HF WIP Rack Reader Rev1.5
SECS/HSMS

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1. Introduction

These operating instructions correspond with the "Directive 1999/5/EC of the European Parliament and the Council on radio equipment and telecommunications transmission equipment and the mutual recognition of the conformity"

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These operating instructions are intended for the operator who must pass these on to the personnel responsible for installation, connection, use, and repairs of the machine.

The operator must ensure that the information contained in these operating instructions and in the accompanying documents has been read and understood.

The operating instructions must be kept at a known place that is easy to reach, and they must be consulted if there is the slightest doubt.

The manufacturer assumes no responsibility for damage to persons, animals, or objects or to the unit itself arising from the improper use or the disregard or insufficient consideration to the safety criteria contained in these operating instructions or based on modifications of the unit or the use of unsuitable replacement parts.

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1.1 Using the device

The device is exclusively used to read passive HF transponders.

Any other use of the machine or any use beyond its intended purpose is considered non-intended and thus improper.

In this case, the device safety and the device protection provided may be compromised. HERMOS AG is not liable for damages resulting from such use.

The device was developed for the use in an industrial environment as a built-in device in other systems. It was not developed as a stand-alone or mobile device in a non-industrial environment, such as domestic, vehicle or open air use.

Intended use also includes the following:

- Following all the operating instructions
- Following all the safety instructions

Improper use, which can endanger the unit, the user and third parties, include:

- The use of the device contrary to its intended use
- Changes to the device as well as attachments and conversions
- Operating the unit when there are obvious problems

WARNING

Danger of injury due to unauthorised modifications

There are risks from unauthorised modifications on the device.

Only original spare parts from the manufacturer must be used. No modification, attachment or conversion may be performed on the device without the permission of HERMOS AG.

WARNING

Danger of injury and interruption of operation due to improper use

There are risks through the improper use of the device.

The device must only be used according to its intended use.

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2. Version history

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Version	Date	Author	Amendments
1.0	31/05/2016	HERMOS AG AL/MZ	Start version protocol description
1.1	06/07/2016	HERMOS AG MZ	Addition to customer manual
1.2	28/07/2016	HERMOS AG MZ	Addition to the multicoloured LED, "Status" data element
1.3	07.06.2018	HERMOS AG MZ	Addition EInk-Display
1.4	14.02.2019	HERMOS AG MZ	Addition EInk-Display fontsize and pollfunction
1.5	14.01.2020	HERMOS AG MZ	16 and 40x hardware

3. Used abbreviations and designations

RFID	Radio Frequency Identification
HF	High Frequency 13.56 MHz ISO15693
SECS	SEMI Equipment Communications Standard
HSMS	High-Speed SECS Message Service
EInk	e paper, reflective display technology without maintenance voltage

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4. General instructions

All previous versions of this document lose their validity with the issue of this version.

We compiled the information in this document according to the best of our ability. HERMOS AG does not guarantee the accuracy and completeness of the information provided in this document and is also not liable for consequential damages based on faulty or incomplete information.

4.1 Objective of the product manual

The product manual serves as support and contains all the necessary information that must be followed for general safety, transport, installation and operation.

The product manual with all safety instructions (as well as all additional documents) must be:

- Followed, read and understood by all persons working with the unit (especially knowledge of the safety instructions)
- Easily available at all times to all persons
- Consulted if even the slightest doubt arises (safety)

Objectives:
- Prevent accidents
- Increase the service life and reliability of the unit
- Reduce the costs of production downtime

4.2 Warranty and liability

The "General Terms and Conditions of Sale and Delivery" of HERMOS AG shall apply.

The warranty period is 24 months beginning with the delivery of the device, which is verified by the invoice or other documents.

The warranty includes repairs of all damages to the unit that occur during the warranty period, and were clearly caused by material or manufacturing defects.

Warranty and liability claims in the event of personal injury or property damage are excluded if they arise from one or more of the following causes:

- Improper use of the unit
- Disregarding the information in the operating instructions
- Unauthorised structural modifications of the unit
- Insufficient maintenance and repairs
- Disaster events due to impact with foreign objects or force majeure

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5. Safety instructions and warnings

5.1 Scope and symbols

Follow the general safety instructions as well as special safety instructions included in the chapters.

The unit was built according to state-of-the-art technology and recognised safety regulations. In order to prevent danger to life and limb of the user, third parties, or the unit, only use the unit for its intended purpose and in perfect condition with regard to safety.

Bodily injuries and/or property damages resulting from non-compliance with the instructions provided in the operating instructions are the responsibility of the company operating the unit or the assigned personnel.
Faults that may compromise safety must be eliminated immediately.

DANGER

Risk of death, injury and property damage.
There is a risk of danger due to disregard of the product manual and the safety information contained therein.
Read the product manual carefully before putting the unit into operation for the first time. Fulfil all required safety conditions.

5.2 Safety symbols - according to DIN 4844-2

The following special safety symbols in accordance with DIN 4844-2 are used at the corresponding passages in the text of this product manual and require special attention depending on the combination of the signal word and symbol.

WARNING

Risk of injury due to disregarding the safety symbols.
Risks exist when disregarding warnings in the operating instructions.
Follow all warnings.

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5.2.1 Mandatory signs

	Observe additional information		Use safety goggles
	Wear ear protection		Wear safety shoes
	Important note		

5.2.2 Warning signs

	Warning of a hazardous area		Warning of hazardous electrical voltage
	Warning of electromagnetic radiation		Warning of flammable substances
	Warning of explosive substances		Warning of electrostatically sensitive components

5.2.3 Prohibition signs

	Unauthorised access prohibited		Fire, open flame and smoking prohibited
	Switching prohibited		Prohibited

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5.2.4 Other signs

	Dispose of packaging material according to rules and regulations		Recycling

5.3 Obligations

5.3.1 Operator's obligations

A safe condition and use of the unit is a requirement for a safe operation of the unit. For that reason, the operator has the obligation to ensure that the following points are adhered to:

➲ The unit may only be operated by trained and authorised personnel.

➲ Prohibit unsafe or dangerous working methods! If necessary, check the conduct and actions of its personnel!

➲ Have personnel who must be trained, instructed or within the scope of general training work only on the unit under the supervision of an experienced person!

➲ Have the personnel confirm by their signature that the operating instructions have been understood!

➲ Precisely establish responsibilities according to the various task areas (operation, installation)!

➲ Operating personnel must be required to immediately report any occurring and identifiable safety deficiencies to their superior!

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5.3.2 Responsibilities of operating personnel

The operating personnel are obligated to contribute to the prevention of work accidents and their consequences by their personal conduct.

Risk of injury due to insufficient personnel qualifications

WARNING

There are dangers to personnel and the proper operation due to inadequately qualified personnel.
Only trained personnel may operate the unit.
New operating personnel must be instructed by the existing operating personnel. The operator must regulate precisely the personnel's areas of responsibility, competence, and monitoring precisely.
The personnel for the areas of responsibility mentioned above must have the corresponding qualification for this work (training, instruction).
If necessary, this can be done by the manufacturer on behalf of the operator.
In case of disregard, all warranty claims are void.

5.3.3 ESD Instructions

CAUTION

Static electricity can damage electronic components in the unit. All persons who install or maintain the unit must be trained in ESD protection.

ESD protective measures must be applied when opening the unit.

➡ Disconnect the power supply prior to removing or adding components!

➡ Observe the basic principles of ESD protection

➡ Take the appropriate ESD precautionary measures

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5.4 Residual risks

Despite all precautionary measures taken, there may still be residual risks that are not apparent.
Adhering to the safety instructions, the intended use, and the product manual as a whole can reduce residual risks.

DANGER	**Danger caused by electrical current** Electrical residual energy remains in lines, equipment and devices after shutting down the device.
	Only qualified electricians may perform work on the electrical supply system.
ATTENTION	Disconnect the unit from the power supply system if active parts of the unit can be accessed using tools. Access is only permitted by authorised personnel.
	Regularly check the electrical equipment of the unit. Regularly check all moving cables for damage within the scope of maintenance and repair work.
DANGER	**Dangers of fire and explosion** There is a risk of fire and explosions in the vicinity of the device. Smoking, exposed flames and fire are strictly prohibited in the vicinity of the unit. Do not store any flammable liquids within the hazardous area of the device. A fire extinguisher must be kept in the vicinity of the device.
WARNING	**Warning of electromagnetic radiation** Electromagnetic radiation develops when transmitting and receiving data. Arrange the antenna in such a position that it is not in the vicinity or make contact with the human body while transmitting. The device satisfies the standard EN50364:2010 (Human Exposure).

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5.5 Supplemental instructions

⮕ Read and understand all safety and operating instructions prior to installing and operating the device.

⮕ This documentation was written for specifically trained personnel. The installation, operation and error handling may only be carried out by specifically trained personnel.

⮕ Keep these instructions. Keep this documentation in a location that is accessible to all personnel involved with the installation, use, and error handling of the device.

⮕ Follow all warnings. Follow all warnings on and in the device and in the documentation.

⮕ Install the unit only in accordance with the manufacturer's instructions.

⮕ Use only the accessories and cables from the manufacturer.

⮕ Troubleshooting that is not described in the chapter ➔ service and troubleshooting may only be performed by the manufacturer.

⮕ When connecting cable connections, only pull on the plug and not on the cable.

⮕ Only use spare parts specified by the manufacturer.

The provisions of the accident-prevention regulations of the government safety organisations always apply to all work on the unit.

⮕ Applicable, legally binding accident prevention regulations.

⮕ Applicable binding regulations at the place of use

⮕ Technical standards for safety and professional work

⮕ Existing environmental protection regulations

⮕ Other applicable regulations

5.5.1 Regulations and certifications

The electrical design and documentation satisfy the DIN / VDE, EN / IEC regulations.

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6. Functional description

6.1 General information

HF reading devices are high frequency identification systems that use radio transmission to read or write data of HF transponders (13.56 MHz), which operate as tamper-proof electronic tags. The HF reading devices communicate with common transponders according to ISO15693 that are available on the market.
The data is transmitted via the existing interface with the preset transmission parameters. If several interfaces are available and connected to the host, the transmission is always carried out on the most recently used interface. The data is embedded in a defined communication protocol and exchanged between the reader and host.

6.2 Modes of operation

The HF WIP rack reader can be set in 2 different operating modes by setting the parameters: Normal mode and polling mode.

6.2.1 Normal operation

During normal operation, the HF reading device is immediately ready for operation after a reset. It does not perform any automatic actions in this mode (standby). During normal operation, actions are triggered by protocol commands from the host or by changes to the sensor state (placing or removing boxes).
In addition to the actions triggered by the host, a corresponding message can be automatically triggered to the host by activating or releasing a sensor (pod placed sensor) and an automatic reading operation is started (it can also be deactivated depending on the parameters). When the reading operation is successful, the data is automatically transmitted to the host. If several heads are occupied at the same time, the message and reading are performed consecutively.
The reading operation can also be initiated by a command of the host system using the communication protocol.
Writing commands (data stored to a transponder) are generally only possible via commands from the host.

6.2.2 Polling mode

HF reading devices can be set into a continuous reading state, which is referred to as polling mode. The device then performs reading operations at regular intervals and outputs the corresponding data of the read HF transponder.
The poll function can be activated by using the reader parameter 0x31 (polling frequency).
The activated antenna ports are defined with the polling port parameters (0x32ff).

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6.3 Illustration
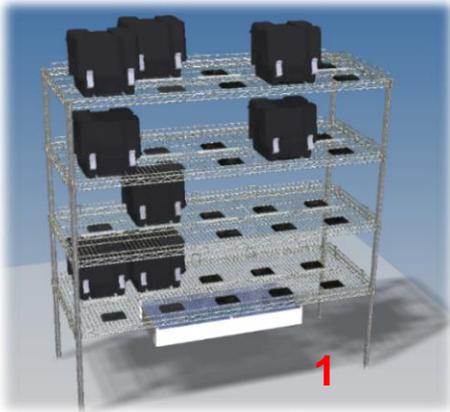
1. Reading unit
2. Antenna heads (32 = 4x8)
2.1 Antenna sensor
2.2 Antenna LED (multicoloured, green, red, yellow)

6.4 Description of the components

Component	Description
Reading unit	The reading unit is mounted on the bottom shelf. Separate antenna connections and IO connections are available in the reading unit for all shelves. The antenna heads are wired with an antenna line and an IO cable.
Antenna head	The antenna head is mounted flat on the mesh shelf. The boxes are set up on the antenna head and thus simultaneously serves as the side guide.
Antenna sensor	Each antenna head is equipped with a light sensor. It automatically detects the occupation of a shelf space during setup.
Antenna LEDs	The status LED on the antenna head is used as a feedback for reading actions. Different status messages are temporarily or permanently displayed.

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6.5 Technical data

Technical data	
Voltage	18 – 30 V DC
Current consumption	200mA@24V , max. 400mA
Fuse type Nano2	750 mA
Operating temperature	-0 to 50°C
Storage temperature	-25°C to 70°C
Permissible humidity at 50°C	25 – 80%
Transmission frequency	13.56MHz , ISO 15693
Transmission power	1.2 W
Output resistance	50 Ω
Ethernet interface	10/100 BaseT
Protocol	SECS / HSMS
Housing material	Stainless steel / PS (polystyrene)
Reader / antenna head dimensions	740 x 300 x 110 mm / 103 x 72 x 11.5 mm
Weight	Approx. 8 kg / approx. 60g

The device label with the CE label, article and serial number are located on the side of the reading unit.

6.5.1 Device labels
The device label is located on the reading unit housing.
It contains a CE mark, article/serial number and the MAC address.

1. Designation
2. Item number
3. Serial number
4. MAC address
5. Order number

```
WIP rack                    CE
P/N:        HRF.W.HFM.32B.HE.1W.XX
S/N:        1606HAG00001
MAC-Add:  00:04:A3:DA:A0:75
HKxxxxxx
HERMOS AG
```

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6.6 Number of the antenna heads

Each antenna head is individually connected to the reading device can be uniquely allocated to its corresponding position in the rack. The status of the LED or sensors can be read out via several antenna heads simultaneously. The readout/writing operation of transponders is always only possible on one head at the same time.

The individual antenna ports are distinguished in the protocol via the <TARGETID> element.

The sensor, LED and antenna of a reading head always have the same TargetID

1 to 32 with the standard module, 1 to 64 for maximum expansion.

The number order starts from the top left at the front down to the bottom right at the rear as displayed in the image below.

Example of the antenna numbers for a rack with 4 levels
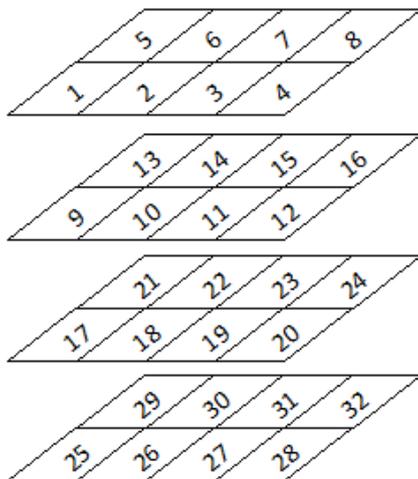
In case of different rack sizes, the number shifts according to the (gapless) counting method.

The LED of a head at the front can be linked to the function of a head at the rear, since the head at the rear cannot always be seen.
This display function can be activated in parameter 28 (ShowLEDMode).
The number (offset) of the places in the rack row is saved in parameter 29.

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6.7   EInk Display

An EInk display can optionally be connected to each antenna head. Power is supplied via the antenna head, there is no battery in the EInk display.
The display remains on when the power is disconnected or there is a power failure. The displays can be written with the SECS / HSMS message S3F69.
The displays are available in different versions. All standard variants have a size of 2.13 inches.
Different display sizes can be customized.

Variant 1:

2-colour: black, white
resolution: 250x128 pixel

The writing process takes approx. 2-3 seconds for the black and white display
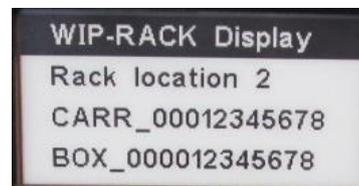
Variant 2:

3- colour: black, white, red
resolution: 212x104 pixel

The writing process takes approx. 5-7 seconds for the black and white text and 10 seconds for 3 colour text.

Variant 3:

3- colour: black, white, yellow
resolution: 212x104 pixel

The writing process takes approx. 10 seconds for the black and white text and 15 seconds for 3 colour text.

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7. Installation

Follow the basic safety instructions in the chapter Safety instructions.

7.1 Safety instructions

⚠	The unit is exclusively designed for indoor use in an industrial environment. The unit may only be installed indoors with a temperature and humidity level with in the range of the specified technical module parameters.
⚡	Never use the unit near or in water. Never pour liquids of any type over the unit. However, if the unit should still come in contact with liquid, disconnect it and have it checked by a technician.
🔥	Do not install the device near heat sources such as radiators, heat registers, stoves or other devices (including amplifiers) that generate heat. Do not install the unit in a flammable environment.
⚠	Never expose the device to extreme temperature fluctuations, since condensation otherwise develops inside the unit and causes damages.
⚡	Do not install the device in the vicinity of voltage lines or other power lines with which they could collide (for example, drilling), which could result in serious injuries or even death.
📡	The device (especially the antenna) should not be installed in the immediate vicinity of electrical equipment such as medical devices, monitors, telephones, TV sets and magnetic disks, and metal objects. This could result in reduced read and write ranges.
💥	Never use the unit in explosive areas (such as paint warehouses).
⚠	Do not use the device in areas where it is exposed to vibrations or shocks.
⚠	The installation location must be adequately illuminated during the installation.
⚡	Never install the unit during a lightning storm.
📡	Make sure that the installation meets the requirements of the FCC (country specific) for human exposure to radio frequencies.

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7.2 Unpacking

The HF module and the accessories can be packed customer-dependent in clean room conditions. In order to maintain this condition, the devices must be unpacked in clean room conditions.

	The packaging material consists of cardboard and foil. Dispose of these materials separately under the respective regulations of your country.

7.3 Power Supply

	There are risks if the device is supplied with the incorrect voltage. Only use cables, plugs and adapters from the manufacturer. Observe power ratings provided in the technical data.

7.4 Mounting the WIP rack

	The mounting surface must be stable, non-flammable, dry and clean. If necessary, clean it before you install the device. Only use components, cable and mounting materials provided by HERMOS. Only mount the components at the designated locations.

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7.5 Commissioning

The unit is connected to the customer network via a 10/100BaseT Ethernet interface.
The HERMOS "Device Discoverer" tool is available for configuring the network setting.
HERMOS components can be found in the LAN network and settings can be easily changed using the "Device Discoverer".
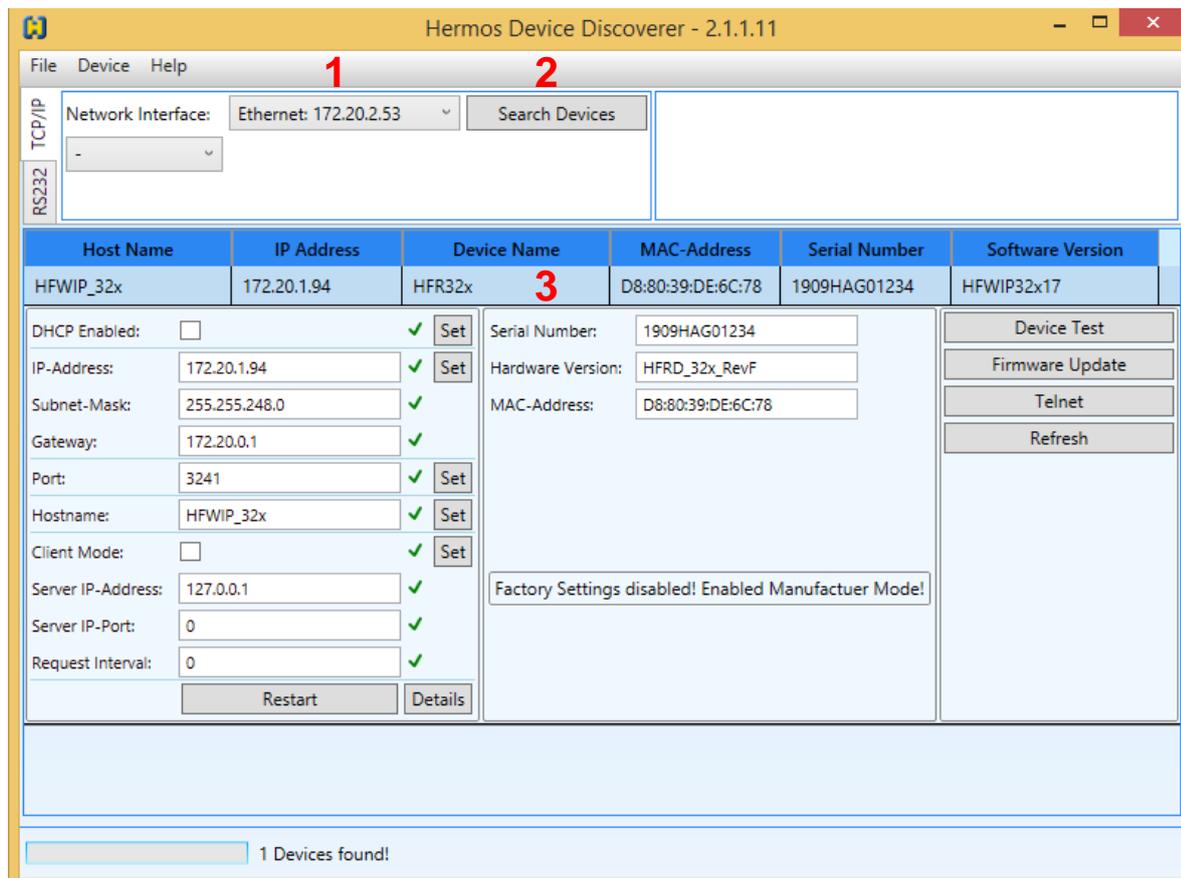
1. Select your network interface if you have several options on your PC.
2. Your network is automatically scanned for all HERMOS reading devices using the "Search Devices" button.
3. Select the desired reading device in the list to open the network settings.
   Here, you can edit the network settings and apply them to the reading device by pressing the respective button.

After parameters are changed, the reading device reboots and can be read in using "Search Devices".

CAUTION

Changing network settings generally cause the reading device to reboot.
This closes an existing HSMS host connection.

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7.6 Firmware update

Firmware updates can also be performed using the "Device Discoverer" HERMOS.
Start the tool with administrator rights and scan the network for all HERMOS devices.
To do this, mark the desired reading device and select "TCP/IP Firmware Download" or "RS232 Firmware Download" button depending on the your interface.
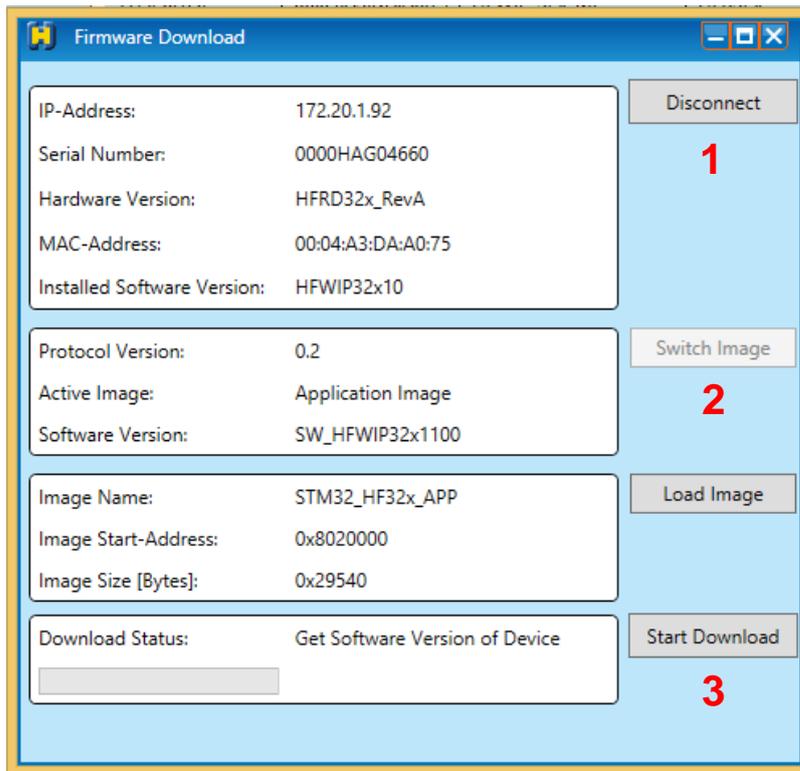
1. Open the download connection by pressing the connect button.
2. Select the new firmware file using the load image button.
3. Start the download process.
   Wait until the "Download Finished" message appears.
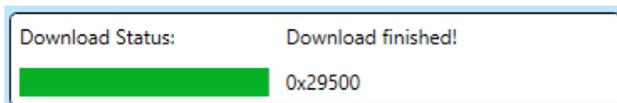
CAUTION

During the download process, do not disconnect the power supply or interrupt the network connection.

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8. Operation

8.1 Operating personnel

⚠️	The device should only be operated by specially trained personnel. If you have any doubts about the required qualifications, please contact the manufacturer. The operation of the device without special expertise can result in damages to the device or on connected devices.

8.2 Communications protocol

The reading device uses an Ethernet interface (10/100BaseT) with HSMS protocol.

The communication structure and process is defined by the SEMI Equipment Communications Standard E5 (SECS-II).

The meaning of the messages is provided in the ➜message details section in which the message content is defined.

8.3 Structure of a message

The message record describes the communication between a reading device with SECS-I and a host. The host and RFID reading device communicate via an Ethernet connection with HSMS protocol according to SEMI E37.

The reading device functions as a HSMS server. This means that it waits for a connection request from a HOST PC (client).

TCP/IP: IP address xxx.xxx.xxx.xxx Port 3241

If there is a connection request from a HOST, a HSMS connection is set up and the SECS II messages defined in the message record are transmitted from the reading device to the respective HOST and vice versa. The HSMS connection remains intact until it is specifically terminated by the host or the reading device.

All reading devices available in the network (LAN) can be operated from any HOST PC. A HSMS reading device, however, can no longer be connected to more than one HOST simultaneously.

The network settings can be changed using a configuration tool provided by HERMOS. Each change to the network settings causes the unit to reboot and thus disconnects existing communication connections.

The **device ID** is a unique number to establish the connection with the reading device.

On delivery, the **device ID** is set to **00 00**. The ID can of course be changed within the validity range.

Device ID MSB	R-Bit	0	0	0	0	0	0	0
Device ID LSB		0	0	0	0	0	0	0	0

Direction reading device to host   0x8000
Direction host to system (reading device) 0x0000

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For more detailed information about the structure and transmission procedure, see SEMI E4.
(SEMI Equipment Communication Standard 1 Message Transfer SECS-I)

8.4   Range of the host interface functions

The following functions can be used via commands by the host in the reading device or automatically transmitted from the reading device to the host:

- Are you there request   S1F1   (Host ➔ Reader)
- Request offline   S1F15   (Host ➔ Reader)
- Request online   S1F17   (Host ➔ Reader)
- Sensor found   S3F5   (Host ➔ Reader)
- Sensor lost   S3F7   (Host ➔ Reader)
- MID read   S3F13   (Host ➔ Reader)
- Display Data Write   S3F69   (Host ➔ Reader)
- Read parameter   S18F1   (Host ➔ Reader)
- Write parameter   S18F3   (Host ➔ Reader)
- Sensor triggered   S18F71   (Reader ➔Host)
- Automatic reading of UID and MID   S18F91   (Reader ➔Host)
- Sensor removed   S18F71   (Reader ➔Host)
- Query sensor state   S18F95   (Host ➔ Reader)
- Scan UID   S18F65   (Host ➔ Reader)
- Read MID   S18F9   (Host ➔ Reader)
- Read MID with UID (addressed)   S18F73   (Host ➔ Reader)
- Read data   S18F5   (Host ➔ Reader)
- Read data with UID (addressed)   S18F67   (Host ➔ Reader)
- Scan UID and read MID   S18F85   (Host ➔ Reader)
- Set LED (on / out / flash)   S18F77   (Host ➔ Reader)
- Query LED state   S18F79   (Host ➔ Reader)

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8.5 Message details

8.5.1 Stream 1 (system state)

S1F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action. The function 0 is defined in each stream and has the same meaning in each stream.

> S1F0   (header only, no additional elements)

S1F1: ARE YOU THERE REQUEST (reading device <-> host, reply)

Determines whether the reading device or the host is online.

> S1F1 W (header only, no additional elements)

S1F2: ON-LINE DATA (host -> reading device)

The host indicates that it is online.

```
S1F2
  <L[2]
     <A[6] MDLN >
     <A[6] SOFTREV >
  >
```

S1F2: ON-LINE (reading device -> host)

The reading device indicates that it is online.

```
S1F2
  <L[2]
     <A[6] MDLN >
     <A[6] SOFTREV >

  >
```

S1F15: REQUEST OFF_LINE (host -> reading device, reply)

The reading device contains a request to change the communication state to "offline".

The reading device can only be set to "online" again using the message S1F17 (or reset S2F19); all other messages are cancelled by message SxF0.

> S1F15 W (header only, no additional elements)

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S1F16: OFFLINE ACKNOWLEDGE (reading device -> host)

Acknowledgement

S1F16
<B[1] OFLACK>.

S1F17: REQUEST ON_LINE (host -> reading device, reply)

The reading device contains a request to change the communication state to "online".

S1F17 W (header only, no additional elements)

S1F18: ONLINE ACKNOWLEDGE (reading device -> host)

Acknowledgement

S1F18
<B[1] ONLACK>.

8.5.2 Stream 2 (system control)

S2F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action.

S2F0 (header only, no additional elements)

S2F13: EQUIPMENT CONSTANT REQUEST (host -> reading device, reply)

The host requests an attribute (parameter) from the reading device.

S2F13 W
<L[1]
<U1[1] ECID>
>

S2F14: EQUIPMENT CONSTANT DATA (reading device -> host)

The reading device transmits the requested attribute (parameter) to the host.

S2F14
<L[1]
<U1[1] ECV>
>

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S2F15: NEW EQUIPMENT CONSTANT SENT (host -> reading device, reply)

The host changes a reading device attribute (parameter).

```
S2F15 W
      <L[1]
       <L[2]
          <U1[1] ECID>
          <U1[1] ECV>
       >
    >
```

S2F16: NEW EQUIPMENT CONSTANT ACKNOWLEDGE (reading device -> host)

The reading device acknowledges the reading device parameter setting.

```
S2F16
      <B[1] EAC>
```

S2F19: RESET SENT (host -> reading device, reply)

The host transmits a request to the reading device to reset the hardware and software.

If a heartbeat time is set, the reading device transmits a S1F1 message once the reset operation is complete.

A power-up reset takes a few seconds.

```
S2F19 W
      <B[1] RIC>
```

S2F20: RESET ACKNOWLEDGE (reading device -> host)

The reading device acknowledges the reset.

This message is only displayed if a software reset (RIC=2) has been triggered.

```
S2F20
      <B[1] RAC>
```

8.5.3 Stream 3 (material-status)

S3F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action.

```
S3F0  (header only, no additional elements)
```

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S3F5: material found (MID FOUND) (reading device -> host, reply)

The reader sends the information that material was detected at the input sensor.

This message is only sent if a sensor is connected and activated.
(par. 26 sensor function / watchport)

```
S3F5 W
<L[2]
  <B[1] MF >
  <B[1] PTN >
>
```

S3F6: Material found acknowledge (MID FOUND, ACK) (host -> reading device)

The host confirms the material found message.

```
S3F6
<B[1] ACKC3 >
```

S3F7: material lost (MID LOST) (reading device -> host, reply)

The reader sends the information that material was lost at the input sensor.

This message is only sent if a sensor is connected and activated.
(par. 26 sensor function / watchport)

The PAGEDATA werden nur angegeben, wenn die letzte Lesung erfolgreich war.

```
S3F7 W
<L[3]
  <B[1] MF >
  <B[1] PTN >
  <B[1] PAGEDATA >
>
```

S3F8: material lost acknowledge (MID LOST, ACK) (host -> reading device)

The host confirms the material lost message.

```
S3F8
<B[1] ACKC3 >
```

S3F13: MID read (MID READ) (reading device -> host, reply)

The reader sends the information that material was read.

```
S3F13 W
<L[2]
  <B[1] PTN >
  <B[1] PAGEDATA >
>
```

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S3F14: Material read acknowledge (MID READ, ACK) (host -> reading device)

The host confirms the MID read message.

```
S3F14
  <B[1] MIDAC >
```

S3F69: Display data write (DISPLAY WRITE) (host -> reading device, reply)

The host writes display data on the addressed antenna port.

```
S3F69 W
 <L[6]
   <B   PTN >
   <U1  COLUMN >
   <U1  LINE >
   <U1  CMD>
   <U1  DSPARG>
   <A   DSPDATA >
   <U1  FONT> *
 >
```

	The specification of the data element FONT is optional.

S3F70: Display data write acknowledge (DISPLAY WRITE, ACK) (reading device -> host)

The reading device confirms the display data write message.

```
S3F70
  <B    ACKC3 >
```

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Write data to display 1 (line 0-3) black, white:
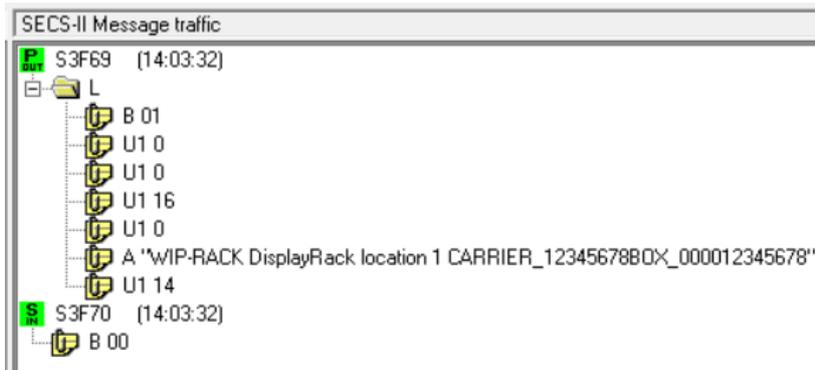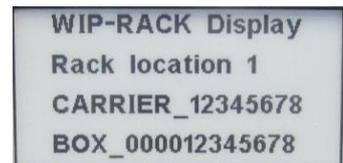
Display:

Write data to display 1 with headline (line 0-3) black, white:
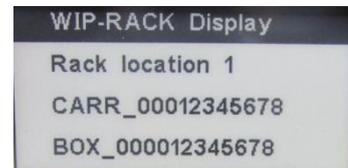
Display:

Write data to display 2 with headline (Zeile 0-3) red, white:

Display:

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Write data to display 2 startpixel (column 25, line 45) red, white:

Display:

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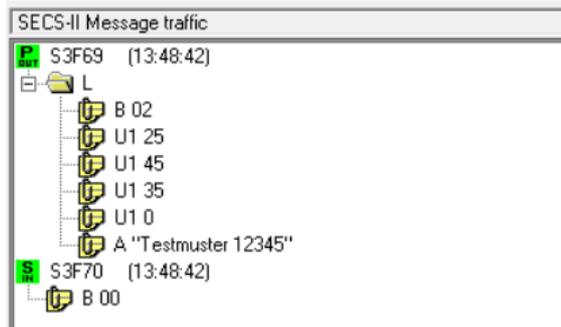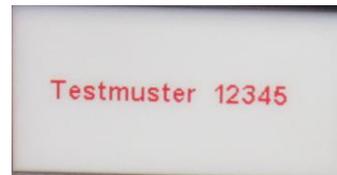
8.5.4 Stream 9 (system error)

S9F1: UNRECOGNISED DEVICE ID (reading device -> host)

The device ID in the header of the message block does not correspond to the expected device ID.

> S9F1
> <B[10] MHEAD >

S9F3: UNRECOGNISED STREAM TYPE (reading device -> host)

The reading device does not recognise the stream type in the header of the message block.

> S9F3
> < B[10] MHEAD >

S9F5: UNRECOGNISED FUNCTION TYPE (reading device -> host)

The reading device does not recognise the function number in the header of the message block.

> S9F5
> < B[10] MHEAD >

S9F7: ILLEGAL DATA (reading device -> host)

The reading device does not recognise the data in the message.

> S9F7
> < B[10] MHEAD >

S9F9: TRANSACTION TIMER TIMEOUT (reading device -> host)

This message indicates a timeout of a transmission timer and the cancellation of the corresponding transaction. Only the most recently transmitted message (that must be acknowledged by the host) is saved and its acknowledgement is monitored by time.

> S9F9
> < B[10] SHEAD >

8.5.5 Stream 18 (control and data transfer)

S18F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action.

> S18F0   (header only, no additional elements)

S18F1: READ ATTRIBUTE REQUEST (RAR) (host -> reading device, reply)

This message requests the current values of the parameters or states.

The value of the TARGETID is irrelevant with this message (01 to 32).

Up to 10 attributes can be queried with a message.

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```
S18F1 W
  <L,2
    <TARGETID>
      < Ln
          <ATTRID1>
          …
          <ATTRIDn>
      >
    >
  >
```
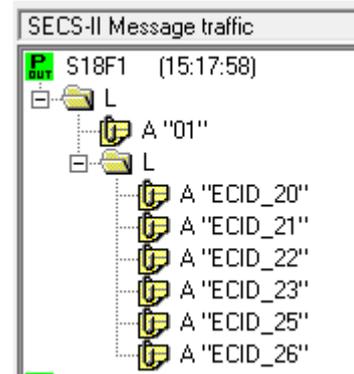

S18F2: READ ATTRIBUTE DATA (RAD) (reading device -> host)

This message requests the current values of the requested parameters or states.

The value of the TARGETID is irrelevant with this message (01 to 32).

```
S18F2
  <L,4
    <TARGETID>
    <SSACK>
    < L,n
        <ATTRVAL1>
        …
        <ATTRVALn>
    >
    < L,1
        <STATUSLIST>
    >
  >
```
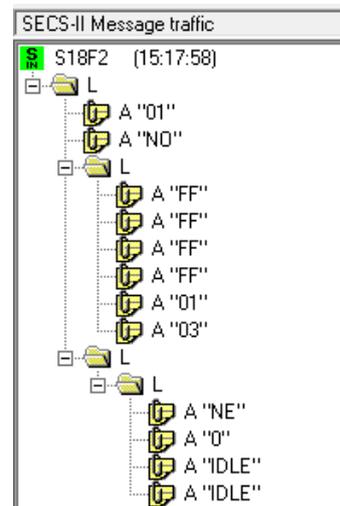

If the ATTRID of the S18F1 message is not known, the corresponding element ATTRVAL receives the value <nothing>.

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S18F3: WRITE ATTRIBUTE REQUEST (WAR) (host -> reading device, reply)

The message transmits a request to the reading device to set (overwrite) the value of the transferred parameters.

The value of the TARGETID is irrelevant with this message (01 to 32).

Up to 10 attributes can be set with a message.

```
S18F3 ,W
<L,2
    <TARGETID>
    <L,n
        <L,2
            1 <ATTRID1>
            2 <ATTRVAL1>
        >
        <L,2
            1 <ATTRIDn>
            2 <ATTRVALn>
        >
    >
>
```
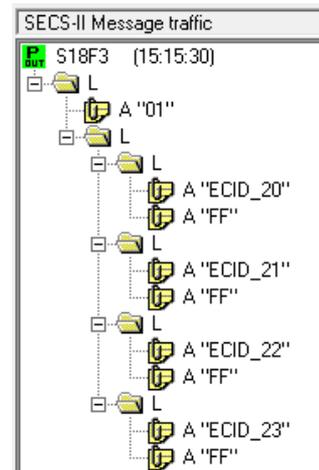

S18F4: WRITE ATTRIBUTE ACKNOWLEDGE (WAA) (reading device ->host)

This message acknowledges that the request for writing the parameter values successfully or reports an error.

The value of the TARGETID is irrelevant with this message (01 to 32).

```
S18F4
 <L,3
    <TARGETID>
    <SSACK>
    <STATUSLIST>
    >
 >
```
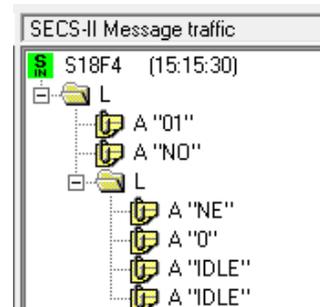

If the ATTRID of the S18F3 message is not known, a communication error (CE) occurs.

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S18F5: READ REQUEST (RR) (host -> reading device, reply)

This message is used for requesting the antenna head specified in the TARGETID for reading data (from the data area). DATASEG defines the start address of the data to be read. DATALENGTH defines the data volume of the data to be read.

S18F5 W

    <L,3
        <TARGETID>
        <DATASEG>
        <DATALENGTH>

    >
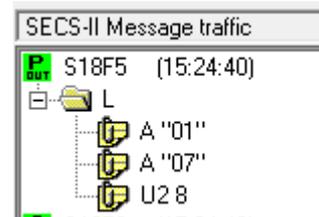
If both the DATASEG as well as the DATALENGTH are missing (elements with zero length), all pages of the data area are queried. If only the DATALENGTH is missing, all data on the specified start address is queried.

If the TARGETID is not known, a communication error (CE) occurs.

S18F6: READ DATA (RD) (reading device -> host)

This message is used to return the requested information of the antenna head specified in the TARGETID or acknowledge the result of the request.

S18F6
  <L,3
    <TARGETID>
    <SSACK>
    <DATA>

   >
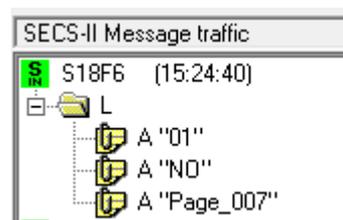
S18F9: READ ID REQUEST (RIR) (host -> reading device, reply)

This message is used for requesting the antenna head specified in the TARGETID for reading the MID.

S18F9,W

    <TARGETID>

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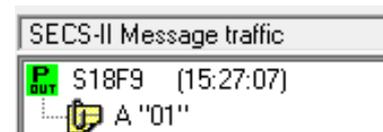
S18F10: READ ID DATA (RID) (reading device -> host)

This message returns a requested MID from the antenna head specified in the TARGETID.

```
S18F10
  <L,4
      <TARGETID>
      <SSACK>
      <MID>
      < L,1
          <STATUSLIST>
      >

  >
```

The reading device can be in maintenance mode (MT) or
operating mode (OP) to read the MID with the message S18F9.
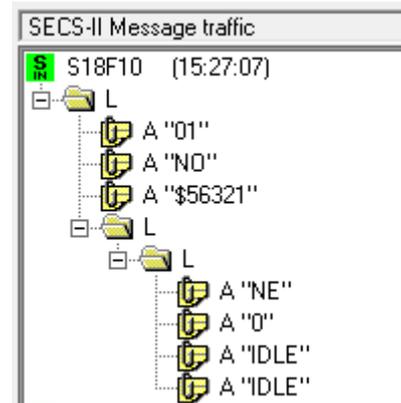
S18F65: SCAN TRANSPONDER REQUEST (STR) (Host -> reading device, answer)

This message is used for requesting the antenna head specified in the TARGETID for executing a scan process.

```
S18F65 W
      <TARGETID>
```
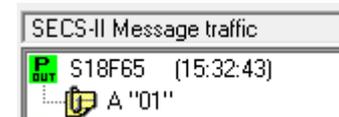
S18F66: SCAN TRANSPONDER ACKNOWLEDGE (STA) (Reading device ->host)

This message reports the scan result of the antenna head specified in the TARGETID.

```
S18F66
      <L,3
        <TARGETID>
        <SSACK>
        <L,n
                <UID1>
                …
                <UIDn>
        >

      >
```
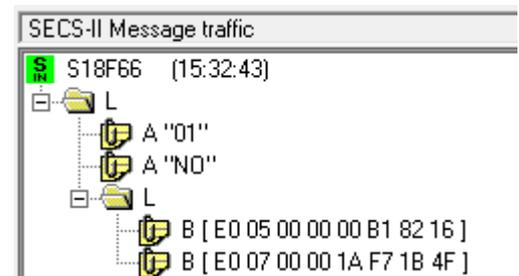
The process returns a UID list with all ISO transponders found in the reading ranges.

If no transponder was detected, the reading device transmits an empty list with <SSACK> NO (normal operation). If the TARGETID is not known, a communication error (CE) occurs.

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S18F67: READ REQUEST UID (RRU) (host -> reading device, reply)

This message is used for requesting the antenna head specified in the TARGETID for precisely reading data (from the data area) from the transponder and its UID is transferred into the <UID> segment. DATASEG defines the start address of the data to be read. DATALENGTH defines the data volume of the data to be read.

```
S18F67 W
        <L,4
                <TARGETID>
                <UID>
                <DATASEG>
                <DATALENGTH>

        >
```


SECS-II Message traffic
S18F67   (15:34:35)
L
  A "01"
  B [E0 05 00 00 00 B1 82 16]
  A "07"
  U2 8
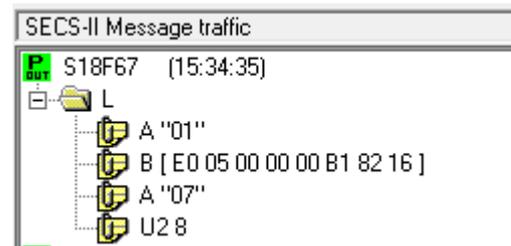
If both DATASEG and DATALENGTH are missing (elements with zero length), up to 200 bytes of the data area are queried. If only the DATALENGTH is missing, all data within the specified section is queried.

S18F68: READ DATA UID (RDU) (reading device -> host)

This message is used to return the requested information of the antenna head specified in the TARGETID or acknowledge the result of the request.

```
S18F68
        <L,3
                <TARGETID>
                <SSACK>
                <DATA>

        >
```
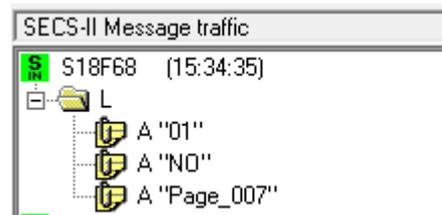

SECS-II Message traffic
S18F68   (15:34:35)
L
  A "01"
  A "NO"
  A "Page_007"

If the TARGETID is not known, a communication error (CE) occurs.

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S18F71: SENSOR STATUS (SS) (reading device -> host)

This message indicates the status change of one of the reading device's sensors. The TargetID corresponding to the number of the sensor (antenna head).

ON - the sensor is covered, OFF - the sensor is not covered.

```
S18F71
        <L,2
            <TARGETID>
            <SSTATUS>

        >
```
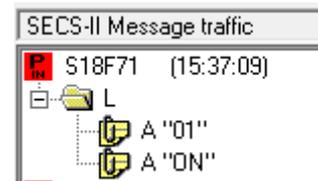

S18F72: SENSOR STATUS ACKNOWLEDGE (SSA) (host -> reading device)

The host acknowledges all incoming S18F71 messages.

```
S18F72
        <L,2
            <TARGETID>

            <SSACK>

        >
```
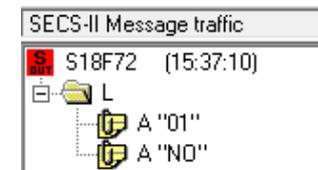

S18F73: READ ID REQUEST UID (RIRU) (host -> reading device)

This message is used for requesting the antenna head specified in the TARGETID for precisely reading the MID from the transponder and its UID is transferred into the <UID> segment.

```
S18F73,W
        <L,2
            <TARGETID>
            <UID>


        >
```

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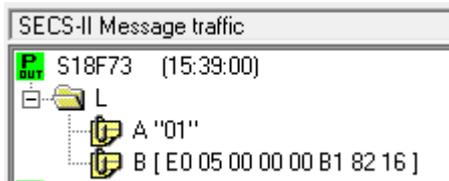
S18F74: READ ID DATA (RID) (reading device -> host)

This message returns the requested MID of the transponder.

```
S18F74
    <L,4
        <TARGETID>
        <SSACK>
        <MID>
        < L,1
            <STATUSLIST>
        >
    >
```

The reading device can be in maintenance mode or operating mode to read the MID with the message S18F73.
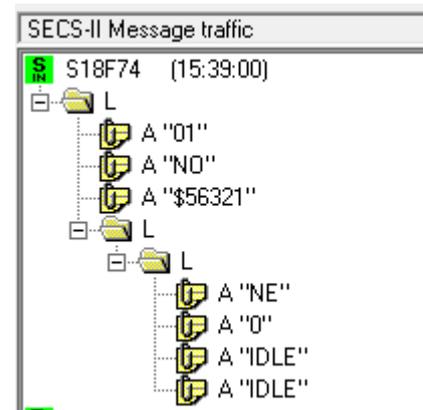
S18F77: SET OUTPUT STATUS (SOS) (host -> reading device)

This message determines the status of the output of the antenna head specified in the TARGETID.

```
S18F77
    <L,2
        <TARGETID>
        <L,1
            <L,3
                <OUTPUT>
                <STATUS>
                <TIMEOUT>*
            >
        >
    >
```
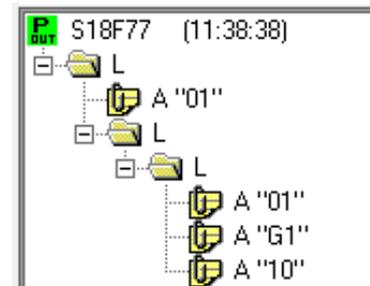
*Timeout optional:
If no timeout (empty field or no data element) or the value 00 is set, the LED remains continuously switched on.

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S18F78: SET OUTPUT STATUS ACKNOWLEDGE (SOSA) (reading device -> host)

This message acknowledges the process for setting the status of the output of the antenna head specified in the TARGETID.

```
S18F78
 <L,3
      <TARGETID>
      <SSACK>
      <STATUSLIST>

    >
```
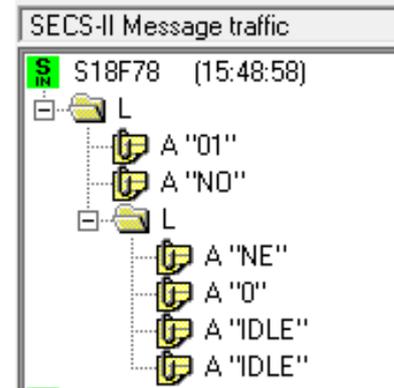

S18F79: GET OUTPUT STATUS (GOS) (reading device -> host)

This message queries the status of the output of the antenna head specified in the TARGETID.

```
S18F79
      <TARGETID>
```

S18F80: OUTPUT STATUS (GOSA) (reading device -> host)

This message delivers the status of the output (LED) of the antenna head specified in the TARGETID.

```
S18F80
 <L,4
      <TARGETID>
      <SSACK>
      <L,1
          <STATUS>

      >
      <STATUSLIST>

    >
```
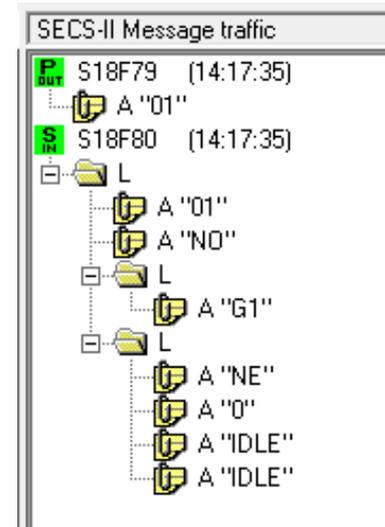

(!)	TARGETID 0 queries all outputs simultaneously. Depending on the hardware variant, a list with 16, 32 or 40 STATUS elements is sent.

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S18F85: SCAN UID AND READ ID REQUEST (STR) (host -> reading device, answer)

This message is used for requesting the antenna head specified in the TARGETID to execute a scan procedure for reading the respective corresponding MID.

```
S18F85 W
      <TARGETID>
```
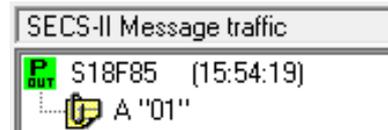

S18F86: SCAN UID AND READ ID ACKNOWLEDGE (STA) (reading device ->host)

This message reports the result of the antenna head specified in the TARGETID to the previous read request.

This procedure transmits a UID and MID list of all ISO transponders that were found in the reading range. If the MID cannot be read, it is transferred as an empty field with the UID. The list is limited to 4 transponders. If more transponders are within the antenna field, only the first 4 transponders are displayed.

```
S18F86
      <L,3
          <TARGETID>
          <SSACK>
          <L,n (max. 4)
              <L,2
                  <UID1>
                  <MID1>
              >
              <L,2
                  <UIDs>
                  <MIDs>
              >
          >
      >
```

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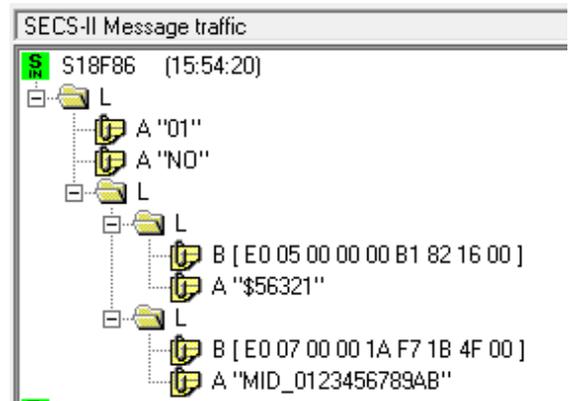
S18F91: AUTO READ SEND (ARS) (reading device ->host)

This message reports the result of the reading operation of the antenna head specified in the TARGETID triggered by the sensor.

This procedure transmits a UID and MID list of all ISO transponders that were found in the reading range. If the MID cannot be read, it is transferred as an empty field with the UID. The list is limited to 4 transponders. If more transponders are within the antenna field, only the first 4 transponders are displayed.

```
S18F91
        <L,3
            <TARGETID>
            <SSACK>
            <L,n (. 4)
                <L,2
                    <UID1>
                    <MID1>
                >
                <L,2
                    <UIDs>
                    <MIDs>
                >
            >
        >
```

SECS-II Message traffic

S18F91   (16:00:47)
L
  A "01"
  A "NO"
  L
    L
      B [E0 05 00 00 00 B1 82 16 00]
      A "$56321"
    L
      B [E0 07 00 00 1A F7 1B 4F 00]
      A "MID_0123456789AB"
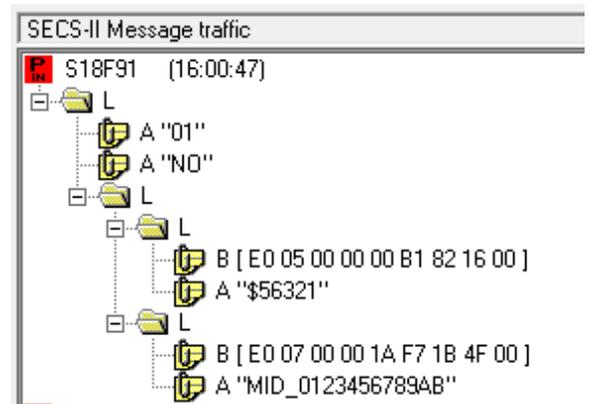
S18F92 AUTO READ SEND ACKNOWLEDGE (ARSA) (host -> reading device)

The host acknowledges all incoming S18F91 messages.

```
S18F92
        <L,2
            <TARGETID>
            <SSACK>
        >
```

SECS-II Message traffic

S18F92   (16:00:47)
  A "01"
  A "NO"

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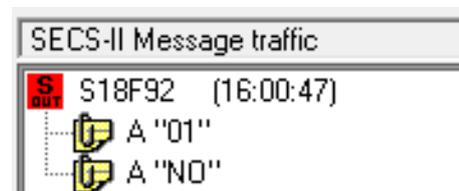
S18F95: GET INPUT STATUS (GIS) (host -> reading device, reply)

This message queries the status of the inputs of the antenna specified in the TARGETID to receive the status of the input (sensor).

```
S18F95 W
        <TARGETID>
```

S18F96: GET INPUT STATUS Response (GISR) (reading device -> host)

This message delivers the status of the input of the antenna addressed in the TARGETID.
TARGETID "00" delivers a status list with all inputs. (16, 32 or 40 inputs and 4 DIP switches)

```
S18F96
    L,4
        1 <TARGETID>
        2 <SSACK>
        3 L,1
              <SSTATUS>


S18F96
    L,3
        1. <TARGETID>
        2. <SSACK>
        3. L,36
            1. <STATUS_INPUT1>
            2. <STATUS_INPUT2>
            3. <STATUS_INPUT3>
                . . .
            30. <STATUS_INPUT30>
            31. <STATUS_INPUT31>
            32. <STATUS_INPUT32>
            33. <STATUS_DIP1>
            34. <STATUS_DIP2>
            35. <STATUS_DIP3>
            36. <STATUS_DIP4>
```
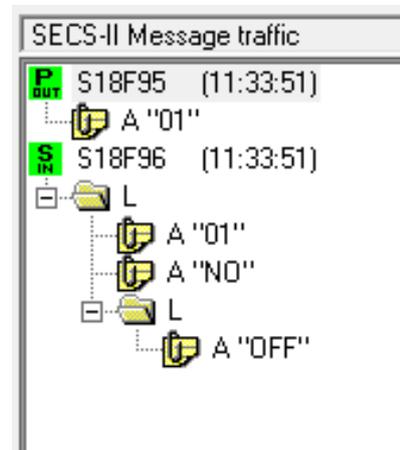

!	The number of inputs depends on the used hardware variant. Hardware variants with 16, 32 and 40 antenna heads / inputs are available.

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8.5.6 Data element directory

The data elements that are used by default in SECS II messages, which are described in the message details section, are defined in this section.

ALARM STATE	**Format: A[1]**

The value of the alarm state refers to the last reading procedure. The alarm state is activated for a reading or writing error. A successful reading or writing operation deactivates the alarm state. The alarm state is also deactivated when exiting the maintenance mode.

    0   …   No alarm
    1   …   Alarm

    Where used   STATUS

ATTRID	**Format: A[max25]**

Designation for an attribute for a special object type.

CIDRW attribute definitions:

"SoftwareRevisionLevel" Change (version) of the software - maximum 8 bytes
"CarrierIDOffset"   Offset of the CID in the CID field (MID area)
"CarrierIDLength"   Length of the CID in the CID field (MID area)

"ECID_00" → Parameter 0 - ➔ Gateway ID
"ECID_01" → Parameter 1 - ➔ Baud rate
"ECID_02" → Parameter 2 - ➔ Inter-character timeout T1
"ECID_03" → Parameter 3 - ➔ Block protocol timeout T2
"ECID_04" → Parameter 4 - ➔ Reply timeout T3
"ECID_05" → Parameter 5 - ➔ Inter-block timeout T4
"ECID_06" → Parameter 6 - ➔ Retry limit RTY
"ECID_07" → Parameter 7 - ➔ TARGETID high byte
"ECID_08" → Parameter 8 - ➔ TARGETID low byte
"ECID_09" → Parameter 9 - ➔ Heartbeat time
"ECID_11" → Parameter 11 - ➔ ReaderID
"ECID_12" → Parameter 12 - ➔ Acknowledgement error message
"ECID_16" → Parameter 16 - ➔ Antenna power level (read only)
"ECID_18" → Parameter 18 - ➔ DIP switch activity
"ECID_19" → Parameter 19 - ➔ DIP switch status
"ECID_20" → Parameter 20 - ➔ Sensor activity 1 (Sensor 1 - 8)
"ECID_21" → Parameter 21 - ➔ Sensor activity 2 (Sensor 9 -16)
"ECID_22" → Parameter 22 - ➔ Sensor activity 3 (Sensor 17-24)
"ECID_23" → Parameter 23 - ➔ Sensor activity 4 (Sensor 25-32)

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"ECID_24" → Parameter 24 - ➔ Sensor activity 5 (Sensor 33-40)
"ECID_25" → Parameter 25 - ➔ Sensor delay time (Sensor 1-40)
"ECID_26" → Parameter 26 - ➔ Sensor Watchport
"ECID_27" → Parameter 27 - ➔ Show LED AutoRead
"ECID_28" → Parameter 28 - ➔ Show LED mode
"ECID_29" → Parameter 29 - ➔ Show LED offset
"ECID_32" → Parameter 32 - ➔ Transponder type
"ECID_33" → Parameter 33 - ➔ Manufacturer type
"ECID_34" → Parameter 34 - ➔ Byte order
"ECID_37" → Parameter 37 - ➔ MID area
"ECID_42" → Parameter 42 - ➔ CarrierIDOffset
"ECID_43" → Parameter 43 - ➔ CarrierIDLength
"ECID_44" → Parameter 44 - ➔ FixedMID
"ECID_48" → Parameter 48 - ➔ Polling Time
"ECID_49" → Parameter 49 - ➔ Polling Frequenz
"ECID_50" → Parameter 50 - ➔ Polling Port 1 - 8
"ECID_51" → Parameter 51 - ➔ Polling Port 9 - 16
"ECID_52" → Parameter 52 - ➔ Polling Port 17- 24
"ECID_53" → Parameter 53 - ➔ Polling Port 25- 32
"ECID_54" → Parameter 54 - ➔ Polling Port 33- 40
"ECID_55" → Parameter 55 - ➔ Polling Delay
"ECID_97" → Parameter 97 - ➔ SSACK
"ECID_98" → Parameter 98 - ➔ Protocol
"ECID_99" → Parameter 99 - ➔ Customer mode
"ECID100" → Parameter 100 - ➔ Customer parameter set
"ECID123" → Parameter 123 - ➔ Fine version (read only)
"ECID132" → Parameter 132 - ➔ Software revision (read only)
"ECID140" → Parameter 140 - ➔ Serial number (read only)
"ECID141" → Parameter 141 - ➔ Hardware version (read only)

ATTRVAL	**Format: A[max4]**

Value of the specified attribute.

CIDRW attribute definitions:

"Configuration"   Number of the heads "01"

"AlarmStatus"   Current CIDRW substate of the ALARM
                        STATE
                          "0" …NO
                          "1" …ALARMS

"OperationalStatus"   Current CIDRW substate of IN OPERATION
                        "IDLE"   ...   Device in IDLE mode

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"BUSY" ...	Reading is busy
"MANT" ...	Maintenance mode

"SoftwareRevisionLevel"	Revision (version) of the software - maximum 8 bytes

Head attribute definitions:

"HeadStatus" Current state

"IDLE" ... Device in IDLE mode
"BUSY" ... Reading device is busy
"NOOP" ... Not operating

"HeadID"   Antenna port number 01 (2 digits)
"01" ... Antenna 1

CMD	Format: U1

Command code for a display data write message.

Command		Display Data
Code	function	
0x00	update display (display memory)	
0x01	clear display + update (white)	-
0x02	clear display + update (black)	-
0x03	clear display with headline + update (red, yellow or black)	-
0x04	clear display with headline + update (white)	-
0x05	clear display without update (white)	-
0x06	clear display without update (black)	-
0x10	write display (black/white) max. 4 lines with 16/20 character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x11	write display (ws/sw) max. 4 lines with 16/20 character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x12	write display (sw/rot sw/gelb) max. 4 lines with xx character xx … siehe Schriftgröße	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x13	write display (rot/ws gelb/ws) max. 4 Zeilen mit xx Zeichen	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x14	write display with headline headline (white/black), text (b/w) max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x15	write display with headline headline (black/white), text (w/b) max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)

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0x16	write display with headline headline (red/black), text (b/r) max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x17	write display with headline headline (black/red), text (r/b) max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x20	clear display and write data to display (black/white) with update Startpixel Zeile und Spalte max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x21	clear display and write data to display (white/black) with update Startpixel Zeile und Spalte max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x22	clear display and write data to display (black/red black/yellow) without update startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x23	clear display and write data to display (red/white yellow/whites) without update startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x30	write display (black/white) without previous clear of the display and update startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x31	write display (white/black) without previous clear of the display and update startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x32	write display (black/white) without previous clear of the display and no update startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x33	write display (white/black) without previous clear of the display and noupdate startpixel line and column max. 4 lines with xx character	1 … 64/80 (ASCII) data length depends on fontsize (data element FONT)
0x80	negate display white pixel <-> black pixel	-
0x81	display colour (red/yellow) black pixel -> red, yellow	-

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0x82	display colour (red/yellow, negate) white pixel -> red, yellow	-
0x83	clear display colour coloured pixel -> white	-

COLUMN   **Format: U1**

Column definiert die Spalte (X-Position) des Cursors. Position 0 ist links.
Ab dieser Position wird der Display-Text geschrieben. Die Anzahl der Spalten hängt vom verwendeten Display-Typ ab. Je nach verwendetem Displaykommando wird der Line Wert ignoriert oder als Pixelwert interpretiert. (siehe Datenelement CMD)
Gültiger Bereich:
    do not care   CMD 0x10 - 0x17
    Pixel   0 - 249   2-farbige EInk-Displays schwarz, weiß
    Pixel   0 - 211   3-farbige EInk-Displays schwarz, weiß, rot/gelb

Wird über den gültigen Bereich hinaus (rechts) geschrieben, so werden diese Zeichen ignoriert.

CPVAL   **Format: A[max2]**

State query value
"OP" ... Operating state
"MT" ... Maintenance state

DATA   **Format: A[max200]**

A vector or string consisting of unformatted data.
Depends on the length of the MID area.

DATALENGTH   **Format: U2**

Total number of bytes to be sent.
The DATALENGTH corresponds to the number of bytes to be read or written
.

DATASEG   **Format: A[2]**

Is used for identifying the requested data.
The DATASEG corresponds to the page number (PAGEID) of the ISO 15693 transponder.
"00" first page of each transponder or first page of the data area.

DISPARG   **Format: U1**

Data element for a display write action.
The data element defines a period of time in which the data are shown on the display.

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This value is ignored in the current hardware version with EInk displays.

DSPDATA	**Format: A[max64]**

The element DSPDATA defines the ASCII-characters to be written on the display.

EAC	**Format: B[1]**

Acknowledgement code for a new reading device attribute

0 ... Parameter successfully set

1 ... Parameter was not set

ECID	**Format: U1**

Parameter number of the reading device (see ECV data element)

ECV	**Format: U1**

Definition of the reading device parameters.

The values are displayed as decimal values, see ➜ Parameters.

FONT	**Format: U1**

Definition of the font size of the display text to be written.

Available fonts are Arial 6 pt, 8 pt, 10 pt, 12pt, 14pt, 20pt, 24pt, 28pt, 40pt, 48pt

The automatic line break is carried out after 6 to 20 characters depending on the font size used.

Font: 6 pt, 8 pt, 10 pt   new line after 20 Zeichen, next line 30 pt.
12 pt, 14 pt   new line after 16 Zeichen, next line 30 pt.
20 pt   new line after 14 Zeichen, next line 30 pt.
24 pt   new line after 12 Zeichen, next line 30 pt.
28 pt   new line after 10 Zeichen, next line 36 pt.
40 pt   new line after 8 Zeichen, next line 50 pt.
48 pt   new line after 6 Zeichen, next line 60 pt.

If an undefined font size is specified or the data element is not specified, the font size 12 pt. is automatically used.

LINE	**Format: U1**

The data element LINE defines the line (Y position) of the cursor. Position 0 is up.

The display text is written from this position. The number of lines depends on the type of display used.

Depending on the display command used, the line value is interpreted as line 0-3 or as a pixel value.

(data element CMD)

Valid range:

CMD 0x10 - 0x17:   line 0 - 3

CMD > 0x20:   pixel 0 - 121   2-colour EInk-displays black/white
     pixel 0 - 103   3-colour EInk-displays black/white, red/yellow

If writing goes beyond the valid range (below), these characters are ignored.

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MDLN	Format: A[6]

System model number (hardware version)

MHEAD	Format: B[10]

Header of the SECS message block associated with the faulty message block.

MID	Format: A

Material ID, predefined area on the transponder where the unique code of the cassette / box is saved.

Depending on the transponder type, the length of the MID can be changed.

The MID length can set from "0" (no MID) up to "10" (MID occupies the first ten pages).

OFLACK	Format: B[1]

Acknowledgement code for an OFFLINE request.

0 OFFLINE acknowledgement (reading device is offline)

ONLACK	Format: B[1]

Acknowledgement code for an ONLINE request.

0 ONLINE assumed (reading device is online)

OUTPUT	Format: A[2]

Number of the output (LED) at the antenna head, always 01 in this hardware version (02 not available here).

"01" ... Output 1 ➔ integrated LED

PM information	Format: A[2]

Information about the operating mode

"NE" … Normal execution

"MR" … "Maintenance mode" required

Where used STATUS

PTN	Format: B[1]

The port number corresponds to the index of the addressed antenna port.

The antenna ports are defined from 1 to 40 depending on the hardware variant.

RAC	Format: B[1]

Acknowledgement code reset

0 … Reset was performed

1 … Reset was not performed

RIC	Format: B[1]

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1 … Power-up reset

2 … Software reset (without resetting the Ethernet components)

3 … Power-up reset RFID module

4 … Software reset RFID module

SHEAD	**Format: B[10]**

Header of the saved SECS message block. Only the last message is saved. It must be acknowledged by the host.

SOFTREV	**Format: A[max 6]**

Software version

SSACK	**Format: A[2]**

Description: Result information about the state of the request with regard to the service request.

"NO"   Normal operation

Indicates the success of the queried procedure.

"EE"   Execution error

Transponder data could not be read. MID sequence cannot be read, since non-exclusively valid ASCII characters were found in the defined MID area. The state of the systems, however, is normal.

"CE"   Communication error

Syntax error in the message, message format or value.

"HE"   Hardware error

Error in the header of the ID reading device/writer, header of the ID reading device/writer is deactivated.

"TE"   Transponder error, reading / writing operation not successful

"NT"   No transponder recognised in the antenna area. (No tag)

SSCMD	**Format: A[max 18]**

Description: Indicates a procedure to be executed by the subsystem.

Is used to distinguish between the different subsystem commands displayed.

"ChangeStatus"   … Change status

"GetStatus"   … Query status

"Reset"   … Reset CIDRW

"PerformDiagnostics"   … Diagnostics are performed.

SSTATUS	**Format: A[max 3]**

Provides information about the sensor state of a specific head.

"ON"   ... Sensor is covered

"OFF"   ... Sensor is not covered

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STATUS   **Format: A[max 32]**

State of the external output (multicolour LED) of an antenna head.

Display	Neutral *	Green	Yellow	Red
LED off	"OFF", "00"	"G0"	"Y0"	"R0"
LED on	"ON", "01"	"G1"	"Y1"	"R1"
LED flashes	"FLASH", "02"	"G2"	"Y2"	"R2
LED unchanged	"KEEP", "03"	"G3"	"Y3"	"R3"
LED flashes quickly	"FAST", "04"	"G4"	"Y4"	"R4"
LED pulses	"PULSE", "05"	"G5"	"Y5"	"R5"

* 2 characters ("00"- "05") are always used for the status query.

STATUS_INPUTx   **Format: A[max 32]**

Provides information about the state of the external input of a specific (no. "x").

"ON"... Input is on

"OFF"... Input is off

"" ... Input is not activated

Status list   **Format: A[2]**

The status list provides information about the system state.
Consists of "PM Information" and the current values of the CIDRW attribute "AlarmStatus", "Operating Status" and "HeadStatus".

  Status list
  L,4

        <PMInformation>
        <AlarmStatus>
        <OperatingStatus>
        <HeadStatus>

TARGETID   **Format: A[2]**

The TargetID is defined with 2 ASCII characters in <u>decimals</u> and corresponds to the antenna connections 1 (01) – 32 (32).

TIMEOUT   **Format: A[2]**

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TIMEOUT is defined with 2 ASCII characters in hexadecimals and corresponds to the waiting time in seconds.
01-FF (1-256s), value 00 or an empty means infinite (always on).

UID	Format: B[8-12]

Represent the unique code of the transponder (unique ID assigned by the manufacturer). With ISO 15693 transponders, the UID has a length of 8 bytes.

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8.5.7 Parameters

The list of parameters and a description of the individual values are provided below.

No. (DEC)	No. (HEX)	Parameter name	Description
0	0x00	**Gateway ID**	The gateway ID is a part of the device ID. The reading unit simultaneously functions as a gateway and reading device (CIDRW with integrated reading head). It corresponds to the "Lower Device ID" in the message header. 00 ... 255 Default:　　0x00
1	0x01	**Baud rate**	Data transfer rate of the RS232 interface Default: 192 19200 Baud
2	0x02	**Inter-character timeout T1**	1 … 100 1/10 s Default:　　(10) 1 s
3	0x03	**Block protocol Timeout T2**	1 … 250 1/10 s Default:　　(20) 2 s
4	0x04	**Reply Timeout T3**	1 … 120 1 s Default:　　(45) 45 s
5	0x05	**Inter-block Timeout T4**	1 … 120 1 s Default:　　(45) 45 s
6	0x06	**Retry limit RTY**	Number or retry attempts for a query or message. Default:　　3
7	0x07	**TARGETID high byte**	High byte of the defined TARGETID
8	0x08	**TARGETID low byte**	Low byte of the defined TARGETID
9	0x09	**Heartbeat time**	The reading device transmits a S1F1 message to the host at defined intervals. 0 … No heartbeat 1 … 255 1 s (1-255s) Default:　　0 … No heartbeat
11	0x0B	**ReaderID**	The reader ID is a part of the device ID. The reader ID corresponds to the 7 LSB (lowest bits) of the "Upper Device ID" in the message header. 00 … 127 (0x00 – 0x7F) Default:　　0x00
16	0x10	**Antenna power level (all heads)**	Output power at the antenna connection Default:　　120 … 1.2 W (not adjustable)
18	0x12	**DIP switch activity**	Activate or deactivate the DIP switches 0x0000 0000 … All DIP switches are deactivated 0x0000 0001 … DIP switch 1 is activated 0x0000 1111 … All DIP switches are activated Default:　　0x0000 1111 … 0x0F
19	0x13	**DIP switch status**	Queries the current position of the DIP switches. Only the parameter can be queried.

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20	0x14	**Sensor activity 1**	Activate and deactivate sensors 1-8 0x0000 0000 … All sensors are deactivated 0x0000 0001 … Sensor 1 is activated 0x1111 1111 … All sensors are activated Default: 0x1111 1111
21	0x15	**Sensor activity 2**	Activate and deactivate sensors 9-16 0x0000 0000 … All sensors are deactivated 0x0000 0001 … Sensor 9 is activated 0x1111 1111 … All sensors are activated Default: 0x1111 1111
22	0x16	**Sensor activity 3**	Activate and deactivate sensors 17-24 0x0000 0000 … All sensors are deactivated 0x0000 0001 … Sensor 17 is activated 0x1111 1111 … All sensors are activated Default: 0x1111 1111
23	0x17	**Sensor activity 4**	Activate and deactivate sensors 25-32 0x0000 0000 … All sensors are deactivated 0x0000 0001 … Sensor 25 is activated 0x1111 1111 … All sensors are activated Default: 0x1111 1111
24	0x18	**Sensor activity 5**	Activate and deactivate sensors 33-40 0x0000 0000 … All sensors are deactivated 0x0000 0001 … Sensor 33 is activated 0x1111 1111 … All sensors are activated Default: 0x1111 1111
25	0x19	**Sensor delay / delay time**	Delay of the sensor event before a procedure (S18F71, S18F91) is triggered. 0 … 255 (1/10s) Default: 5 (0.5 s)

26	0x1A	**Sensor function / Watch port**	The watch port parameter defines which action is performed during setup.
			
			Bit 0: Box has been removed (S18F71)
			            0 … deactivated, 1 … activated
			
			Bit 1: Box has been set up (S18F71)
			            0 … deactivated, 1 … activated
			Bit 2 -3: Not used
			Bit 4: Automatic read scan and read MID
			            (S18F91)
			            0 … deactivated, 1 … activated
			
			Bit 5-7: Not used
			
			Default: 0x0001 0011 (S18F71, S18F91 activated)

27	0x1B	**ShowLED AutoRead**	The execution of an automatic reading is displayed in seconds. Continuous light … successful reading

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			Flashing light … no reading is possible 0 … 255 1 s (0-255s) Default: 0 … No display

28	0x1C	**ShowLED MODE**	Automatic takeover of a rear rack space indicator to a front rack space.
			Bit 0: Takeover LED "ON" ("01")
			     0 … deactivated, 1 … activated
			
			Bit 1: Takeover LED "OFF" ("00")
			     0 … deactivated, 1 … activated
			Bit 2-6: Not used
			Bit 7: Status of the taken over LED
			     0 … PULSE (pulsing 50ms)
			     1 … FAST (flashing 200ms)
			0x1000 0011 … Takeover ON,OFF activated
			Default: 0x00 … Takeover of the LED deactivated

29	0x1D	**ShowLED Offset**	Offset for the automatic takeover## of the display of a rear rack space to the display on a front rack space. Number of rack spaces of a row. Default: 4 … Rack spaces per row
32	0x20	**Transponder type**	The parameter defines the transponder type. The set type is used for reading and writing messages without a UID transfer. The transponder type (manufacturer) corresponds to the 2nd byte of the transponder UID. Default: 5 … Infineon
33	0x21	**Manufacturer type**	This parameter defines the exact manufacturer type. The set type is used for reading and writing messages without a UID transfer. The manufacturer type corresponds to the 3rd byte of the transponder UID. Default: 0

34	0x22	**Byte order**	The byteorder parameter defines the transfer of the data bytes of a transponder page.
			example „1234" = rotate „4321"
			Bit 0-1: 1
			Bit 2: ISO transponder read, readUID
			     1 … rotate datenbytes
			Bit 3: Infineon rransp. read, readUID
			     1 … rotate datenbytes
			Bit 4-7: not used
			Standard: 0x0B

35	0x23	**AFI - Application Family Identifier**	The application family identifier is used for scanning with AFI. (The function is not yet implemented) Default: 0 … No AFI defines
36	0x24	**Advanced UID**	The Advanced UID parameter defines whether the UID is transmitted with or without DSFID bytes for scan messages.

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			Default: 0 … 8-byte UID without DSFID byte
37	0x25	**MID area**	The parameter defines the MID area. 0 … 10 pages Default: 4 pages = 16-byte MID area
42	0x2A	**CarrierIDOffset**	Defines the offset of the CID (=MID) within the MID area. The valid value range depends on the MID area values and the CarrierIDLength. Default: 0
43	0x3B	**CarrierIDLength**	Defines the length of the CID (=MID) within the MID area. The valid value range depends on the MID area value and the CarrierIDLength. Default: 16

44	0x2C	**FixedMID**	Defines the reading and writing behaviour of the CID length defined in SEMI E99-03.
			0 … Dynamic CID length
			    The length of the MID is variable. Valid Lengths are 1–CID length bytes.
			
			1 … Defined CID length
			    The length of the MID is defined at CID length. A deviation of this length results in an error message.
			
			Default: 0

48	0x30	**Polling Time**	* not implemented yet Definition of a polling time. If the parameter Polling Time is set, the reader polls for a defined period of time. valid period of time (1-255 seconds) 0x00 Continuous polling Standard: 0
49	0x31	**Polling Frequency**	The polling frequency sets the reader into a continuous reading state. If the parameter is set to 0x00, no polling takes place. With each polling process, the next activated antenna port (Par.50-54) is switched. A complete poll cycle therefore takes: Number of activated antenna ports * Polling frequency Standard: 10 (1,0 s)
50	0x32	**Polling Port 1 - 8**	activates and deactivates the poll-function of the antenna ports 1-8 0x0000 0000 … all Ports deactivated 0x0000 0001 … Port 1 is activated 0x1111 1111 … all Ports are activated Standard: 0x1111 1111
51	0x33	**Polling Port 9 - 16**	activates and deactivates the poll-function of the antenna ports 9-16 0x0000 0000 … all Ports deactivated

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			0x0000 0001 … Port 9 is activated 0x1111 1111 … all Ports are activated Standard: 0x1111 1111
52	0x34	**Polling Port 17 - 24**	activates and deactivates the poll-function of the antenna ports 17-24 0x0000 0000 … all Ports deactivated 0x0000 0001 … Port 17 is activated 0x1111 1111 … all Ports are activated Standard: 0x1111 1111
53	0x35	**Polling Port 25 - 32**	activates and deactivates the poll-function of the antenna ports 25-32 0x0000 0000 … all Ports deactivated 0x0000 0001 … Port 25 is activated 0x1111 1111 … all Ports are activated Standard: 0x1111 1111
54	0x36	**Polling Port 33 - 40**	activates and deactivates the poll-function of the antenna ports 33-40 0x0000 0000 … all Ports deactivated 0x0000 0001 … Port 33 is activated 0x1111 1111 … all Ports are activated Standard: 0x1111 1111
55	0x37	**Polling Delay**	Delay of the polling event before a procedure (S18F71, S18F91) is triggered. 0 … 255 (1/10s) Standard: 20 (2,0s)

97	0x61	**SSACK type**	Defines the error message for a reading operation without transponders in the antenna area.
			0 … "NO" Normal operation
			            for reading without transponders
			1 … "NT" No tag
			            for reading without transponders
			Default: 1 … No tag

98	0x62	**Protocol**	Query of the current protocol 1 … SECS/HSMS Default: 1 (only HSMS protocol is supported)

99	0x63	**Customer mode**	The parameter defines different customer-specific behavioural patterns that influence the different reading device parameters.
			0x00 … Establish default values.
			          Attention: the network settings are
			          reset.
			0x05 … Infineon default values
			Default: 5 Infineon

100	0x64	**Customer Parameter Set**	This parameter is set specifically to customer requirements at the factory.
123	0x7B	**Fine version (Read only)**	Query of the firmware - fine version.

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124	0x7C	**RFID Modul version** (read only)	Request of the firmware version from the RFID module. Version is only correct on the 2nd query.
132	0x84	**Software revision** **(Read only, S18F1)**	Query of the firmware version.
140	0x8C	**Serial number** **(Read only, S18F1)**	Query of the serial number.
141	0x8D	**Hardware version** **(Read only, S18F1)**	Query of the hardware version.

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8.6   ASCII table

DEC	HEX	CTRL	Code
0	0	^@	NUL
1	1	^A	SOH
2	2	^B	STX
3	3	^C	ETX
4	4	^D	EOT
5	5	^E	ENQ
6	6	^F	ACK
7	7	^G	BEL
8	8	^H	BS
9	9	^I	HT
10	A	^J	LF
11	B	^K	VT
12	C	^L	EF
13	D	^M	CR
14	E	^N	SOH
15	F	^O	SI
16	10	^P	DLE
17	11	^Q	DC1
18	12	^R	DC2
19	13	^S	DC3
20	14	^T	DC4

DEC	HEX	CTRL	Code
21	15	^U	NAK
22	16	^V	SYN
23	17	^W	ETB
24	18	^X	CAN
25	19	^Y	EM
26	1A	^Z	SUB
27	1B	^[	ESC
28	1C	^\	FS
29	1D	^]	HP
30	1E	^^	RS
31	1F	^_	US

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DEC	HEX	CTRL
32	20	BLANK
33	21	!
34	22	"
35	23	#
36	24	$
37	25	%
38	26	&
39	27	'
40	28	(
41	29	)
42	2A	*
43	2B	+
44	2C	,
45	2D	-
46	2E	.
47	2F	/
48	30	0
49	31	1
50	32	2
51	33	3
52	34	4
53	35	5
54	36	6
55	37	7

DEC	HEX	CTRL
56	38	8
57	39	9
58	3A	:
59	3B	;
60	3C	<
61	3D	=
62	3E	>
63	3F	?
64	40	@
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
76	4C	L
77	4D	M
78	4E	N
79	4F	O

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DEC	HEX	CTRL
80	50	P
81	51	Q
82	52	R
83	53	S
84	54	T
85	55	U
86	56	V
87	57	W
88	58	X
89	59	Y
90	5A	Z
91	5B	[
92	5C	\
93	5D	]
94	5E	^
95	5F	_
96	60	'
97	61	a
98	62	b
99	63	c
100	64	d
101	65	e
102	66	f
103	67	g

DEC	HEX	CTRL
104	68	h
105	69	i
106	6A	j
107	6B	k
108	6C	l
109	6D	m
110	6E	n
111	6F	o
112	70	p
113	71	q
114	72	r
115	73	s
116	74	t
117	75	u
118	76	v
119	77	w
120	78	x
121	79	y
122	7A	z
123	7B	{
124	7C	|
125	7D	}
126	7E	~
127	7F	□

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9. Service and Troubleshooting

9.1 General information

Follow the basic safety instructions in the chapter Safety instructions.

⮕ The maintenance of the HF WIP rack and its components may only be performed by the manufacturer

⮕ Observe the instructions in this section when errors occur. Do not perform any further troubleshooting measures in addition to the described measures.

⮕ In case of doubt concerning errors and handling them, contact the manufacturer.

9.2 Troubleshooting personnel

Troubleshooting must only be performed by specially trained personnel. In case of doubts concerning the necessary qualifications, contact the manufacturer.

The handling of device errors by untrained personnel as well as the incorrect handling of the device can result in personal injuries as well as damages to the reading device and/or connected devices.

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9.3   Safety instructions

	All components of the antenna oscillating circuit carry high voltage.
	Only use spare parts specified by the manufacturer. Unauthorised substitution of parts can result in fire, electric shock or other hazards
	Electrostatic charges damage electronic components within the device. ESD protective measures must be applied prior to opening the unit.
	Carefully remove the housing covers to prevent damage. Do not operate the device when the housing is open.
	Never short circuit the fuse! This may result in fire or damages on the device. Only use fuses specified by the manufacturer.

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9.4   Software releases

Release date	Version	Description
28/06/2016	Version 1.1 FV 00	Initial release, prototype, green LED
06/07/2016	Version 1.1 FV 01	New parameter 97 SSACK S18F91 empty reading SSACK = "NT"
15/02/2017	Version 1.3 FV 01	Improved network stack multicolour LED
20/02/2017	Version 1.3 FV 02	Improved reset handler, Release for multicolour LED
07.06.2018	Version 1.4 FV 00	EInk-Display implemented, testmode LED und display
30.04.2019	Version 1.5 FV 04	Poll-function implemented
06.12.2019	Version 1.7 FV 01	HW-Version 40x
15.01.2020	Version 1.7 FV 02	automatische HW identification (16,32,40 ports) poll-function extended

9.5   Customer service

HERMOS AG
Track & Trace RFID Division
Gartenstraße 19
D-95490 Mistelgau
Germany

Tel.	+49 (0) 9279 – 991 - 0
Fax	+49 (0) 9279 – 991 - 100
E-mail	rfid.support@hermos.com
URL:	http://www.hermos.com/de/produkte/rfid/

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10. Disassembly and storage

10.1 Disassembly

	➲ Remove the power supply and the Ethernet cable
	➲ Remove all antenna lines and IO cables
	➲ Loosen and remove the mounting screws
	➲ Remove all components from the rack space.

10.2 Storage

Store the reading device and its components in a clean and dry environment.
Make sure that the power supply has been removed.
Observe the required storage conditions specified in the technical data.

11. Transport and disposal

11.1 Transport

Use a solid cardboard box for the transport.
Use enough cushioning material to protect the device on all sides.

11.2 Disposal

The device and its components are made of various materials.
Disconnect the electronic components from the housing and dispose of them separately.

	➲ Do not dispose of the unit in normal household waste.
	➲ Dispose of the materials separately and according to the legal regulations of your country.
	➲ Housing and attachments as plastic waste
	➲ Electronic components, antennas and cables as electronic waste