_{eff}$

Ambient conditions
Ambient temperature -25 ... 70 °C (248 ... 343 K)
Storage temperature -40 ... 85 °C (233 ... 358 K)

Mechanical specifications
Protection degree IP67 in accordance with EN 60529 with IPT-FP
Connection type screw terminals
Interface cable 2 conductor, accord. to RS 485
Supply up to 3 x 1.5 mm²

Material
Housing aluminium, black anodised

Electrical connection

Subject to reasonable modifications due to technical advances.
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Pepperl+Fuchs Group • Tel.: Germany (06 21) 7 76-0 • USA (330) 4 25 35 55 • Singapore (6) 7 79 90 91 • Internet http://www.pepperl-fuchs.com
**Lower part for read/write station**

**Model number**

U-P6-B5

- INTERBUS-remote bus subscriber
- 2 PG screw fittings for IN and OUT supply
- 2 EMV PG screw fittings for BUS IN and OUT
- Complete read/write functionality via the INTERBUS
- Transfer of 10 bytes of data in one cycle
- DIP switch for ring termination
- Field device with protection class IP67

**Dimensions**

**Technical Data**

<table>
<thead>
<tr>
<th>Interface</th>
<th>Physical</th>
<th>RS 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>INTERBUS-remote bus</td>
<td></td>
</tr>
<tr>
<td>ID code</td>
<td>03</td>
<td></td>
</tr>
<tr>
<td>Transfer rate</td>
<td>500 kBit/s</td>
<td></td>
</tr>
</tbody>
</table>

**Indicators/operating means**

- DIP-switch: ring termination
  - 0 = closed
  - 1 = bus continued

**Electrical specifications**

- Rated operational voltage $U_a$: 20 ... 30 V DC, ripple 10% SS, PELV
- Power consumption $P_0$: max. 5 W with read/write head IPT-FP
- Galvanic isolation: function insulation acc. to DIN EN 50178, design isolation voltage 50 Veff

**Ambient conditions**

- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Connection type: screw terminals
- Interface cable: up to 1.5 mm²
- Supply: up to 3 x 1.5 mm²
- Material: aluminium, black anodised

**Function**

The base is used in combination with an upper part, the IPT-FP read/write station. The device is operated as a slave on the INTERBUS remote bus. The device makes available the complete read/write functionality. Up to 10 bytes are transmitted per cycle. The continuing bus is activated via DIP switch.

**Documentation**

Handbuch IPT-FP mit U-P6-B5
Manual IPT-FP with U-P6-B5

**Matching system components**

IPT-FP
Read/write station

**Electrical connection**

Pg screw fitting
Lower part for read/write station

Model number

**U-P6-B6**
- PROFIBUS-DP acc. to EN 50170
- 2 PG screw fittings for IN and OUT supply
- 2 EMV PG screw fittings for BUS IN and OUT
- Complete read/write functionality via the PROFIBUS-DP
- Transmission of up to 7 double words, 32 bit each, in one cycle
- Connectable bus termination
- Field device with protection class IP67

Documentation

Handbuch IPT-FP mit U-P6-B6
Manual IPT-FP with U-P6-B6

Matching system components

**IPT-FP**
Read/write station

Function

The base is used in combination with an upper part, the IPT-FP read/write station. The device is operated as a slave on the PROFIBUS-DP. The device makes available the complete read/write functionality. Up to 32 bytes are transmitted per cycle. Of these, up to 7 double words, each with 32 bits, are available to the user.

The address is set and the terminating resistor for the bus is connected via DIP switches.

While the bus termination is switched on, the subsequent subscribers which are connected to the terminals (P, N out) are disconnected from the bus.

Dimensions

**Technical Data**

**Interface**
- Physical: RS 485
- Protocol: PROFIBUS-DP acc. to EN 50170
- Transfer rate: 9.6; 19.2; 93.75; 187.5; 500; 1500 kBit/s
- 3; 6; 12 MBit/s self-synchronising

**Indicators/operating means**
- DIP-switch: Setting the station address
  - bus connection
  - ON = active
  - OFF = non-active

**Electrical specifications**
- Rated operational voltage $U_e$: 20 ... 30 V DC, ripple 10 %, PELV
- Power consumption $P_0$: max. 5 W with read/write head IPT-FP
- Operating voltage/interfance: 
  - function insulation acc. to DIN EN 50178, design isolation voltage 50 V

**Ambient conditions**
- Ambient temperature: -25 ... 70 °C (248 ... 343 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Connection type: screw terminals
- Interface cable: 2 x 0.64 mm², double screened, accord. to PROFIBUS standard EN 50170
- Supply: up to 3 x 1.5 mm²
- Material: aluminium, black anodised

Electrical connection

Subject to reasonable modifications due to technical advances.
3.5 System Accessories
**Handheld read/write device**

**Dimensions**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>90 mm</td>
</tr>
<tr>
<td>Height</td>
<td>180 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>206 mm</td>
</tr>
</tbody>
</table>

**Technical Data**

**General specifications**

- Read distance: 0 ... 80 mm
- Writing distance: 0 ... 45 mm

**Indicators/operating means**

- Display: PSION Workabout with display
- Keyboard: PSION Workabout with alphanumerical keyboard

**Electrical specifications**

- Supply: battery: 2 AA-size batteries or compatible NiCd rechargeable batteries

**Ambient conditions**

- Ambient temperature: -20 ... 60 °C (253 ... 333 K)
- Storage temperature: -25 ... 60 °C (248 ... 333 K)

**Mechanical specifications**

- Protection degree: IP43 in accordance with EN 60529
- Construction type: read/write unit with PSION workabout

**Model number**

IPT-HH6

- Portable read / write device
- Handheld-computer PSION Workabout with LC-display and keyboard
- Simple operating software
- Protection degree IP43

**Documentation**

Handbuch IPT-HH...
Manual IPT-HH...

**Function**

The handheld read/write device IPT-HH6 consists of a read/write device and a PSION Workabout with operating software. The device is designed for mobile, on-site data acquisition. Device function is controlled via the PSION Workabout. The operating program makes available all standard functions and the user can select between German and English menus. In addition, the user can write his own programs.
**Handheld read/write device**

**Model number**

IPT-HH9

- Portable read / write device
- Handheld-computer PSION Workabout with LC-display and keyboard
- Simple operating software
- Protection degree IP43

**Documentation**

Handbuch IPT-HH...

Manual IPT-HH...

**Function**

The IPT-HH9 hand read/write device consists of a read/write head and a PSION-Workabout with operating software. The device is designed for mobile, on-site data acquisition.

Device function is controlled via the PSION-Workabout. The operating program makes available all standard functions. The user can select between German and English menus. In addition, the user can write his own programs.

---

**Dimensions**

![Dimensions Diagram]

**Technical Data**

<table>
<thead>
<tr>
<th>General specifications</th>
<th>Read distance</th>
<th>0 ... 20 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing distance</td>
<td>0 ... 10 mm</td>
<td></td>
</tr>
</tbody>
</table>

**Indicators/operating means**

<table>
<thead>
<tr>
<th>Display</th>
<th>PSION Workabout with display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard</td>
<td>PSION Workabout with alphanumerical keyboard</td>
</tr>
</tbody>
</table>

**Electrical specifications**

| Supply                  | battery: 2 AA-size batteries or compatible NiCd rechargeable batteries |

**Ambient conditions**

| Ambient temperature     | -20 ... 60 °C (253 ... 333 K) |
| Storage temperature     | -25 ... 85 °C (248 ... 358 K) |

**Mechanical specifications**

| Protection degree       | IP43 in accordance with EN 60529 |
| Construction type       | PSION Workabout with read/write head |
4 Microwave Identification System IDENT-M System V

4.1 System Description

The Microwave Identification System IDENT-M System V makes possible contact-free data transmission over long read/write distances, even under unfavorable environmental conditions. These long distances are required, in particular, for automotive industry and logistics applications. With ranges of up to a few meters and in combination with large memory capacities, the microwave identification system offers the ideal solution.

The microwave identification system is not affected by cutting oils, dust, paint or dirt. In addition, data transmission is possible through most plastics. Through the use of circularly polarized microwaves, metals cause only minimal interfering reflections.

Features
- Working frequency 2.45 GHz
- Memory capacity 8 ... 32 kbyte
- Read distance up to 2 m
- Write distance up to 2 m
- Data transmission rate 76.8 kbaud

Highlights
- Very fast, thanks to high data transmission rate
- Large memory capacity
- Addressable data carrier
- Data carrier with LED
- Battery charge state can be detected
- Handheld read/write device
- Bus coupler for field buses

4.1.1 Areas of application

In automotive industry and logistics applications, large read/write distances as well as large memory capacities of the data-carriers are required. With ranges of up to 5 meters and in combination with memory capacities of up to 32 kbyte, the microwave identification system IDENT-M System V offers the ideal solution.
4.1.2 System construction

The microwave identification system consists of the following components: data carrier, read/write head with the directional antenna and control interface unit. The antenna transmits its high-frequency signal at 2.45 GHz. If this signal is incident on the data carrier, it is modulated and reflected to the antenna. The information is decoded in the control interface unit and passed on to the higher-order computer.

Using the bus coupler, it is possible to directly connect the microwave identification system to PROFIBUS-DP, INTERBUS and Allen Bradley Remote I/O.
## 4.1.3 Distance table: data carrier - read/write heads

Read/write distance (m)

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>MVH500-F15</th>
<th>MVH2000-F15</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVC-60-64K</td>
<td>0 ... 0.5, max. 1.5</td>
<td>0.2 ...2, max. 4</td>
</tr>
<tr>
<td>MVC-60B-64K</td>
<td>0 ... 0.5, max. 1.5</td>
<td>0.2 ...2, max. 4</td>
</tr>
<tr>
<td>MVC-60-256K</td>
<td>0 ... 0.5, max. 1.5</td>
<td>0.2 ...2, max. 4</td>
</tr>
</tbody>
</table>
4.2 MVC Data Carriers

The data carriers essentially consist of memory module, the circuit for the wireless communication functions and the battery. This has a life span of approx. 8 years or 30 million read operations of 64 bytes. For diagnostic purposes, read and write operations can be indicated by means of an LED.

The data carriers contain up to 32 kbytes of memory, of which 31 kbytes are available for user data.
### Technical Data

#### General specifications
- **Operating frequency**: 2.45 ... 2.45 GHz ± 200 kHz
- **Transfer rate**: 76.8 kBit/s

#### Memory
- **Capacitance**: 8 kByte (7168 Bytes available for user data)
- **Battery life**: approx. 8 years without write or read operations, or approx. 30 million read operations on 64 bytes per access

#### Indicators/operating means
- **LED yellow lights during the data transfer** (can be switched off)

#### Ambient conditions
- **Ambient temperature**: -20 ... 70 °C (253 ... 343 K)
- **Storage temperature**: -20 ... 70 °C (253 ... 343 K)
- **Shock and impact resistance**: 100 G, 11 ms on all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47

#### Mechanical specifications
- **Protection degree**: IP67 according to EN 60529
- **Material**: PBT
- **Installation**: horizontal and vertical ±45° arbitrary rotation
- **Mass**: approx. 100 g

### Data carrier
- **Model number**: MVC-60-64K
- **7168 bytes memory available**
- **Long battery life**
- **Disconnectable LED**
- **Protection degree IP67**

### Dimensions

![Dimensions Diagram](image_url)
### Data carrier

**Model number**

MVC-60B-64K

- Replaceable battery
- 7168 bytes memory available
- Disconnectable LED
- Protection degree IP67

### Dimensions

![Dimensions Diagram]

#### Technical Data

**General specifications**

- **Operating frequency**: 2.45 ... 2.45 GHz ± 200 kHz
- **Transfer rate**: 76.8 kBit/s

**Memory**

- **Capacitance**: 8 kByte (7168 Bytes available for user data)
- **Battery life**: approx. 4 years without read or write operations or approx. 15 mill. read operations on 64 bytes per access, battery is replaceable

**Indicators/operating means**

- **LED yellow lights during the data transfer** (can be switched off)

**Ambient conditions**

- **Ambient temperature**: -20 ... 70 °C (253 ... 343 K)
- **Storage temperature**: -20 ... 70 °C (253 ... 343 K)
- **Shock and impact resistance**: 100 G, 11 ms on all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47

**Mechanical specifications**

- **Protection degree**: IP67 according to EN 60529
- **Material**: PBT
- **Installation**: horizontal and vertical ±45° arbitrary rotation
- **Mass**: approx. 100 g

---

**Subject to reasonable modifications due to technical advances.**
## Technical Data

**General specifications**
- Operating frequency: 2.45 ... 2.45 GHz ± 200 kHz
- Transfer rate: 76.8 kBit/s

**Memory**
- Capacitance: 32 kByte (31 kByte for user data available)
- Battery life: approx. 8 years without write or read operations, or approx. 30 million read operations on 64 bytes per access

**Indicators/operating means**
- LED yellow lights during the data transfer (can be switched off)

**Ambient conditions**
- Ambient temperature: -20 ... 70 °C (253 ... 343 K)
- Storage temperature: -20 ... 70 °C (253 ... 343 K)
- Shock and impact resistance: 100 G, 11 ms on all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47

**Mechanical specifications**
- Protection degree: IP67 according to EN 60529
- Material: PBT
- Installation: horizontal and vertical ±45° arbitrary rotation
- Mass: approx. 100 g

---

**Data carrier**

**Model number**
- MVC-60-256K
- 31 kByte memory available
- Long battery life
- Disconnectable LED
- Protection degree IP67

**Dimensions**

![Dimensions Diagram]

**Technical Data for Model MVC-60-256K**

- Transfer rate: 76.8 kBit/s
- Capacitance: 32 kByte (31 kByte for user data available)
- Battery life: approx. 8 years without write or read operations, or approx. 30 million read operations on 64 bytes per access
- Protection degree: IP67
- Mass: approx. 100 g
The read/write head contains the circuit for the wireless communication with the data carrier and the connection to the control interface unit. The data transmission rate of 76.8 kBAud between the data carrier and read/write head makes it possible to transmit 4 bytes while the data carrier is moving at a speed of 100 km/h.

The read/write heads are protected against dust and splash water as per IP65. Two LEDs indicate the transmission and reception activities of the head.

Read/write distances of up to 5 m can be obtained.
### Read/write head

#### Model number
MVH500-F15
- 2 LEDs as function indicators
- Protection degree IP65

#### Accessories
- **MVK-5**: 5 m connecting cable for read/write head
- **MVK-10**: 10 m connecting cable for read/write head
- **MVK-20**: 20 m connecting cable for read/write head
- **MVK-30**: 30 m connecting cable for read/write head

### Dimensions

### Technical Data

#### General specifications
- Operating frequency: 2.45 ... 2.45 GHz ± 200 kHz

#### ATEX
- **EG Declaration of conformity**: No. A116624F (Federal office for telecommunications approvals)

#### General specifications
- **Emitted power**: 1.54 mW (1.9 dBm)
- **Transfer rate**: 76.8 kBit/s
- **Operating distance**: 0 ... 0.5 m, maximum 1.5 m

#### Indicators/operating means
- LED Tx communication
- LED OK power on

#### Ambient conditions
- **Ambient temperature**: -20 ... 70 °C (253 ... 343 K)
- **Storage temperature**: -20 ... 70 °C (253 ... 343 K)
- **Shock and impact resistance**: 50 G, 11 ms, in all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47

#### Mechanical specifications
- **Protection degree**: IP65 according to EN 60529
- **Connection type**: 3 m cable securely connected to head, max. length 1200 m, extension cable as accessory
- **Material**: Housing PBT
- **Installation**: Distance between two heads 2 m at operating distance 0.5 m
- **Mass**: approx. 1200 g
# Read/write head

**Model number**

MVH2000-F15  
- Protection degree IP65  
- 2 LEDs as function indicators

**Accessories**

- **MVK-5**  
  5 m connecting cable for read/write head  
- **MVK-10**  
  10 m connecting cable for read/write head  
- **MVK-20**  
  20 m connecting cable for read/write head  
- **MVK-30**  
  30 m connecting cable for read/write head

---

# Dimensions

![Dimensions Diagram](image)

---

# Technical Data

<table>
<thead>
<tr>
<th>General specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating frequency</strong></td>
<td>2.45 ... 2.45 GHz ± 200 kHz</td>
</tr>
</tbody>
</table>

**ATEX**

- **EG Declaration of conformity**  
  No. A116624F (Federal office for telecommunications approvals)

<table>
<thead>
<tr>
<th>General specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emitted power</strong></td>
<td>10 mW (10 dBm)</td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>76.8 kBit/s</td>
</tr>
<tr>
<td><strong>Operating distance</strong></td>
<td>0.2 ... 2 m, maximum 4 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators/operating means</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LED Tx</strong></td>
<td>communication</td>
</tr>
<tr>
<td><strong>LED OK</strong></td>
<td>power on</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-20 ... 70 °C (253 ... 343 K)</td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-20 ... 70 °C (253 ... 343 K)</td>
</tr>
<tr>
<td><strong>Shock and impact resistance</strong></td>
<td>50 G, 11 ms, in all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection degree</strong></td>
<td>IP65 according to EN 60529</td>
</tr>
<tr>
<td><strong>Connection type</strong></td>
<td>0.3 m cable securely connected to head, max. length 1200 m, extension cable as accessory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing</strong></td>
<td>PBT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Installation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance between two heads</strong></td>
<td>8 m at operating distance 2 m</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>approx. 1200 g</td>
</tr>
</tbody>
</table>
4.4 MVI Control Interface Units

Two read/write heads can be connected to one control interface unit. The implemented "intelligent" functions simplify the programming of the higher-order computer. Data integrity is ensured by the check code and the multiple reading, writing and comparison of the data.

In addition to the RS 232 interface, the control interface unit also contains an RS 422 interface. These can be used to link up to 16 control interface units and, therefore, up to 32 read/write heads to a bus system.
Control interface unit

Model number
MVI-D2-2HRX

Features
- Serial interfaces RS 232 and RS 422, addressable
- Bus connection with up to 16 control interface units possible via RS 422
- 2 read/write heads connectable
- LEDs as function indicators

Electrical Connection

Dimensions

Indicating/operating means
### Technical data

<table>
<thead>
<tr>
<th>Interface</th>
<th>Physical</th>
<th>RS 232 point-to-point connection or RS 422 addressable with up to 16 control interface units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer rate</td>
<td>300; 600; 1200; 2400; 4800; 9600; 19200 Bit/s</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>≤ 15 m at RS 232 ≤ 1200 m for RS 422</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators/operating means</th>
<th>LED AT</th>
<th>read/write head connected (2 LEDs, 1 per head)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LED CM</td>
<td>read/write head active (2 LEDs, 1 per head)</td>
</tr>
<tr>
<td></td>
<td>LED TR</td>
<td>trigger signal present (2 LEDs, 1 per head)</td>
</tr>
<tr>
<td></td>
<td>LED HO</td>
<td>reserved</td>
</tr>
<tr>
<td></td>
<td>LED PG</td>
<td>reserved</td>
</tr>
<tr>
<td></td>
<td>LED SD</td>
<td>data transmission from MVI-D2-2HRX to computer</td>
</tr>
<tr>
<td></td>
<td>LED RD</td>
<td>data transmission from computer to MVI-D2-2HRX</td>
</tr>
<tr>
<td></td>
<td>LED ER</td>
<td>error condition</td>
</tr>
<tr>
<td></td>
<td>LEDs 0, 1, 2, 3</td>
<td>output set</td>
</tr>
<tr>
<td></td>
<td>LED BT</td>
<td>battery voltage of battery in the MVI-D2-2HRX too low</td>
</tr>
</tbody>
</table>

### Electrical specifications

<table>
<thead>
<tr>
<th>Rated operational voltage $U_e$</th>
<th>24 V DC ± 10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption</td>
<td>1 A</td>
</tr>
<tr>
<td>Input</td>
<td>1 trigger input per read/write head, galvanically isolated</td>
</tr>
<tr>
<td>Output</td>
<td>4 outputs, that can be individually replaced via commands</td>
</tr>
</tbody>
</table>

### Ambient conditions

| Ambient temperature | -20 ... 55 °C (253 ... 328 K) |
| Storage temperature  | -20 ... 70 °C (253 ... 343 K) |
| Climatic conditions  | 35 ... 90 °C non-condensing   |
| Shock and impact resistance | 50 G, 11 ms, in all 3 spatial axes, with 3 positive and negative accelerations on each, in accordance with IEC 68-2-27 and IEC 68-2-47 |

### Mechanical specifications

| Protection degree | IP20 in accordance with EN 60529 |
| Connection type   | 2 units MVH500-F15 or MVH2000-F15 |
|                   | 2 round 10-pin sockets for read/write head connections, 15-pin sub-sockets for serial interface, 24 screw terminals |
| Material          | PBT |
| Mass              | approx. 400 g |
**Control interface unit**

**Dimensions**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>330</td>
<td>310</td>
</tr>
<tr>
<td>185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Model number**

MVI-F57-2HB12

**Electrical Connection**

Terminal configuration see manual

**Features**

- TCP/IP protocol over ethernet
- 2 read/write heads connectable
- LEDs as function indicators
- Four line display

**Indicating/operating means**

- Display
- Function keys

- Double tag carrier
- Coding
- ST6
- ST7
- ST8
- ST9
- ST10
- ST11
- ST12
- Terminals front view
**Technical data**

<table>
<thead>
<tr>
<th><strong>Interface</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>Ethernet</td>
</tr>
<tr>
<td>Protocol</td>
<td>TCP/IP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Indicators/operating means</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>4 line LCD display with 4 function keys for adjusting the IP address</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electrical specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operational voltage $U_e$</td>
<td>24 V DC ± 10 % or 100 V ... 250 V AC</td>
</tr>
<tr>
<td>Current consumption</td>
<td>1 A at 24 V DC, 200 mA at 230 V AC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Input</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input type</td>
<td>1 trigger input per read/write head, galvanically isolated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ambient conditions</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>0 ... 45 °C (273 ... 318 K)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 ... 70 °C (253 ... 343 K)</td>
</tr>
<tr>
<td>Climatic conditions</td>
<td>max. 90 % Humidity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mechanical specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection degree</td>
<td>IP66</td>
</tr>
<tr>
<td>Connection type</td>
<td>2 units MVH500-F15 or MVH2000-F15 via special Pg cable gland</td>
</tr>
<tr>
<td>Material</td>
<td>aluminium; makrolon window</td>
</tr>
<tr>
<td>Mass</td>
<td>approx. 6900 g</td>
</tr>
</tbody>
</table>

**Model number**

MVI-F57-2HB12

**Documentation**

- Handbuch IDENT-M System V
- Manual IDENT-M System V

**Software**

Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

**Function**

The control interface unit MVI-F57-2HB12 with TCP/IP protocol connects the IDENT-M System V directly to the Ethernet. The device consists of a control interface unit MVI-D2-2HRX and a IPC. 2 read/write heads are connectable to the MVI-D2-2HRX. The IPC is connected to the Ethernet. So the identification system is operated as a TCP/IP participant in the Ethernet and provides the full read/write functionality.
4.5 MVG Bus Couplers

The bus coupler product series is a modular concept for linking the identification system with standard field buses. For this purpose, the serial interface of the bus coupler is connected to the control interface unit of the microwave identification system and the field bus connection of the bus coupler is connected to the field bus.

The bus couplers are encased in the time-tested terminal housing (K-system) for cabinet installation. Variants are available for the field-bus connection to PROFIBUS-DP, INTERBUS and Allen Bradley Remote I/O.
**Bus coupler for INTERBUS**

**Model number**

MVG-KFD2-B5

**Features**

- Complete read/write functionality via the INTERBUS
- Transmission of 2 words, 16 bit each, in one cycle
- Connection of field bus and serial interface by means of removable terminals
- 4 LEDs as indicators for the connection identification system
- 1 LED for the field bus connection; bus wires "IN" galvanically isolated from the device supply

**Electrical Connection**

[Diagram showing electrical connections]

**Indicating/operating means**

[Diagram showing indicating/operating means]
Technical data

Interface 1
Connection of identification system
Physical RS 422 / RS 485
Protocol ASCII
Transfer rate 9600 kBit/s

Interface 2
Connection of control system
Physical RS 485
Protocol INTERBUS
ID code 03

Indicators/operating means
LED RS 422/485 serial interface active
green: data exchange with the identification system
red: faulty telegram from identification system

LED DOWNLOAD download:
flashes for approx. 2 seconds after device is switched on. The software download can be started during this time. The device cannot be addressed from the PROFI-BUS-DP during this time.

LED BUS field bus active / device error:
green: data exchange via the field bus
red, hardware error detected on the ident-coupler circuit board or faulty data exchange
5 s red / 0.5 s green flashing: faulty bus communication

LED OPERATION power supply / device error:
green: power supply and hardware of the ident-coupler circuit board OK
red: hardware error on the ident-coupler circuit board detected

LED INT.CON internal communication active:
green: faulty communication
red: faulty telegrams

Rotary switch ring termination
0 = closed
1 = bus continued

Electrical specifications
Rated operational voltage $U_e$ 18 ... 35 V DC , ripple 10 %SS , PELV
Current consumption $< 180$ mA / 24 V DC
No-load supply current $I_0$ $≤ 110$ mA

Ambient conditions
Ambient temperature $-25 ... 70 °C (248 ... 343$ K)
Storage temperature $-25 ... 85 °C (248 ... 358$ K)
Climatic conditions air humidity max. 75 %

Mechanical specifications
Protection degree IP20 in accordance with EN 60529
Connection type removable self-opening instrument terminals, max. conductor csa
$2 \times 2.5$ mm²

Material Housing Makrolon 6485
Construction type K-system, 40 mm (2 TE)

Model number
MVG-KFD2-B5

Documentation
Handbuch MVG-KFD2-B5
Manual MVG-KFD2-B5

Matching system components
MVI-D2-2HRX

Function
The bus coupler acts as a coupling module in the KF-housing via which the identification system IDENT-M System V can be connected to the INTERBUS. For this purpose, the serial interface (RS 422 / RS 485) of the bus coupler is connected to the control interface unit of the identification system and the field bus connection is connected to the INTERBUS.
The identification system is operated as a slave on the INTERBUS via the bus coupler and provides full read/write functionality.
Four, 16-bit words are occupied in the process data channel. The parameter channel is not used. A maximum of 2 words, each 16 bits, can be transmitted as user data per cycle.
**Bus coupler for PROFIBUS-DP**

- **Model number**: MVG-KFD2-B6

**Features**

- Complete read/write functionality via the PROFIBUS-DP
- Transmission of 2 words, 16 bit each, in one cycle
- Connection of field bus and serial interface by means of removable terminals
- 4 LEDs as indicators for the connection identification system
- 1 LED for the field bus connection; bus wires "IN" galvanically isolated from the device supply

**Dimensions**

**Electrical Connection**

**Indicating/operating means**

Subject to reasonable modifications due to technical advances.
### Technical data

#### Interface 1
- **Connection of**: identification system
- **Physical**: RS 422 / RS 485
- **Protocol**: ASCII
- **Transfer rate**: 9600 kBit/s

#### Interface 2
- **Connection of**: control system
- **Physical**: RS 485
- **Protocol**: PROFIBUS-DP acc. to EN 50170
- **Transfer rate**: 9.6; 19.2; 44.44; 93.95; 187.5; 500; 1500 kBit/s self-synchronising

#### Indicators/operating means
- **LED RS 422/485**: serial interface active
  - green: data exchange with the identification system
  - red: faulty telegram from identification system
- **LED DOWNLOAD**: download:
  - flashes for approx. 2 seconds after device is switched on. The software download can be started during this time. The device cannot be addressed from the PROFIBUS-DP during this time.
- **LED BUS**: field bus active / device error:
  - green: data exchange via the field bus
  - red, hardware error detected on the ident-coupler circuit board or faulty data exchange
  - 5 s red / 0.5 s green flashing: faulty bus communication
- **LED OPERATION**: power supply / device error:
  - green: power supply and hardware of the ident-coupler circuit board OK
  - red: hardware error on the ident-coupler circuit board detected
- **LED INT.CON**: internal communication active:
  - green: faulty communication
  - red: faulty telegrams
- **DIP-switch**: setting the station address
- **Rotary switch**: bus termination
  - 0 = not active
  - 1 = active

#### Electrical specifications
- **Rated operational voltage** $U_e$: 18 ... 35 V DC, ripple 10 %, PELV
- **Current consumption**: $< 180$ mA / 24 V DC
- **No-load supply current** $I_0$: $\leq 110$ mA

#### Ambient conditions
- **Ambient temperature**: -25 ... 70 °C (248 ... 343 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 75 %

#### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: removable self-opening instrument terminals, max. conductor csa
  - 2 x 2.5 mm²
- **Material**: Housing: Makrolon 6485
- **Construction type**: K-system, 40 mm (2 TE)

### Model number
- MVG-KFD2-B6

### Documentation
- Handbuch MVG-KFD2-B6
- Manual MVG-KFD2-B6

### Matching system components
- MVI-D2-2HRX

### Function
The bus coupler acts as a coupling module in the KF-housing via which the identification system IDENT-M System V can be connected to the PROFIBUS-DP. For this purpose, the serial interface (RS 422 / RS 485) of the bus coupler is connected to the control interface unit of the identification system and the field bus connection is connected to the PROFIBUS-DP.

The identification system is operated as a slave on the PROFIBUS-DP via the bus coupler and provides full read/write functionality.

A maximum of 31 words, each 16 bits, can be transmitted as data.

A total of 16 PROFIBUS-DP modules of varying lengths are defined. Depending on command length and the data to be transmitted, the appropriate modules can be selected via the GSD file.
Bus coupler for Allen Bradley Remote I/O

Model number
KHD2-MVI-AB2

Features
- 100 % compatible to Allen-Bradley Remote I/O
- Nine simple commands
- Configurable as 1/4 rack
- Communication via block transfer

Dimensions

Electrical Connection

- 100 % compatible to Allen-Bradley Remote I/O
- Nine simple commands
- Configurable as 1/4 rack
- Communication via block transfer
## Technical data

### Interface 1
- **Connection of**: identification system
- **Physical**: RS 232
- **Protocol**: ASCII
- **Transfer rate**: 19200 Bit/s
- **Cable length**: 15 m

### Interface 2
- **Connection of**: control system
- **Physical**: Allen Bradley RIO
- **Protocol**: Allen Bradley RIO "Block Transfer"
- **Transfer rate**: 57.6; 115.2; 230.4 kBit/s
- **Cable length**: 3000 m at 57.6 kBit/s<br>1000 m at 115.2 kBit/s<br>at 230.4 kBit/s on request

### Indicators/operating means
- **DIP-switch**: setting the configuration

### Electrical specifications
- **Rated operational voltage** $U_e$: 21 ... 27 V DC
- **Power consumption** $P_0$: max. 5 W

### Ambient conditions
- **Ambient temperature**: 0 ... 60 °C (273 ... 333 K)
- **Storage temperature**: -25 ... 85 °C (248 ... 358 K)
- **Climatic conditions**: air humidity max. 90 %

### Mechanical specifications
- **Protection degree**: IP20 in accordance with EN 60529
- **Connection type**: self-opening connection terminals, max. core cross-section 2 x 2.5 mm², 9-pin Sub-D built-in connector
- **Material**
  - **Housing**: Makrolon 6485
  - **Construction type**: K-system, 40 mm (2 TE)

## Model number
- **KHD2-MVI-AB2**

## Documentation
- **Manual KHD2-MVI-AB2**

## Matching system components
- **MVI-D2-2HRX**

## Function
With this bus coupler, the identification system can be directly coupled to the Allen-Bradley Remote I/O field bus. The device functions as a bus subscriber which behaves as a remote-rack from Allen-Bradley. As a result, communication components in the control system are no longer needed and the amount of cabling required is reduced. The serial interface of the device is connected to the MVI-D2-2HRX control interface unit of the identification system and the bus connection is connected to the field bus. Nine commands are available for simple operation through the control system. The device is configured as a 1/4 rack. Communication occurs via block transfer. The necessary settings are made using DIP switches.
4.6 System Accessories
**Connecting cable**

- Connecting cable for read/write head

**Dimensions**

<table>
<thead>
<tr>
<th>Connector</th>
<th>Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="connector.png" alt="Connector Diagram" /></td>
<td><img src="socket.png" alt="Socket Diagram" /></td>
</tr>
</tbody>
</table>

**Technical Data**

<table>
<thead>
<tr>
<th>Model number</th>
<th>MVK-5</th>
<th>MVK-10</th>
<th>MVK-20</th>
<th>MVK-30</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical Data</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection type</td>
<td>circular connector on both sides</td>
<td>circular connector on both sides</td>
<td>circular connector on both sides</td>
<td>circular connector on both sides</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td>PVC</td>
<td>PVC</td>
<td>PVC</td>
<td>PVC</td>
</tr>
<tr>
<td>Cable length</td>
<td>5 m</td>
<td>10 m</td>
<td>20 m</td>
<td>30 m</td>
</tr>
</tbody>
</table>
5 Microwave Identification System IDENT-M System T

5.1 System Description

The microwave-identification system operates in the frequency range from 2.435 to 2.465 GHz. It is, for the most part, insensitive to interfering environmental influences and, therefore, offers a high degree of functional safety. With read distances of up to 6 m, the system is particularly well suited for the automotive industry, as well as logistics and entry and access controls.

**Features**
- Working frequency 2.435 ... 2.465 GHz
- Data carrier with memory capacity of 574 bit
- 8-digit decimal number as fixcode
- Read distance up to 6 m
- Write distance up to 0.5 m
- Data transmission rate 16 kBaud

**Highlights**
- Multi-tag capability
- 100 frequency channels
- Motion recognition possible
- Battery life independent of the read/write procedures
- Digital inputs and outputs
- Stand-alone functionality
Microwave Identification System IDENT-M System T

5.1.1 Areas of application

The Ident-M System T is a functional, highly efficient and reliable system for the identification of persons, material and vehicles.

Typical areas of application are:

- Automotive industry:
  - final vehicle assembly
  - manufacture of components
  - vehicle tracking
- Access and entry controls, area monitoring
- Automatic identification of fast-moving objects with variable orientation and undefined motion paths
5.1.2 System construction

The system consists of a read/write device and the code or data carriers. The code or data carriers contain a fixed code or memory for data which may be changed. The write/read devices perform the transmission of data to the code and data carriers and can be directly connected to a higher-order computer, e.g. PC or PLC, via serial interfaces.

The read/write devices can also be used in stand-alone operation.
5.1.3 Function of the entire system

The system is control-system independent and multi-tag capable. Equipped with efficient safety functions, data can be reliably transmitted with the aid of microwaves between code or data carriers and a read/write device. 100 channels in the 2.45 GHz-range are available for use.

As a result, systems can be installed which consist of several read/write devices, each having the ability to simultaneously communicate with various code or data carriers. In this way, the data can be transmitted encrypted and interference-free.

The motion recognition function of the read/write device can also be used to detect various objects, such as humans, animals or vehicles as they move towards or away from the device.

The basis of the system is the circularly polarized microwave radiation emitted by the read/write device. In the normal case, the radiation spreads in a uniform beam. Microwaves are attenuated differently by different materials as they spread and are reflected by materials which are metal or which have a metallic surface.

The output of the microwave emitter is measured in such a way that the code and data carriers of the system can read at distances of up to 6 m; data carriers can reliably be written to distances of up to 0.5 m. Motion recognition is ensured at distances of up to 5 m.
Microwave Identification System IDENT-M System T

5.1.4 Distance table: code carrier - read/write devices

Read distance (m)

<table>
<thead>
<tr>
<th>Code carrier</th>
<th>Read/write device</th>
<th>MTT-S3</th>
<th>MTT-F52-S3</th>
<th>MTT6000-F51-S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTO-C1</td>
<td></td>
<td>3.3</td>
<td>3.3</td>
<td>6.0</td>
</tr>
<tr>
<td>MTO-C2</td>
<td></td>
<td>3.3</td>
<td>3.3</td>
<td>6.0</td>
</tr>
</tbody>
</table>

5.1.5 Distance table: data carrier - read/write devices

Read/write distance (m)

<table>
<thead>
<tr>
<th>Data carrier</th>
<th>Read/write device</th>
<th>MTT-S1</th>
<th>MTT-F52-S1</th>
<th>MTT6000-F51-S1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing</td>
<td>Reading</td>
<td>Writing</td>
<td>Reading</td>
</tr>
<tr>
<td>MTM-C1</td>
<td>0.5</td>
<td>4.0</td>
<td>0.5</td>
<td>4.0</td>
</tr>
<tr>
<td>MTM-C2</td>
<td>0.5</td>
<td>4.0</td>
<td>0.5</td>
<td>4.0</td>
</tr>
</tbody>
</table>

5.1.6 Read/write speed

How the maximum speed at which a code or data carrier can be read by the read/write device is determined is described below.

\[ V = 3600 \times \text{width [m]}/\text{read time [ms]} \]

Example: a read time of 150 ms and a path length of 1.5 m yield 36 km/h.

At a distance of 70 % of the maximum read range, the width is calculated to be approx. 0.5 * read range.

The read times can be found in the descriptions for the code carriers and data carriers.

Notice:
The values calculated in this way are the maximum theoretically attainable values. In actual use, the maximum attainable speeds may be lower due to various influencing factors.
5.2 MTO Code Carriers

The code carrier can still be safely read even when multiple code carriers are located in the read zone.

Each code carrier is delivered ex works with an 8-digit decimal number and a 32-bit checksum for unique identification. As a result, it is impossible to confuse the carriers.

An environmentally friendly lithium cell ensures a long operating life, independent from the number of read procedures. When the capacity is depleted, a bit is set in the status register of the code carrier. This bit can be analysed during the next data transmission from the read/write device.
Microwave Identification System IDENT-M System T

Communication:

The code carriers repeatedly reflect the information to any transmitting read/write devices. The reflection is broadband. If multiple read/write devices simultaneously irradiate the code carrier, all can be read reliably without interference.

The reflected data consist of an 8-digit decimal number written by the manufacturer - including a 32-bit checksum. A sequence, consisting of a "code" and the content of the status register, is called an ID-frame. This ID-frame is reflected by the code carrier in random intervals. An interval enclosed by two ID-frames is called the message period. The maximum message period (Tmax) is always less than 150 ms and averages 80 ms. This means that the code carrier can reflect the ID-frame 12 times per second. (see fig.)

Multiple detection:

As the code carrier transmits its ID-frame in random intervals, several code carriers can read at the same time, as shown in the figure below.

When collisions occur, a checksum algorithm in the read/write device cancels these ID-frames. In the most unfavourable situations, e.g. when all data carriers are very far away or if strong interference is present, the likelihood of an error due to false interpretation is, thanks to the 32-bit checksum, less than 1 to 5x10^9.

![Diagram showing multiple detection and ID-frame structure](image)

Read time:

The times required to detect 8 code carriers in the read zone can be determined using the adjacent curves.
**Code carrier**

**Model number**

MTO-C1

- 8-digit decimal number as fix code
- Battery life expectancy 6 years
- Battery life independent of the read/write operations
- Credit card size
- Protection degree IP67

**Function**

The code carrier can still be safely read from a distance of more than 3 m, even when several code carriers are located in the read zone. Each code carrier is delivered ex works with an invariable and unique 8-digit decimal number and a 32-bit test check sum which detects the data carrier unambiguously and thus unmistakably. An ecologically friendly lithium cell assures a long action time regardless of the number of read processes. Towards the end of the capacity, one bit which can be evaluated by means of the read/write device during the next data transfer, is set in the status register of the code carrier.

The MTO-C1 code carrier can either be fixed with a clip, a card retainer, magnetically or with adhesive tape. In addition, it is provided with holes for M3 screws. The code carrier is vibration resistant, corrosion resistant, UV-stable, waterproof and resistant to chemicals.

**Accessories**

MTA-C1V1
Card holder with fixing clip

MTA-C1V2
Card holder for window mounting in vehicles

**Dimensions**

**Technical Data**

<table>
<thead>
<tr>
<th>General specifications</th>
<th>Operating frequency</th>
<th>2.435 ... 2.465 GHz, channel separation 300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>EG Declaration of conformity</td>
<td>No. A131866J (Federal office for Post and Telecommunication)</td>
</tr>
<tr>
<td>General specifications</td>
<td>Reading speed</td>
<td>depending on the operating mode and the number of data carriers in the read zone between 80 ms and 2700 ms</td>
</tr>
<tr>
<td>Distance</td>
<td>distance tables, see introduction</td>
<td></td>
</tr>
<tr>
<td>Capacitance</td>
<td>an 8-digit decimal number as fix code and 32-bit checksum</td>
<td></td>
</tr>
<tr>
<td>Battery life</td>
<td>typically 6 years, independent of the number of read operations</td>
<td></td>
</tr>
<tr>
<td>Ambient conditions</td>
<td>Ambient temperature</td>
<td>-20 ... 85 °C (253 ... 358 K)</td>
</tr>
<tr>
<td></td>
<td>Storage temperature</td>
<td>-20 ... 85 °C (253 ... 358 K)</td>
</tr>
<tr>
<td>Shock and impact resistance</td>
<td>shock: 500 G, 1 ms on all 3 spatial axes 100x in accordance with IEC 68-2-27 impact: 40 G, 6 ms on all 3 spatial axes 1000x in accordance with IEC 68-2-29 Eb</td>
<td></td>
</tr>
<tr>
<td>Mechanical specifications</td>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td>Material</td>
<td>Housing</td>
<td>Polymer</td>
</tr>
<tr>
<td>Mass</td>
<td>15 g</td>
<td></td>
</tr>
</tbody>
</table>

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### Code carrier

#### Model number

**MTO-C2**
- 8-digit decimal number as fix code
- Battery life expectancy 6-10 years
- Battery life independent of the read/write operations
- Rugged housing
- Protection degree IP67

#### Function

The code carrier can still be safely read from a distance of more than 3 m, even when several code carriers are located in the read zone. Each code carrier is delivered ex works with an invariable and unique 8-digit decimal number and a 32-bit test check sum, which detects the data carrier unambiguously and thus unmistakably. An ecologically friendly lithium cell assures a long action time regardless of the number of read processes. Towards the end of the capacity, one bit which can be evaluated by means of the read/write device during the next data transfer, is set in the status register of the code carrier. The MTO-C2 code carrier is fixed with 2 M4 screws. The C2 housing type is especially robust allowing for application in rough operating conditions. The code carrier is vibration resistant, corrosion resistant, UV-stable, waterproof and resistant to chemicals.

### Technical Data

<table>
<thead>
<tr>
<th>General specifications</th>
<th>Operating frequency</th>
<th>2.435 ... 2.465 GHz, channel separation 300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATEX</strong></td>
<td>EG Declaration of conformity</td>
<td>No. A131866J (Federal office for Post and Telecommunication)</td>
</tr>
<tr>
<td><strong>General specifications</strong></td>
<td>Reading speed</td>
<td>depending on the operating mode and the number of data carriers in the read zone between 80 ms and 2700 ms</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>Distance tables, see introduction</td>
<td></td>
</tr>
<tr>
<td><strong>Capacitance</strong></td>
<td>an 8-digit decimal number as fix code and 32-bit checksum</td>
<td></td>
</tr>
<tr>
<td><strong>Battery life</strong></td>
<td>typically 10 years, independent of the number of read operations</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td>Ambient temperature</td>
<td>-40 ... 85 °C (233 ... 358 K)</td>
</tr>
<tr>
<td></td>
<td>Storage temperature</td>
<td>-20 ... 85 °C (253 ... 358 K)</td>
</tr>
<tr>
<td><strong>Shock and impact resistance</strong></td>
<td>40 G, 6 ms, in all 3 spatial axes 1000x in accordance with IEC 68-2-29 Eb</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 G, on all 3 spatial axes, 100x in accordance with IEC 68-2-27</td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical specifications</strong></td>
<td>Protection degree</td>
<td>IP67 according to EN 60529</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Housing</td>
<td>Polymer</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>60 g</td>
<td></td>
</tr>
</tbody>
</table>
5.3 MTM Data Carriers

Up to 606 bits (82 7-bit-ASCII characters and one checksum) can be stored in the data carrier. Thus, 574 bits are available for application-specific data. In addition, each data carrier is assigned a permanent, 8-digit decimal number ex works for unique identification.

Formatting and setting of the various possible operating modes is carried out by means of microwaves. The same conditions as for the writing of data apply. The distance from the read/write device must not exceed 0.5 m here.

The life expectancy of the internal lithium cell is dependent on the mode in which the data carrier is operated. When the voltage drops at the end of the cell's lifetime, a bit is set in the status register which is transmitted to the read/write device with each read process.
Microwave Identification System IDENT-M System T

Communication:

The data carriers repeatedly reflect the information to any given transmitting read/write device. Data are transmitted at a frequency between 2.435 GHz and 2.465 GHz. If multiple read/write devices simultaneously irradiate the data carrier, all can be read reliably without interference.

The reflected data consist of a marker which is coded ex works, an 8-digit decimal number from the code memory - including a 32-bit checksum, the data from the read/write memory and a status field. A sequence, consisting of marker/checksum, data and status, is called an ID-frame. Depending on the formatting of the data carrier, this ID-frame is transmitted either with a constant or a random interval. Message period is the term for two subsequent ID-frames and the included interval. Whenever the data carriers are put into the random mode, multiple data carriers can be analyzed within the read range.

Multiple detection:

Whenever the data carrier is set to the random mode, several data carriers can be analyzed within the read range, as shown in the figure below. When a collision occurs, a checksum algorithm in the read/write device cancels these ID-frames. In the most unfavorable situations, e.g. when all data carriers are very far away or if strong interference is present, the likelihood of an error due to false interpretation is, thanks to the 32-bit checksum, less than 1 to 5x10^9.

Read time:

The times required to read all data carriers in the read range are listed in the adjacent graphic.

Comment:

The graphic is applicable only for MR4H-formatted data carriers, i.e. minimal memory capacity, interval 4 and high speed (see section Operating Modes).

If more than 4 data carriers are to be expected in the read range, it may be necessary to set a longer interval length for the data carriers.
Microwave Identification System IDENT-M System T

Operating modes:

The formatting commands for the various modes are transmitted via microwave and to the distance at which the data carriers can still be written. The memory capacity, interval type, interval length and the rate of data transmission to be used are the parameters.

The formatting can be used to optimize various characteristics for the application. The various memory modes are used to obtain an optimization of the memory structure with regard to speed. Select between the two types of intervals to specify whether multiple detection, i.e. the analysis of multiple data carriers in the read range, should be performed. Multiple detection is possible only in the random mode. Interval length and the selected data transmission rate affect the transmission time. The read range is linked to the transmission rate.

The characters M, Q, F etc. are the abbreviations of the designations and will be explained in detail later. These abbreviations must be specified during programming.

Memory modes

<table>
<thead>
<tr>
<th>M - mini</th>
<th>(small capacity), 46 bits, 14 data bits plus checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q - quarter</td>
<td>(quarter capacity), 186 bits, 154 data bit plus checksum</td>
</tr>
<tr>
<td>F - full</td>
<td>(full capacity), 606 bits, 574 data bits plus checksum</td>
</tr>
</tbody>
</table>

Interval type

| C - constant | the interval, together with the ID-frame, is always constant |
| R - random  | the interval changes randomly (random mode) |

Interval length

| 0 - zero | i.e. uninterrupted |
| 4 - small | i.e. 4 times in the ID-frame period |
| 8 - medium | i.e. 8 times in the ID-frame period |

Data transmission rate

| L - low | read and write at 4 kbyte/s |
| H - high | read at 16 kbyte/s. Write at 4 kbyte/s |

The modes are designated with MC0L, MR4H, FC0H etc. Interval-16 modes are also available; the modes listed above are, however, sufficient for most applications.

The read times are dependent on the selected operating mode. Listed in the table are the maximum read times based on both high and low data transmission rates for the various operating modes. Also listed are the battery lives for the operating modes.

<table>
<thead>
<tr>
<th>Read time in [ms] at data transmission rate</th>
<th>Battery life [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini memory</td>
<td></td>
</tr>
<tr>
<td>MC0-H/L 50</td>
<td>6</td>
</tr>
<tr>
<td>MC4-H/L 100</td>
<td>6</td>
</tr>
<tr>
<td>MC8-H/L 170</td>
<td>10</td>
</tr>
<tr>
<td>MR4-H/L 170</td>
<td>9</td>
</tr>
<tr>
<td>Quarter memory</td>
<td></td>
</tr>
<tr>
<td>QC0-H/L 70</td>
<td>6</td>
</tr>
<tr>
<td>QC4-H/L 180</td>
<td>9</td>
</tr>
<tr>
<td>QC8-H/L 350</td>
<td>10</td>
</tr>
<tr>
<td>QR4-H/L 350</td>
<td>9</td>
</tr>
<tr>
<td>Full memory</td>
<td></td>
</tr>
<tr>
<td>FC0-H/L 140</td>
<td>6</td>
</tr>
<tr>
<td>FC4-H/L 370</td>
<td>6</td>
</tr>
<tr>
<td>FC8-H/L 750</td>
<td>10</td>
</tr>
<tr>
<td>FR4-H/L 750</td>
<td>10</td>
</tr>
</tbody>
</table>
Microwave Identification System IDENT-M System T

Write range:

The write range has a lobar shape. It is dependent on the field of the microwaves and the sensitivity of the data carrier. For the MTM-C1 data carrier, a reliable write range lies within a lobe from 0 to 0.5 m.

Write time:

The write time is dependent on the formatting of the data carrier and has a statistically assured size. For example, for format MC0H it lies at 200, for QC0H at 300 and for FC0H at 400 ms for the normal case. These times increase with a desired write reliability of 99.999 %, i.e. 1 error per 100000 write procedures to 600, 800 and 3000 ms, respectively.

Write reliability:

A backup memory exists should the data carrier accidentally be removed from the write zone while receiving the data which are to be written via the microwaves. The old data are automatically saved to this backup memory. The "write-error bit" is set in the status register of the data carrier. The system receives an automatic warning via this bit.

Status register:

The status register contains 7 bits.
- Bit 7 = 1, battery capacity exhausted
- Bit 7 = 0, battery OK
- Bit 6 = 1, unsuccessful write attempt
- Bit 6 = 0, successful write attempt
- Bits 5 and 4 = 1, monitor input 1 open
- Bits 5 and 4 = 0, monitor input 1 to ground
- Bits 3, 2 and 1 = 1, monitor input 2 open
- Bits 3, 2 and 1 = 0, monitor input 2 to ground

Status register:

The status register contains 7 bits.
- Bit 7 = 1, battery capacity exhausted
- Bit 7 = 0, battery OK
- Bit 6 = 1, unsuccessful write attempt
- Bit 6 = 0, successful write attempt
- Bits 5 and 4 = 1, monitor input 1 open
- Bits 5 and 4 = 0, monitor input 1 to ground
- Bits 3, 2 and 1 = 1, monitor input 2 open
- Bits 3, 2 and 1 = 0, monitor input 2 to ground
**Data carrier**

**Model number**

MTM-C1

- Memory 574 bit plus 8-digit decimal number as fix code
- Battery life expectancy 6-10 years
- Battery life independent of the read/write operations
- Rugged housing
- Protection degree IP67

**Function**

The data carrier can be read from a distance of 4 m and safely inscribed from a distance of 0.5 m dependent on different settings. A max. of 606 bits (82 7-bit-ASCII characters and a 32-bit test check sum) can be stored in the data carrier. Thus 574 bit are available for application specific data. In addition, each data carrier is delivered ex works with an invariable and unique 8-digit decimal number, which detects the data carrier unambiguously. By means of microwaves, formatting and the setting of various possible operating modes takes place. The same conditions are applicable as for the writing of data. The distance to the read/write device can be up to 0.5 m.

The life of the internal lithium cells depends on the operating mode of the data carrier. When the voltage drops towards the end of the capacity, one bit is set in the status register, and transmitted to the read/write device during each read procedure. The data carrier is vibration resistant, corrosion resistant, UV-stable, waterproof and resistant to chemicals.

**Technical Data**

**General specifications**

- Operating frequency: 2.435 ... 2.465 GHz, channel separation 300 kHz
- ATEX
  - EG Declaration of conformity: No. A131866J (Federal office for Post and Telecommunication)

**Reading speed**

depending on operating mode and number of data carriers in the read zone, between 50 ms and 2000 ms

**Writing speed**

depending on the operating mode, between 200 ms and 6000 ms

**Distance**

distance tables, see introduction

**Memory**

- Capacitance: 606 Bit R/W (584 bits available for user data)
- 8-digit decimal number as fix code
- Battery life: typical: 6 ... 10 years, independent of the number of read and write processes, but dependent on the selected modes

**Ambient conditions**

- Ambient temperature: -20 ... 85 °C (253 ... 358 K)
- Storage temperature: -20 ... 85 °C (253 ... 358 K)
- Shock and impact resistance:
  - shock: 500 G, 1 ms on all 3 spatial axes 100x in accordance with IEC 68-2-27
  - impact: 40 G, 6 ms on all 3 spatial axes 1000x in accordance with IEC 68-2-29 Eb

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material: Polymer
- Housing
- Mass: 15 g

**Dimensions**

- **Width:** 86 mm
- **Height:** 54 mm
- **Depth:** 3 mm

**Accessories**

**MTA-C1V1**
Card holder with fixing clip

**MTA-C1V2**
Card holder for window mounting in vehicles
**Model number**

MTM-C2

- Memory 574 bit plus 8-digit decimal number as fix code
- Battery life expectancy 6-10 years
- Battery life independent of the read/write operations
- Rugged housing
- Protection degree IP67

**Function**

The data carrier can be read from a distance of 4 m and safely inscribed from a distance of 0.5 m dependent on different settings. A max. of 606 bits (82 7-bit-ASCII characters and a 32-bit test check sum) can be stored in the data carrier. Thus 574 bit are available for application specific data. In addition, each data carrier is delivered ex works with an invariable and unique 8-digit decimal number, which detects the data carrier unambiguously.

By means of microwaves, formatting and the setting of various possible operating modes takes place. The same conditions are applicable as for the writing of data. The distance to the read/write device can be up to 0.5 m. The life of the internal lithium cells depends on the operating mode of the data carrier. When the voltage drops towards the end of the capacity, one bit is set in the status register, and transmitted to the read/write device during each read procedure. The C2 housing type is especially robust allowing for application in rough operating conditions.

The data carrier is vibration resistant, corrosion resistant, UV-stable, waterproof and resistant to chemicals.

---

**Dimensions**

```
+-----+-----+
|     |     |
| 90  | 8   |
|     |     |
+-----+-----+
```

---

**Technical Data**

**General specifications**

- Operating frequency: 2.435 ... 2.465 GHz , channel separation 300 kHz
- ATEX
  - EG Declaration of conformity: No. A131866J (Federal office for Post and Telecommunication)

**Memory**

- Capacitance: 606 Bit R/W (584 bits available for user data) 8-digit decimal number as fix code
- Battery life: typical: 6 ... 10 years, independent of the number of read and write processes, but dependent on the selected modes

**Ambient conditions**

- Ambient temperature: -40 ... 85 °C (233 ... 358 K)
- Storage temperature: -40 ... 85 °C (233 ... 358 K)
- Shock and impact resistance:
  - shock: 500 G, 1 ms on all 3 spatial axes 100x in accordance with IEC 68-2-27
  - impact: 40 G, 6 ms on all 3 spatial axes 1000x in accordance with IEC 68-2-29 Eb

**Mechanical specifications**

- Protection degree: IP67 according to EN 60529
- Material:
  - Housing: Polymer
- Mass: 60 g
5.4 MTT Read/Write Devices

The read/write device establishes the connection between the code and/or data carriers of the IDENT-M System T and a higher-order computer (industrial-PC, PLC, etc.).

Communication with the computer occurs via an RS 232 or RS 485 (2- or 4-wire) serial interface.

Function of the read/write device within the entire system

The user and basis software can be stored in two 128 kbyte Flash-EEPROMs. Variables and protocols can be stored in a 128 kbyte SRAM. The user software and the database can be actualized via one of the serial inputs.

The devices are equipped with two serial interfaces: an RS 232 and an interface which can function as either an RS 232 or as an RS 485. Additional connections are possible by means of 3 optical coupling inputs, 2 optical coupling outputs and 1 relay output.

The device can, thus, also be operated in stand-alone operation, i.e. without a higher-order computer, for identification tasks.
Microwave Identification System IDENT-M System T

Architecture of the read/write device

An LED which can illuminate in three different colors as well as a buzzer integrated in the device, all of which are controlled via the user program, indicate the operating status.

There are various ways to adjust and/or communicate with the device.

First, the device can be adjusted and tested via an internal control panel with two push button switches and two 7-segment displays.

Device variants

The microwave read/write devices are available in different versions, whereby the device variants are hardware and software compatible.

MTT-S3

Standard device with following characteristics:
- Maximum read distance: 4 m
- Standard housing with protection class IP43
- Rated operating voltage 24 V DC, switchable to 12 V DC
- Stand-alone operation by means of internal application software possible
- 384 kbyte Flash-EEPROM for program and database memory
- Internal control unit with push button switches, 7-segment displays and buzzer
- Host interfaces: Port A: RS 232, Port B: RS 232 / RS 485 2-wire/ RS485 4-wire switchable
- Real time clock

MTT-F52-S3

Same as standard device, however:
- Special housing with protection class IP65
- Without housing cover monitoring

MTT6000-F51-S3

Same as standard device, however:
- Maximum read distance: 6 m
- Larger housing with protection class IP56

The device is delivered ex works with the "P+F-Talk" protocol software. Defined in this Pepperl+Fuchs protocol are a wide range of commands which allow the user to perform simple communication operations between the higher-order computer and the read/write device.

Another option is a so-called setup tag. This is a data carrier which contains specific data and parameterises the read/write device accordingly when read.
Microwave Identification System IDENT-M System T

Write and read ranges

For plane-parallel alignment of code/data carriers and read/write devices, the read range is dependent on the following settings:

- Transmission power of the read/write device (low/high)
- Reception sensitivity of the read/write device (low/high)
- Set read speed of the code/data carrier

By combining the transmission power and reception sensitivity, the read range can be set to four levels. The following read-range settings are possible:

<table>
<thead>
<tr>
<th>Read range</th>
<th>Sensitivity</th>
<th>Transmission power</th>
<th>Range factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HIGH</td>
<td>HIGH</td>
<td>100 %</td>
</tr>
<tr>
<td>2</td>
<td>HIGH</td>
<td>LOW</td>
<td>50 %</td>
</tr>
<tr>
<td>3</td>
<td>LOW</td>
<td>HIGH</td>
<td>25 %</td>
</tr>
<tr>
<td>4</td>
<td>LOW</td>
<td>LOW</td>
<td>12 %</td>
</tr>
</tbody>
</table>

Data are always written to a data carrier with an elevated transmission power at 4 kbit/s. Write operations to a data carrier are independent of reception sensitivity and read speed.

The maximum write distance is 0.5 m for all devices.

The following two illustrations show the read ranges of the read/write devices:

![Read ranges of the MTT-S3, MTT-F52-S3](image-url)
Read ranges of the MTT6000-F51-S3
## Read/write device

**Model number**

MTT-S3

**Features**

- Serial interfaces RS 232 and RS 485
- Dual-LED for function display
- Stand-alone functionality
- Inputs and outputs
- Motion recognition possible
- 100 frequency channels
- Internal control unit with push button switches, 7-segment displays and buzzer

## Dimensions

![Dimensions Diagram]

## Electrical Connection

**Interface Description:**

- DTMF, LED, external control input
- RS 232 for data station
- RS 232 / RS 485 for host processor
- Parallel output and relays

### Interface Descriptions:

- **J1:**
  - 1: LED 1
  - 2: LED 2
  - 3: GndLED
  - 4: SDTMF
  - 5: RndDTMF
  - 6: Tamp a
  - 7: Tamp b

- **J2:**
  - 1: Tx 232a
  - 2: Rx 232a
  - 3: Gnd 232a

- **J3:**
  - 1: Tx 232b
  - 2: Rx 232b
  - 3: Gnd 232b
  - 4: CGnd
  - 5: Tx-/Rx-485
  - 6: Tx+/Rx+485
  - 7: Gnd 485
  - 8: Rx 485-
  - 9: Rx485+
  - 10: Gnd 485r

- **J4:**
  - 1: Outpl 1
  - 2: Out 1c
  - 3: Out 1e
  - 4: Out 2c
  - 5: Out 2e
  - 6: R1c
  - 7: R1b
  - 8: R1m
### Technical data

**General specifications**

- **Operating frequency**: 2.435 ... 2.465 GHz, 100 ID-channels
- **Channel separation**: 300 kHz
- **Polarisation**: circular
- **Transfer rate read**: 4 kBit/s, 16 kBit/s
- **Transfer rate write**: 4 kBit/s
- **Acquisition range of the motion recognition**: 5 m for velocities between 0.3 and 9.2 m/s
- **Distance**: distance tables, see introduction

**ATEX**

- **EG Declaration of conformity**: No. A131866J (Federal office for Post and Telecommunication)

**Interface 1**

- **Physical**: RS 232
- **Protocol**: ASCII
- **Transfer rate**: ≥ 1.2; ≤ 19.2 kBit/s
  - Standard setting: 9.6 kBit/s

**Interface 2**

- **Physical**: RS 232 or RS 485; for RS 485: full- (4-wire) or half-duplex (2-wire)
- **Protocol**: ASCII
- **Transfer rate**: ≥ 1.2; ≤ 38.4 kBit/s
  - Default setting: 9.6 kBit/s

**Memory**

- **Type/Size**: flash EEPROM 3 x 128 kByte
- **SRAM**: 128 kByte

**Indicators/operating means**

- **LED**: green/yellow/red controllable per software

**Electrical specifications**

- **Rated operational voltage**: U_{op} 20 ... 28 V DC selectable via Jumper 10 ... 14 V DC
- **Current consumption**: at 24 V: 150 mA
  - at 12 V: 500 mA

**Output**

- **Electronic output 1**: open-collector; 1 ... 30 V DC, max. 500 mA
- **Electronic output 2**: open-collector; 1 ... 30 V DC, max. 100 mA

**Relay switching current**: ≤ 2 A; P_{max} = 50 W
**Switching voltage**: ≤ 220 V DC; 48 V AC

**Input**

- **Optocoupler**: 3 inputs
- **Input level**: ON: ≥ 2.4 V, max. 30 V
  - OFF: ≥ 0 V, max. 0.2 V

**Ambient conditions**

- **Ambient temperature**: -20 ... 60 °C (253 ... 333 K)
- **Storage temperature**: -20 ... 60 °C (253 ... 333 K)

**Mechanical specifications**

- **Protection degree**: IP43 in accordance with EN 60529
- **Material front**: polycarbonate
- **Material back face**: high grade steel
- **Mass**: 1.9 kg
- **Dimensions**: 263 mm x 176 mm x 54 mm (W x H x D)

### Model number

**MTT-S3**

### Documentation

- **Handbuch MTT...-S3**
- **Manual MTT...-S3**

### Software

Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

### Function

The read/write device establishes the connection between the code and/or data carriers of the IDENT-M System T and a higher-order computer (industrial-PC, PLC, etc.). Communication with the computer occurs via an RS 232 or RS 485 (2- or 4-wire) serial interface.

The system is multi-tag capable, i.e. multiple code or data carriers are identified in the acquisition range. The read/write devices can be set to 100 different frequency channels, thereby preventing mutual interference.

The devices can also be used in stand-alone operation through various inputs and outputs. An LED as well as a buzzer integrated in the device indicate the operating status.

The device can be adjusted and tested via an internal control panel with two push button switches and two 7-segment displays. It is also possible to perform the parameterisation via a so-called setup tag.

The device is delivered ex works with the "P+F-Talk" protocol software. Defined in this Pepperl+Fuchs protocol are a wide range of commands which allow the user to perform simple communication operations between the higher-order computer and the read/write device.

Additional information can be found in the descriptions of the system and device.
Illustration of MTT-S1 Hardware Features:

1. Multicoloured LED
2. Jumper field
3. RESET-button
4. Buzzer
5. Display
6. "Parameter-selection" button
7. "Value-selection" button
8. Monitor contact for the cover
9. Cable connection access, bottom
10. Cable connection access, back

Jumper settings

Battery on
- Host RS 232 (Tx)
- Host RS 232 (Rx)

Battery off
- Host RS 485 (Tx)
- Host RS 485 (Rx)

Microwave field shape

<table>
<thead>
<tr>
<th>Curve</th>
<th>Power</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>B</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>C</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>D</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

Curve Power Sensitivity

<table>
<thead>
<tr>
<th>Curve</th>
<th>Power</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>B</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>C</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>D</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>
Model number
MTT-F52-S3

Features
- Serial interfaces RS 232 and RS 485
- Dual-LED for function display
- Stand-alone functionality
- Inputs and outputs
- Motion recognition possible
- Multi-day capability
- 100 frequency channels
- Internal control unit with push button switches, 7-segment displays and buzzer
- Protection degree IP65

Electrical Connection

Interface Description:
DTMF, LED, external control input

RS 232 for data station

J1: 1 LED 1
2 LED 2
3 GndLED
4 SDTMF
5 RtnDTMF
6 Tamp a
7 Tamp b

RS 232 / RS 485 for host processor

J3: 1 Tx 232b
2 Rx 232b
3 Gnd 232b
4 CGnd
5 Tx-/Rx-485
6 Tx+/Rx+485
7 Gnd 485
8 Rx 485-
9 Rx485+
10 Gnd 485r

Parallel output and relays

J4: 1 Outpl1
2 Out1c
3 Out1e
4 Out2c
5 Out2e
6 R1c
7 R1b
8 R1m

Dimensions

Electrical Connection

Interface Description:
DTMF, LED, external control input

RS 232 for data station

J1: 1 LED 1
2 LED 2
3 GndLED
4 SDTMF
5 RtnDTMF
6 Tamp a
7 Tamp b

RS 232 / RS 485 for host processor

J3: 1 Tx 232b
2 Rx 232b
3 Gnd 232b
4 CGnd
5 Tx-/Rx-485
6 Tx+/Rx+485
7 Gnd 485
8 Rx 485-
9 Rx485+
10 Gnd 485r

Parallel output and relays

J4: 1 Outpl1
2 Out1c
3 Out1e
4 Out2c
5 Out2e
6 R1c
7 R1b
8 R1m
### Technical data

**General specifications**
- **Operating frequency**: 2.435 ... 2.465 GHz, 100 ID-channels
  
- **Channel separation**: 300 kHz

**Polarisation**
- **Transfer rate**: read: 4 kBit/s, 16 kBit/s
  - **write**: 4 kBit/s

**Acquisition range of the motion recognition**
- **Distance**: distance tables, see introduction

**ATEX**
- **EG Declaration of conformity**: No. A131866J (Federal office for Post and Telecommunication)

**Interface 1**
- **Physical**: RS 232
- **Protocol**: ASCII
- **Transfer rate**: ≥ 1.2; ≤ 19.2 kBit/s
  - **standard setting**: 9.6 kBit/s

**Interface 2**
- **Physical**: RS 232 or RS 485; for RS 485: full- (4-wire) or half-duplex (2-wire)
- **Protocol**: ASCII
- **Transfer rate**: ≥ 1.2; ≤ 38.4 kBit/s
  - **default setting**: 9.6 kBit/s

**Memory**
- **Type/Size**: flash EEPROM 3 x 128 kByte
  - **SRAM**: 128 kByte

**Indicators/operating means**
- **LED green/yellow/red**: controllable per software

**Electrical specifications**
- **Rated operational voltage**: Uo 20 ... 28 V DC selectable via Jumper 10 ... 14 V DC
- **Current consumption**: at 24 V: 150 mA
  - **at 12 V**: 500 mA

**Output**
- **Electronic output 1**: open-collector; 1 ... 30 V DC, max. 500 mA
- **output 2**: open-collector; 1 ... 30 V DC, max. 100 mA
- **Relay switching current**: ≤ 2 A; Pmax = 50 W
  - **switching voltage**: ≤ 220 V DC; 48 V AC

**Input**
- **Optocoupler**: 3 inputs
- **Input level**: ON: ≥ 2.4 V, max. 30 V
  - **OFF**: ≥ 0 V, max. 0.2 V

**Ambient conditions**
- **Ambient temperature**: -20 ... 60 °C (253 ... 333 K)
- **Storage temperature**: -20 ... 60 °C (253 ... 333 K)

**Mechanical specifications**
- **Protection degree**: IP65 according to EN 60529
- **Material**: front: ABS
  - **rear**: ABS
- **Mass**: 1.7 kg
- **Dimensions**: 250 mm x 160 mm x 57 mm (W x H x D)

---

### Model number

**MTT-F52-S3**

### Documentation

**Handbuch MTT...-S3**

**Manual MTT...-S3**

### Software

Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

### Function

The read/write device establishes the connection between the code and/or data carriers of the IDENT-M System T and a higher-order computer (industrial-PC, PLC, etc.). Communication with the computer occurs via an RS 232 or RS 485 (2- or 4-wire) serial interface.

The system is multitag capable, i.e. several code or data carriers are identified within the sensing range. The read/write devices can be set to 100 different frequency channels, thereby preventing mutual interference.

The devices can also be used in stand-alone operation through various inputs and outputs.

An LED as well as a buzzer integrated in the device indicate the operating status.

The device can be adjusted and tested via an internal control panel with two push button switches and two 7-segment displays. It is also possible to perform the parameterisation via a so-called setup tag.

The device is delivered ex works with the "P+F-Talk" protocol software. Defined in this Pepperl+Fuchs protocol are a wide range of commands which allow the user to perform simple communication operations between the higher-order computer and the read/write device.

The device has a special housing with PG cable glands, whereby protection degree IP65 is reached.

Additional information can be found in the descriptions of the system and device.
**Model number**

MTT-F52-S3

---

**Note**

**MTT Internal View**

**Illustration of MTT-S1 Hardware Features:**

1. Multicoloured LED
2. Jumper field
3. RESET-button
4. Buzzer
5. Display
6. "Parameter-selection” button
7. "Value-selection” button
8. Monitor contact for the cover
9. Cable connection access, bottom
10. Cable connection access, back

**Jumper settings**

Battery on

<table>
<thead>
<tr>
<th>Battery on</th>
<th>Battery off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host RS 232 (Tx)</td>
<td>Host RS 485 (Tx)</td>
</tr>
<tr>
<td>Host RS 232 (Rx)</td>
<td>Host RS 485 (Rx)</td>
</tr>
</tbody>
</table>

**Microwave field shape**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Power</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>B</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>C</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>D</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

**W (m)**

<table>
<thead>
<tr>
<th>HS</th>
<th>Pr</th>
<th>Pp</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>0.5</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>1.0</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>1.5</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>2.0</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

---

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Subject to reasonable modifications due to technical advances.

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**System T**

**Electrical Connection**

**Interface Description:**
- DTMF, LED, external control input
- RS 232 for data station
- RS 232 / RS 485 for host processor
- Parallel output and relays

**Dimensions**

**Model number**

MTT6000-F51-S3

**Features**

- High reading distance 6 m
- Serial interfaces RS 232 and RS 485
- Dual-LED for function display
- Stand-alone functionality
- Inputs and outputs
- Motion recognition possible
- Multi-day capability
- 100 frequency channels
- Internal control unit with push button switches, 7-segment displays and buzzer
- Protection degree IP56
### Technical data

<table>
<thead>
<tr>
<th>General specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating frequency</td>
<td>2.435 ... 2.465 GHz 100 ID channels, channel separation 300 kHz</td>
</tr>
<tr>
<td>Polarisation</td>
<td>circular</td>
</tr>
</tbody>
</table>
| Transfer rate                                               | read: 4 kBit/s, 16 kBit/s  
write: 4 kBit/s |
| Acquisition range of the motion recognition                 | 5 m for velocities between 0.3 and 9.2 m/s |
| Distance                                                    | distance tables, see introduction |

**ATEX**

| EG Declaration of conformity | No. A131866J (Federal office for Post and Telecommunication) |

**Interface 1**

<table>
<thead>
<tr>
<th>Physical</th>
<th>RS 232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>ASCII</td>
</tr>
</tbody>
</table>
| Transfer rate     | ≥ 1.2; ≤ 19.2 kBit/s  
standard setting: 9.6 kBit/s |

**Interface 2**

<table>
<thead>
<tr>
<th>Physical</th>
<th>RS 232 or RS 485; for RS 485: full- (4-wire) or half-duplex (2-wire)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>ASCII</td>
</tr>
</tbody>
</table>
| Transfer rate     | ≥ 1.2; ≤ 38.4 kBit/s  
default setting: 9.6 kBit/s |

**Memory**

| Type/Size         | flash EEPROM 3 x 128 kByte  
SRAM 128 kByte |

**Indicators/operating means**

| LED green/yellow/red | controllable per software |

**Electrical specifications**

<table>
<thead>
<tr>
<th>Rated operational voltage $U_e$</th>
<th>20 ... 28 V DC selectable via Jumper 10 ... 14 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption at 24 V</td>
<td>150 mA</td>
</tr>
<tr>
<td></td>
<td>500 mA</td>
</tr>
</tbody>
</table>

**Output**

| Electronic          | output 1: open-collector; 1 ... 30 V DC, max. 500 mA  
output 2: open-collector; 1 ... 30 V DC, max. 100 mA |
|---------------------|----------------------------------------------------|
| Relay               | switching current ≤ 2 A; $P_{\text{max}} = 50$ W  
switching voltage ≤ 220 V DC; 48 V AC |

**Input**

<table>
<thead>
<tr>
<th>Optocoupler</th>
<th>3 inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input level ON</td>
<td>≥ 2.4 V , max. 30 V</td>
</tr>
<tr>
<td></td>
<td>OFF: ≥ 0 V , max. 0.2 V</td>
</tr>
</tbody>
</table>

**Ambient conditions**

| Ambient temperature | -20 ... 60 °C (253 ... 333 K) |
| Storage temperature | -20 ... 60 °C (253 ... 333 K) |

**Mechanical specifications**

| Protection degree | IP56 in accordance with EN 60529 |
| Material          | Polycarbonate |
| Mass              | 3 kg |
| Dimensions        | 315 mm x 234 mm x 128 mm (W x H x D) |

### Model number

| MTT6000-F51-S3 |

### Documentation

| Handbuch MTT...-S3 |
| Manual MTT...-S3 |

### Software

Communication with the identification system is very easy with the demo program IDENT 98. It shows the system options and simplifies commissioning. The demo program is included in the scope of delivery.

### Function

The read/write device establishes the connection between the code and/or data carriers of the IDENT-M System T and a higher-order computer (industrial-PC, PLC, etc.). Communication with the computer occurs via an RS 232 or RS 485 (2- or 4-wire) serial interface. The system is multitag capable, i.e. several code or data carriers are identified within the sensing range. The read/write devices can be set to 100 different frequency channels, thereby preventing mutual interference. The devices can also be used in stand-alone operation through various inputs and outputs.

An LED as well as a buzzer integrated in the device indicate the operating status. The device can be adjusted and tested via an internal control panel with two push button switches and two 7-segment displays. It is also possible to perform the parameterisation via a so-called setup tag.

The device is delivered ex works with the "P+F-Talk" protocol software. Defined in this Pepperl+Fuchs protocol are a wide range of commands which allow the user to perform simple communication operations between the higher-order computer and the read/write device. The device offers an increased read distance of 6 m.

Additional information can be found in the descriptions of the system and device.
Model number
MTT6000-F51-S3

Note

MTT6000-F51 Internal View

Illustration of MTT6000-F51 Hardware Features:
1 Multicoloured LED
2 Jumper field
3 RESET-button
4 Display

Jumper settings

Battery on
Host RS 232 (Tx)
Host RS 232 (Rx)

Battery off
Host RS 485 (Tx)
Host RS 485 (Rx)

Microwave field shape

<table>
<thead>
<tr>
<th>Curve</th>
<th>Power</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>B</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>C</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>D</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

W (m) Wave width
Pr Transfer range (70 % of R_{max})
Pp Data transfer range (70 % of R_{max})
R (m) Range

Curves:
A, B, C, D
Pr, Pp
HS, LS
Microwave Identification System IDENT-M System T

5.5 System Accessories
Card holder

### Model number
MTA-C1V1

- Card holder for code and data carrier MTO-C1 and MTM-C1
- With fastening clip

### Technical data

#### Mechanical specifications
- **Material**
  - support: polycarbonate
  - clip: metal
- **Mass**
  - without clip: 7 g
  - with clip: 10 g
- **Dimensions**
  - 92 mm x 64 mm x 9 mm (W x H x D) including Clip

---

Card holder

### Model number
MTA-C1V2

- Card holder for code and data carrier MTO-C1 and MTM-C1
- Window installation in vehicles by means of adhesive strips

### Technical data

#### Mechanical specifications
- **Material**
  - support: polycarbonate
  - clip: polycarbonate
- **Mass**
  - (window version): 7 g
  - with clip: 11 g
6 General Accessories

6.1 Program IDENT 98

With the program IDENT 98, all IDENT-I and IDENT-M identification systems from Pepperl+Fuchs can be operated. If a system is connected, the program automatically detects the system (Plug & Play). All essential commands can be executed with the program. A uniform user interface is, thus, available for all identification systems.

The program supports the following identification systems and components:

- IDENT-I System P
- IDENT-I System V (fixcode and read/write)
- IDENT-M System V
- IDENT-M System T

Documentation
Handbuch IDENT 98
Manual IDENT 98

Additional key features of the program are:

- The user can work simultaneously with several open windows within the user interface.
- Interface monitor
  The interface monitor has the same functionality for all systems and logs all communication with the connected identification system.
- Command window
  Using the Command window, any command can be entered and sent to the identification system.
- Language switch
  The language used for all dialog boxes and messages during program execution can be switched "online" (German and English).
### Additional Information

#### 7 Additional Information

##### 7.1 Housing Protection Classes

(DIN VDE 0470 Part 1, EN 60 529)

<table>
<thead>
<tr>
<th>Degree of protection against physical contact and foreign particles</th>
<th>Degree of protection against water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - Not protected</td>
<td>0 - Not protected</td>
</tr>
<tr>
<td>1 - Protected against access to dangerous parts with back of hand</td>
<td>1 - Protected against water drops</td>
</tr>
<tr>
<td>- Protected against solid foreign particles 50 mm in diameter and larger</td>
<td></td>
</tr>
<tr>
<td>2 - Protected against access to dangerous parts with a finger</td>
<td>2 - Protected against water drops when housing is angled up to 15°</td>
</tr>
<tr>
<td>- Protected against solid foreign particles 12.5 mm in diameter and larger</td>
<td></td>
</tr>
<tr>
<td>3 - Protected against access to dangerous parts with a tool</td>
<td>3 - Protected against water mist</td>
</tr>
<tr>
<td>- Protected against solid foreign particles 2.5 mm in diameter and larger</td>
<td></td>
</tr>
<tr>
<td>4 - Protected against access to dangerous parts with a wire</td>
<td>4 - Protected against splash water</td>
</tr>
<tr>
<td>- Protected against solid foreign particles 1.0 mm in diameter and larger</td>
<td></td>
</tr>
<tr>
<td>5 - Protected against access to dangerous parts with a wire</td>
<td>5 - Protected against water jets</td>
</tr>
<tr>
<td>- Protected against dust</td>
<td></td>
</tr>
<tr>
<td>6 - Protected against access to dangerous parts with a wire</td>
<td>6 - Protected against strong water jets</td>
</tr>
<tr>
<td>- Dust proof</td>
<td></td>
</tr>
<tr>
<td>7 - Protected against the affects of temporary submersion in water</td>
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</tr>
<tr>
<td>8 - Protected against the affects of continuous submersion in water</td>
<td></td>
</tr>
<tr>
<td>9 - Protected against water during high-pressure/steam-jet cleaning</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
If a code does not need to be specified, it is to be replaced by the letter X.

Devices for which the second digit is a 7 or 8 do not need to fulfill the requirements of the devices for which the second digit is a 5 or 6 unless they are provided with a double designation (e.g. IPX6/IPX7).
### 7.2 Type Key

#### Structure of the type codes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product group</td>
<td>Mechanics</td>
<td>Additional information</td>
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</tbody>
</table>

#### Associated product group

<table>
<thead>
<tr>
<th>1. digit</th>
<th>2. digit</th>
<th>3. digit</th>
<th>Characteristic value</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 4. digit</td>
<td></td>
<td></td>
<td>xx Chip recognition</td>
<td>IPC02-50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>xxxx Read/Write distance</td>
<td>MVIH2000-F145</td>
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#### System component

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>C Code-/Data carrier</td>
<td></td>
<td></td>
<td>IPC01-25</td>
</tr>
<tr>
<td>H Head</td>
<td></td>
<td></td>
<td>IPH-FP3-R2</td>
</tr>
<tr>
<td>I Control interface unit</td>
<td></td>
<td></td>
<td>IVI-KHD2-4HB6</td>
</tr>
<tr>
<td>T Read terminal</td>
<td></td>
<td></td>
<td>MTT-S1</td>
</tr>
<tr>
<td>U Interface unit with control functions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Datapax</td>
<td></td>
<td></td>
<td>IVD-DEMOIVT-32K</td>
</tr>
<tr>
<td>S Software</td>
<td></td>
<td></td>
<td>MVIWINIDM</td>
</tr>
<tr>
<td>K Cable</td>
<td></td>
<td></td>
<td>MVK-10</td>
</tr>
<tr>
<td>Z Accessories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Code carrier battery-operated</td>
<td></td>
<td></td>
<td>MTO-C1</td>
</tr>
<tr>
<td>M Data carrier battery-operated</td>
<td></td>
<td></td>
<td>MTM-C2</td>
</tr>
<tr>
<td>A Accessories</td>
<td></td>
<td></td>
<td>MTA-C1V1</td>
</tr>
<tr>
<td>G Gateway</td>
<td></td>
<td></td>
<td>MVG-KFD2-B6</td>
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</table>

#### System specification

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<tr>
<td>R IDENT-I System V (Read only, Fixcode)</td>
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<td></td>
<td>IRI-KHD2-4-4M</td>
</tr>
<tr>
<td>V IDENT-I System V, IDENT-M System V</td>
<td></td>
<td></td>
<td>IVI-KHD2-4HB1</td>
</tr>
<tr>
<td>T IDENT-M System T</td>
<td></td>
<td></td>
<td>MTT-S1</td>
</tr>
<tr>
<td>P IDENT-I System P</td>
<td></td>
<td></td>
<td>IPH-FP3-R2</td>
</tr>
</tbody>
</table>

#### Principle of operation

<table>
<thead>
<tr>
<th>1. Group</th>
<th>2. Group</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Inductive (IDENT-I)</td>
<td></td>
<td>IVI-KHD2-4HB6</td>
</tr>
<tr>
<td>M Microwave (IDENT-M)</td>
<td></td>
<td>MTT-S1</td>
</tr>
</tbody>
</table>
### Additional Information

#### Structure of the type codes

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<th></th>
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</thead>
<tbody>
<tr>
<td>Product group</td>
<td>Mechanics</td>
<td>Additional information</td>
</tr>
</tbody>
</table>

#### 2. Group

**Mechanics (for K-system)**

<table>
<thead>
<tr>
<th>Housing mechanics</th>
<th>1. digit</th>
<th>2. digit</th>
<th>3. digit</th>
<th>4. digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1K VariKont M incl. terminal compartment</td>
<td>K</td>
<td>Mechanics</td>
<td>115 mm housing with removable terminals</td>
<td>0</td>
</tr>
<tr>
<td>BGT Sub-rack</td>
<td>K</td>
<td>Mechanics</td>
<td>115 mm housing without removable terminals</td>
<td>2</td>
</tr>
<tr>
<td>Fxx Connector with threaded joint</td>
<td>K</td>
<td>Mechanics</td>
<td>Remote Process Interface</td>
<td>3</td>
</tr>
<tr>
<td>xx Diameter</td>
<td>K</td>
<td>Mechanics</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>F Flange</td>
<td>K</td>
<td>Mechanics</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>GK Screw thread synthetic</td>
<td>K</td>
<td>Mechanics</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>GM Screw thread metal</td>
<td>K</td>
<td>Mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARD ISO-CARD</td>
<td>C1</td>
<td>ISO-CARD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1 ISO-CARD</td>
<td>M</td>
<td>C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 CARD, heavy duty</td>
<td>S1</td>
<td>Software version 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1 Software version 1</td>
<td>M</td>
<td>S1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2 Software version 2</td>
<td>V1</td>
<td>Version 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1 Version 1</td>
<td>M</td>
<td>V1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2 Version 2</td>
<td>M</td>
<td>V2</td>
<td></td>
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</tr>
<tr>
<td>HHx Handheld</td>
<td>M</td>
<td>HHx</td>
<td></td>
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</tr>
</tbody>
</table>

#### 4. digit

- 0 without power supply
- 2 up to 24 V
- 3 up to 36 V
- 4 up to 48 V
- 5 up to 115 V
- 6 up to 230 V

#### 3. digit

- D DC
- A AC

#### 2. digit

- F 115 mm housing with removable terminals
- H 115 mm housing without removable terminals
- S Remote Process Interface

#### 1. digit

- K K-system

---

Subject to reasonable modifications due to technical advances.

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### Additional Information

#### Structure of the type codes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>product group</td>
<td>mechanics</td>
<td>additional information</td>
</tr>
</tbody>
</table>

#### 3. Group

<table>
<thead>
<tr>
<th>additional information</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>various</td>
<td></td>
</tr>
<tr>
<td>xxxK</td>
<td>storage capacity in KBits</td>
</tr>
<tr>
<td>V1</td>
<td>plug connector M12, standard</td>
</tr>
<tr>
<td>EXM</td>
<td>hazardous area, encapsulation</td>
</tr>
<tr>
<td>EXIA</td>
<td>hazardous area, intrinsic safety</td>
</tr>
<tr>
<td>T1</td>
<td>increased temperature -25 °C ... 150 °C</td>
</tr>
<tr>
<td>T2</td>
<td>increased temperature -25 °C ... 130 °C</td>
</tr>
<tr>
<td>T3</td>
<td>increased temperature -25 °C ... 110 °C</td>
</tr>
<tr>
<td>T4</td>
<td>Temperature system up to 200 °C für 30 min</td>
</tr>
<tr>
<td>T5</td>
<td>increased temperature up to 200 °C</td>
</tr>
</tbody>
</table>

#### communication output

| R1 | 20 mA current loop (TTY) |
| R2 | RS232 |
| R3 | RS422 |
| R4 | RS485 |
| RX | multiple serial interface |
| B1 | PROFIBUS FMS |
| B3 | AS-Interface |
| B4 | Prox-Bus |
| B5 | Interbus-S |
| B6 | PROFIBUS DP |
| B7 | DeviceNet |
| B8 | ControlNet |
| M | multiple output |
| D1 | 16 Inputs/Outputs |
| D2 | 8 Inputs/Outputs |
| D3 | 8 Inputs/Outputs |

| xH | number of heads |
| x. | number of heads |
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Tel. (1) 4 21 00 50
Telefax (1) 4 21 20 33
uteco@uteco.gr
<table>
<thead>
<tr>
<th>Country</th>
<th>Company, Address, Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungary</td>
<td>DEAK Process Control Ltd.</td>
</tr>
<tr>
<td></td>
<td>Dozsa Gy. ut 4/c. 1/2</td>
</tr>
<tr>
<td></td>
<td>2400 DUNAJVAROS</td>
</tr>
<tr>
<td></td>
<td>Tel. (25) 50 02 40</td>
</tr>
<tr>
<td></td>
<td>Telefax (25) 50 02 42</td>
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<tr>
<td></td>
<td><a href="mailto:jdeak@deak.hu">jdeak@deak.hu</a></td>
</tr>
<tr>
<td></td>
<td>Pepperl+Fuchs Kft.</td>
</tr>
<tr>
<td></td>
<td>Kisto Utca 16-18</td>
</tr>
<tr>
<td></td>
<td>8200 VESZPREM</td>
</tr>
<tr>
<td></td>
<td>Tel. (88) 59 01 00</td>
</tr>
<tr>
<td></td>
<td>Telefax (88) 59 01 32</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:kmikola@hu.pepperl-fuchs.com">kmikola@hu.pepperl-fuchs.com</a></td>
</tr>
<tr>
<td></td>
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<tr>
<td>Iceland</td>
<td>Tóhúsualan ehf. Suurlandisbraut 20</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 8960</td>
</tr>
<tr>
<td></td>
<td>128 REYKJAVIK</td>
</tr>
<tr>
<td></td>
<td>Tel. (25) 50 04 50 / 50 04 54</td>
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<td>Telefax (25) 50 04 02</td>
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</tr>
<tr>
<td>Iran</td>
<td>Farayand PAS</td>
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<td></td>
<td>5th Floor - No. 104</td>
</tr>
<tr>
<td></td>
<td>Africa Express Way, Corner of Golshahr 19697 TEHRAN</td>
</tr>
<tr>
<td></td>
<td>Tel. (21) 2 05 43 41</td>
</tr>
<tr>
<td></td>
<td>Telefax (21) 2 05 43 88</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:Farayandpas@neda.net">Farayandpas@neda.net</a></td>
</tr>
<tr>
<td>Israel</td>
<td>Kama Ltd.</td>
</tr>
<tr>
<td></td>
<td>20 Hametsuda St. 58 190 AZOR</td>
</tr>
<tr>
<td></td>
<td>Tel. (3) 5 56 77 47</td>
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<td></td>
<td>Telefax (3) 5 56 75 48</td>
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<tr>
<td></td>
<td><a href="mailto:Kama@netvision.net.il">Kama@netvision.net.il</a></td>
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<tr>
<td></td>
<td>MAYSAF N. H. Ltd.</td>
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<tr>
<td></td>
<td>Electrical &amp; Control Systems</td>
</tr>
<tr>
<td></td>
<td>Mirza Kadesh 5</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 85</td>
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<td></td>
<td>26272 KIRIAT HAIM</td>
</tr>
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<td></td>
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<tr>
<td>Italy</td>
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</tr>
<tr>
<td></td>
<td>Via delle Industrie, 4</td>
</tr>
<tr>
<td></td>
<td>20050 MEZZAGO (Milano)</td>
</tr>
<tr>
<td></td>
<td>Tel. (0 39) 6 29 21</td>
</tr>
<tr>
<td></td>
<td>Telefax (0 39) 6 29 22 40</td>
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<td><a href="mailto:info@it.pepperl-fuchs.com">info@it.pepperl-fuchs.com</a></td>
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<td>Pepperl+Fuchs B.V.</td>
</tr>
<tr>
<td></td>
<td>Het Wielsem 10</td>
</tr>
<tr>
<td></td>
<td>5231 Bw’s-HERTOGENBOSCH</td>
</tr>
<tr>
<td></td>
<td>Tel. (73) 6 40 93 88</td>
</tr>
<tr>
<td></td>
<td>Telefax (73) 6 44 47 49</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:sales@nl.pepperl-fuchs.com">sales@nl.pepperl-fuchs.com</a></td>
</tr>
<tr>
<td></td>
<td>Nigeria</td>
</tr>
<tr>
<td></td>
<td>Laantalal Nigeria Limited</td>
</tr>
<tr>
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