DKM-100

DKM-100 Data Concentrator

Operating Manual and Installation Instructions

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Contents

1. General

1.1 Brief description

The Elster DKM-100 Data Concentrator is used for the transmission of serial digital data on telephone lines. It has been specially designed for communication between the ELSTER EK-86/-87/-88 System Volume Correctors and DS-100 Data Storage Devices at one end and a control station at the other.

Up to four such devices can be simultaneously connected to the DKM-100 Data Concentrator via V.24 serial interfaces. The DKM-100 has an XT Bus slot for a modem card for connection to a telephone network. A terminal device can be logically linked (quasi-transparently) through each of these connections to a control station. Most parameterisation functions can also be carried out from the control station via the modem.

The DKM-100 has another V.24 interface for the connection of a terminal for test and parameterisation purposes.

Four signalling inputs and four switching outputs are available in the DKM-100 for telecontrol applications.

Each of the four signalling inputs can be parameterised alternatively for 2 or 4 levels. On a change in level a spontaneous fax message is triggered, provided a spontaneous message receiver has been assigned to the relevant signal input.

The DKM-100 has the following operating modes:

- After switch-on and correct execution of the self-tests and initialisations, the device assumes the standby mode. When it has been operated in a different mode and this function is terminated, it again reverts to the standby mode.

- On establishing an external modem link (the device is called), the device changes into the command mode. It remains in the command mode while ever a link to the control station exists, but no terminal device has been selected by the control station. In the command mode commands are received from the control station and executed. After terminating the command mode, the device again reverts to the standby mode.

- On a special command from the modem interface a quasi-transparent link is established between the control station and the selected terminal device. The DKM-100 is then in the transparent mode. The DKM-100 does not logically exist for the control station in this operating mode. After termination of the transparent mode, the device again reverts to the command mode.

- On detecting a character on the monitor interface, the device changes to the parameterisation/test mode. The parameterisation and test mode is used for parameterising the device and tracing the communications for test purposes. This operating mode is independent of the others and can be operated at the same time as the standby, command and transparent modes.

- After a change of level on a signal input to which a spontaneous message receiver has been assigned, the DKM-100 generates a spontaneous message and transfers it to the spontaneous message receiver with the aid of the internal modem.

1.2 Main features

- Connections for up to four ELSTER terminal devices.
- For each device:
  - Switched power supply output (+5V).
  - Static power supply output (+8V).
  - RTS/CTS handshake.
  - Adjustable transmission parameters.
  - Adjustable type of terminal device / transmission protocol.
- Monitor interface with adjustable transmission parameters.
- Four signalling inputs to NAMUR specifications.
- Four potential-free power switches for external voltages up to 40V/50mA.
- Display of operating status via four LEDs.
- Various modem cards can be used.
- Operation on dialled telephone lines.
- Performance of the modem link depends on type of modem used.

1.3 Mechanical description

The electronics, including the power supply unit and the modem, are accommodated in a wall-mounted housing having IP64 protection. All cables are led into the housing through PG union glands. The connections for the electrical supply, signalling inputs, switching outputs, terminal devices and the telephone line are implemented as screw terminals. The monitor interface, which is not required for normal operation, is passed to a 9-pole SUB D socket mounted on the circuit board in the terminal compartment.

1.4 Remote data transmission with the DKM-100

The DKM-100 can be operated from the control station using the control-station software LSM-100 from V3.50 onwards. This is available in two levels of expansion:

- In Expansion Level I (LSM-100/I) you can only communicate interactively with the DKM-100 and the terminal devices connected to it. In the DKM-100 command mode you can read the device data as well as the interface assignment and you can also change the device data (remote parameterisation). In the transparent mode you can read the device data and the interval values from the terminal devices.

- In Expansion Level II (LSM-100/II) you can communicate with the DKM-100 and the terminal devices connected to it both interactively and also automatically. In the automatic mode the software processes so-called batch jobs containing a number of call sequences. The call sequences in turn define which stations and in which sequence they are automatically called and which commands are to be executed. The jobs and call sequences quoted, together with the commands to be executed, can be created according to your requirements with the file manager in the control-station software. With the exception of the time setting function in the terminal devices, no parameterisation functions can be carried out in the automatic mode.

1.5 Block diagram

1. Reihe:
Parameter memory Real-time clock Configuration switches
Data and program memory

2. Reihe:
Microcontroller XT Bus Modem card

3. Reihe:
Power supply unit 230VAC Optocouplers, power drivers NAMUR evaluation

Serial interface, line drivers and receivers

4-way serial interface, line drivers and receivers

4. Reihe:
Mains connection L N PE Switching outputs 1 2 3 4 Signalling inputs 1 2 3 4

V.24 monitor interface RxD TxD RTS CTS GND

Terminal device interfaces
1 2 3 4
RxD TxD RTS CTS GND +8V +5V ...

Telephone line
1 2
a2 La Lb b2 a2 La Lb b2

Fig. : Block diagram

2 Installation of the DKM-100

2.1 Installation requirements

A 230V alternating mains voltage and a telephone connection unit (TAE) with an N-coded socket are needed for the installation of a DKM-100. It is recommended that a lightning-protected TAE-socket protected is used.

The supplied telephone lead is 2.7 m long and the leads to the terminal devices are each approx. 1.5 m long.

The DKM-100 must only be installed in Ex-free areas !

2.2 Mounting the device

The DKM-100 is intended for wall mounting. The housing dimensions and the drilling distances can be taken from the drawing in Appendix A4.

EMC warning note:
The device contains electronic circuits which can be damaged by electrostatic discharges. The installation personnel should therefore discharge themselves before starting the installation work.

Only open the device after switching off the electrical supply.

All cables to be connected are terminated in the terminal compartment, so that the front frame of the DKM-100 does not need to be unscrewed.

- **Mains connection:**

  The 230V mains connection lead is connected to the orange terminal block KL1.

<u>Important:</u> The earth conductor (PE, green/yellow) must be connected to the lowermost terminal on the terminal block KL1 !!!

The live and neutral conductors are connected to the two upper terminals; the polarity is unimportant.

- **Terminal device cables:**

The terminal device cables on the interfaces Ser1 and Ser2 are connected at the works. The interfaces Ser3 and Ser4 are assigned at the works only if an appropriate note is made in the ordering text. For retrofitting by the customer the assignment is given in Appendix A1. **The instructions given in Appendix A5 should be observed when connecting the cable screen to the PG/EMC cable gland!**

- **Telephone lead:**

  The telephone lead is fitted at the works to one of the two line interfaces. The connecting cable to the DKM-100 internal modem is terminated on the second line interface, also at the works. The assignment can be taken from Appendix A1.

- **Signalling inputs**

  The signalling inputs E1 and E2 are passed to the terminal block KL9, the signalling inputs E3 and E4 to the terminal block KL10. The evaluation of the inputs is carried out according to Namur specifications. A1S, A1R or E1 generators or open-collector transistor switches can be connected.

- **Switching outputs:**

  The switching outputs A1 and A2 are passed to the terminal block KL11 and the switching outputs A3 and A4 to the terminal block KL12.

  The switching outputs are open-collector outputs, electrically isolated by optocouplers. They can be switch external voltages up to 40V and currents up to 50mA.

  See the chapter "Switching outputs" for a wiring example.

2.3 Setting the configuration switches

The DKM-100 has 16 configuration switches. These switches are located directly on the circuit board and are therefore only accessible after opening the housing.

The switches have been set at the works such that the DKM-100 can be put directly into operation, i.e. without changing the configuration switches.

The configuration switches have switch positions "ON" when switched to the left and "OFF" when switched to the right (viewed from the side of the terminals).

Four switches are used for activating / deactivating the terminal device interfaces. Only the interfaces identified as "active" via the configuration switches are operated. No terminal device can be operated on a terminal device interface deactivated by the configuration switches. Ex-works all four switches are set to "ON" so that when a new terminal device is later connected, the configuration switches do not need to be altered.

One switch is used to activate the integral modem. After switching on the DKM-100, the set modem parameters are automatically loaded into the modem.

The complete parameterisation of the monitor interface is carried out via the configuration switches, because with an incorrect setting in the memory no further access to the device would be possible otherwise.

Switch settings that are not plausible lead to error messages.

As an additional security function, the ex-works default setting is always loaded after switch-on from the EPROM into the EEPROM if there is a certain switch setting. To achieve this, the switches, starting from the bottom with S2/1, must be set alternately to "OFF" and "ON". However, with this function no range of device functions is provided after initialisation, because the switches for the actual configuration must still be set correctly. The actual range of functions is only provided after switching the device off, setting the configuration switches and switching on again. The following table shows a summary of the configuration switches. The ex-works setting is shown in **bold type**.

Comp. No.	**Switch No.**	**Function**	**Switch setting "ON" (left)**	**Switch setting "OFF" (right)**
S1	8	Monitor interface: Parity bit	With parity bit	**Without parity bit**
S1	7	Not assigned		
S1	6	Not assigned		
S1	5	Internal modem	**Active**	Not active
S1	4	Terminal device interface 4	**Active**	Not active
S1	3	Terminal device interface 3	**Active**	Not active
S1	2	Terminal device interface 2	**Active**	Not active
S1	1	Terminal device interface 1	**Active**	Not active
S2	8	Test mode for switching inputs and outputs	Active	**Not active**
S2	7	Not assigned		
S2	6	Not assigned		
S2	5	Monitor interface: Baud rate	4800 or **9600**	1200 or 2400
S2	4	Monitor interface: Baud rate	2400 or **9600**	1200 or 4800
S2	3	Monitor interface: Stop bits	2 stop bits	**1 stop bit**
S2	2	Monitor interface: Data bits	**8 data bits**	7 data bits
S2	1	Monitor interface: Parity bit	Even parity	**Odd parity**

Table: Assignment of configuration switches.

2.4 Modem installation

When the device is supplied, the modem has normally already been installed by Elster and the relevant parameters have been set. Due to the design of the device however, other types of modem can also be used. To enable this, an XT Bus slot is provided for a short PC card (maximum length = 15 cm) for the connection of a modem. This slot is located directly on the circuit board and therefore only becomes accessible after opening the housing (see Chap. 2.2). The parameters required for the operation of the modem can be set in the DKM-100 using the DKM-100 terminal. Initialisation of the modem occurs after a cold or warm start (Reset) and after changing the modem parameters. Changing the type of modem during the device operation is not permissible.

Minimum requirements on the modem card to be used:

- Hayes "AT" command set is available.
- Minimum data security protocol conforming to MNP4.
- Possible transmission rate up to at least 4800 bit/s.
- PC plug-in card as short version (max. 15 cm long).
- Fittings with holding panel.

The modem is mechanically connected to the circuit board via three points:

- It is plugged into the VG strip X3 with its connector strip via an adapter circuit board (XT adapter).
- The card holder is screwed to a mounting bracket which is in turn screwed to the housing via a mounting hole. In order to ensure isolation between the card holder for the modem card (GND potential) and the housing (earth potential), it is important that a plastic screw is used at this point with a plastic washer between the circuit board and the mounting bracket.
- The modem card is supported at the upper left corner on a plastic distance piece.

The electrical connection to the DKM-100 is made via the adapter circuit board and the VG strip X3. The connection to the telephone line is made via a cable which is plugged at one end into the telephone connection on the modem card. At the other end it is connected to the "Line" on one set of terminals. This is internally connected (through the circuit board) to "Line" on the second terminal set which in turn is joined to the external telephone connection.

If the modem mounted ex-works is to be replaced on site by another, the following procedure should be adopted:

- Switch off all electrical voltages to the DKM-100.
- Remove the front panel.
- Remove the modem <--> DKM-100 connecting lead from the modem line connection.
- Remove the modem holding bracket from the CPU board (upper right corner).

- Pull off the modem including the XT Bus adapter from the CPU board.
- Separate the XT Bus adapter from the old modem.
- Make sure that the new modem is set to COM1 / IRQ4 (see operating manual for the new modem).
- Connect the XT Bus adapter to the new modem.
- Take the holding bracket from the old modem and fit it to the new one.
- Connect the modem including the XT Bus adapter and holding bracket to the XT Bus interface on the CPU board.
- Screw on the holding bracket with the plastic screw and plastic washer to the upper right mounting hole (the plastic washer should be located between the CPU and the short leg of the holding bracket !).
- Connect the modem <--> DKM-100 lead to the modem line connection.
- Screw on the front panel again and clip-on the terminal cover.
- Switch on the mains supply again.
- If the setting data for the new modem is not identical with that of the old modem, the new setting data must be entered using the DKM-100 terminal (see Chapter "DKM-100 terminal-modem configuration").

2.5 Initial operation

After switching on or after a reset, the DKM-100 first carries out a self-test for almost all function groups. The green LEDs on the front panel indicate the presence of the +5V and +8V supply voltages and are active immediately after switching on the supply voltage. The yellow LED for "System active" is activated approx. 2 s later and signals that the system is running properly. It should not go out during the whole period of operation. The fourth LED also becomes active once a link to the control station is established.

Designation	Colour	Function
+8V	Green	+8V power supply for the terminal devices is active.
+5V	Green	+5V power supply is active.
System active	Yellow	System is active.
On-line	Yellow	Link to control station established.

Table: LEDs on the front panel.

If the acceptance of the ex-works default setting is demanded by the configuration switches, the error status is deleted before the self-tests are executed.

The error status is otherwise retained, even when the device is switched off and provided the expressed command for deletion has not been issued.

When the self-test has been successfully completed, the device is initialised. The configuration switches are read. If the data in the EEPROM is corrupted or the function for loading the ex-works default setting is selected through the configuration switches, the parameters from the EPROM are transferred to the EEPROM.

If the relevant configuration switch indicates that a terminal device interface is assigned, the DKM-100 attempts to activate the corresponding device and to establish communications according to the type of protocol set in the EEPROM. It determines the interface status from the reaction (device type or "No terminal device detected").

After the successful execution of the initialisation procedure the device assumes the standby mode. Due to the extensive self-tests, the complete initialisation takes approx. 15 s. Prior to this, the device is not yet ready to receive commands on the monitor interface nor on the modem interface.

3 Interfaces

3.1 V.24 terminal device interfaces

Up to four Elster terminal devices or read-out devices can be connected to the DKM-100. The interfaces include the signals for data transmission and the handshake and power supply. A supply voltage of +8V for each interface can be switched in via a jumper and is then always present. The jumpers JP3 to JP6 are located approximately in the centre of the terminal compartment below the X2 terminal interface.

Terminal device interface	Jumper for +8V
1	JP3
2	JP4
3	JP5
4	JP6

Table: Jumpers for the +8V supply to the terminal devices.

The 5V supply for the terminal devices is designed to be separately switchable for each terminal device connection. The supply voltage is switched differently depending on the type of terminal device set in the parameters. With AS-100 devices the supply is continuously activated. With DS-100 or EK8x devices the supply is only activated when communications are to take place with the terminal device. A waiting period of 2 s is maintained between activation of the supply voltage and sending the first character.

The following listed device types can be connected to the terminal device interfaces:

Type of terminal device
DS-100/x (all types)
EK-86
EK-87
EK-88
Ek-90
TC-90
AS-100 (not yet supported by the control station software)
AS-200 (not yet supported by the control station software)

Signals on the terminal device interface:

Signal name	**Direction**		**Meaning**
	from DKM-100	**to DKM-100**	
RxD		x	Receive data
TxD	x		Send data
RTS	x		DKM-100 ready to receive
CTS			Terminal device ready to receive
GDN			Device ground
+8V	x		Static +8V supply
+5V	x		Switched +5V supply

Table: Signals on the terminal device interfaces.

3.2 V.24 monitor interface

The DKM-100 has a V.24 interface in the form of a 9-pole SUB D socket X2 for its parameterisation and control. This is located approximately in the centre of the DKM-100 terminal compartment. Since the operator guidance is carried out completely by the DKM-100, only a terminal or PC with a terminal program (e.g. Telix or Procom) is required and no special parameterisation software. The transmission parameters (9600 baud, 8 data bits, no parity bit, 1 stop bit) for this interface can be set using the configuration switches (see Chap. "Installation of the DKM-100 - Setting the configuration switches").

A null-modem lead in which the pin assignments for RxD/TxD and RTS/CTS have been interchanged should be used for the link between the DKM-100 and the PC.

Signal name	**Pin**	**Direction**		**Meaning**
		from DKM-100	**to DKM-100**	
RxD	2		x	Receive data
TxD	3	x		Send data
RTS	7	x		DKM-100 ready to receive
CTS	8		x	Monitor ready to receive
GND	5			Device ground

Table: Signals on the monitor interface.

No particular terminal program is specified for the communication. However, some keys must be redefined as follows for the menu guidance.

Key	**Coding**
↑	01
↓	02
←	03
→	04

Table: Key definition for the terminal program.

A key-definition file with the name "DKM100.KEY" is supplied with the control-station software for the terminal program "TELIX".

Function	**Parameter**	**Telix command**
Transfer parameter	Standard setting: 9600 baud, no parity bit, 8 data bits, 1 stop bit (9600,n,8,1)	ALT-P
Terminal emulation	ANSI	ALT-T
Key definition for terminal emulation	Defined in "DKM-100.KEY"	ALT-K **T**erminal **L**oad (DKM100KEY) e**X**it
Upload from DKM-100	ASCII protocol	ALT-R
Download to DKM-100	ASCII protocol	ALT-S

Table: Communication parameters for the monitor interface.

3.3 Switching outputs

The DKM-100 has four switching outputs which can switch external voltages up to 40V. The maximum current loading is 50mA. The outputs are electrically isolated using optocouplers and can be read out to increase the functional reliability.

The switching outputs are at present operated by the software in that they can only be switched from the control station. It is intended in a later software version that they will be able to switch automatically in reaction to changes on the signalling inputs within the scope of the spontaneous message functions.

3.4 Signalling inputs

The DKM-100 has four signalling inputs which as standard are configured as NAMUR inputs. In this configuration a voltage of 8V is available on the inputs, enabling the appropriate current to be set via the generators to be connected (e.g. A1R, A1S, E1, transistor switches).

The switching thresholds for the valid signal level and the line fracture detection are listed in the following table. The values have a tolerance of about +/-5%, because they are derived from the +8V power supply.

Ex-works assignment	**Evaluation**	**Terminal voltage / V**	**Current / mA**	**Generator resistance / kOhm**
BREAK	Line fracture	> 7.9	< 0.07	>113
HIGH	High level	6.8 - 7.9	0.07 - 1.1	6.18 ... 113
UNDEF	Invalid	5.8 - 6.8	1.1 - 2.1	2.76...6.18
LOW	Low level	0 - 5.8	> 2.1	0 ... 2.76

Table: Level evaluation on the signalling inputs according to NAMUR specification.

The switching status of the signalling inputs can be interrogated by the control station. If a so-called "action" is assigned to the signalling input (see Chapter "Spontaneous message function" and also "DKM-100 terminal - Parameterisation - Configure spontaneous messages for inputs"), the spontaneous fax message recipient defined in the action is called after a level change. The message text appearing on the fax printout (maximum 30 characters long) can be set separately for each signalling input from the control station or from the DKM-100 terminal.

Application examples for the configuration of the signalling inputs:

- Alarm outputs from EK-8x Volume Correctors or a DS-100/V.
- Door contacts.
- SAV (safety cut-off valve)

The hardware also offers the possibility of individually setting each input instead of using them as analogue inputs for voltage measurement as in the NAMUR specification. This configuration is obtained with a slight hardware modification and can only be carried out by Elster. In this case the following data applies:

Voltage range:	0 ... 8V
Input resistance:	250 kOhm
Resolution:	8 bits ≡ 33mV

3.5 Modem interface

For use with a modem card, the DKM-100 has a VG strip on which the signals required for an XT Bus are present. A more detailed description of this interface will not be given here, since it conforms to the standards and it is not relevant for the user. A passive adapter circuit board provides the contact between the VG strip and the modem card. The signals are passed directly by this circuit board, i.e. without any conversion.

The commands for the relevant modem card can be set in the DKM-100 parameter / test mode (see Chap. "DKM-100 terminal - Parameterisation - Configure the modem"). With the modem installed in the DKM-100 ex-works, the necessary parameters are also set ex-works, so that for operation no changes need to be made on site.

4 DKM-100 terminal

4.1 Introduction

The DKM-100 terminal is used for parameterising and testing the DKM-100 on site. The parameterisation and test mode is started when a device is detected on the monitor interface, i.e. when any character is received on the monitor interface. This mode is operated independent of the other functions. i.e. it can also be used simultaneously, e.g. with data transmission to the control station.

The DKM-100 Data Concentrator is set at the works such that it is **not** necessary to use a terminal on site to put the DKM-100 into operation.

4.2 Putting the DKM-100 terminal into operation

A commercially available PC/Laptop/Notebook on which a terminal program is installed (e.g. Telix, Procom, etc.) can be used as the DKM-100 terminal (see Chapter "V.24 monitor interface").

The DKM-100 terminal is connected to the 9-pole SUB D socket X2 in the centre of the DKM-100 terminal compartment. To connect it, a so-called null-modem should be used (RxD and TxD, RTS and CTS crossed, see Chapter "V.24 monitor interface").

Operation "step-by-step":

- Connect the PC/Laptop/Notebook to the SUB D socket X2 using the null-modem cable.
- Switch on the PC/Laptop/Notebook.
- Switch on the DKM-100 (if not already switched on).
- Start the terminal program (e.g. Telix).
- Set up the terminal program (see Chapter "V.24 monitor interface").
- Press any key -> the DKM-100 main menu appears (see Chapter "Operating the menu system").

If the DKM-100 main menu is not displayed, a DKM-100 Reset can be executed by briefly switching off the DKM-100 or by briefly bridging the solder pad B6 to the left above the terminal interface X2 in the terminal compartment. After a reset the DKM-100 needs about 15 seconds for a self-test. Then the main menu can be displayed by pressing any key on the terminal. If the main menu still does not appear, the terminal program (e.g. Telix) must be started again (with the DKM-100 connected and switched on).

4.3 Operating the menu system

The operation of the DKM-100 in the parameterisation and test mode takes place based on a menu system with a tree-like structure. Starting from a main menu and by selecting menu points, the user gains access to the appropriate submenus where he can select individual commands. The selected menu point is marked by inverting the lettering. Movement within the menu structure occurs using just four keys as follows:

Key	Function
"↑"	Selection of the upper menu point.
"↓"	Selection of the lower menu point.
"ESC"	Return to the next higher menu level.
"ENTER"	Activation of the selected menu or command.

Table: Operating the menu system.

The coding of the keys must be adapted in the terminal program used to suit the DKM-100 (see Chap. "Interfaces - V.24 monitor interface").

At the start of the parameterisation and test mode the operator is first presented with the **main menu** as shown below:

ELSTER DKM-100
Software version: 60xx
> Device information
Monitor / test functions
Parameterisation
Link to control station
Log out

4.4 Device information

In the menu "Device information" the operator can call up information about the set parameters, connected terminal or read-out devices and the DKM-100 status. All commands are pure read commands. After the appropriate information has been displayed, the operator returns to the main menu again by pressing any key.

The meaning of the parameters to be read out is explained in the Chapter "DKM-100 terminal - Parameterisation".

Submenu - Device information:

ELSTER DKM-100
Device information

> Read software version
Read device identification
Read serial number
Read plain-text name
Read error status
Read operating hours counter
Read date and time
Read terminal-device interface status
Read control-station interface status
Read control-station dialling method
Read control-station entry
Read modem parameters
Read back outputs
Read signalling status of inputs
Read action table for spontaneous messages
Read spontaneous message table for inputs

Command "Read software version"
Software version: 60xx with "xx" for version, e.g. 6012 for software version 1.2.

Command "Read device identification"
Device identification: ELS DKM100/A

Command "Read serial number"
Serial number: 00000310xxxx

Command "Read plain-text name"
Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Command "Read error status"
Error status: xx

Command "Read operating hours counter"
Operating hours counter: xxxxxx

Command "Read date and time"
Time: hh:mm:ss
Date: dd.mm.yy
Correction value: xxxxxxx

Command "Read terminal-device interface status"
A request for the entry of the desired interface number appears.
Terminal device number (1..4): x
After entry of the number:

Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Transmission rate: xxxxx
Parity: x
Data bits: x
Stop bits: x
Timeout between 2 characters (s): x
Interface status: xx

The entered parameters are read from the EEPROM and displayed. The DKM-100 finds the interface status itself directly by first checking the signal "CTS" on the terminal device connections which are activated by the configuration switches. With a correct level it attempts to interrogate the version of the connected device. The evaluation of the information obtained is made according to the following table:

Config. switch	Protocol type	CTS input	Interface status
ON	D	Active	DS-100/EK-8x
ON	D	Inactive	No terminal device detected
ON	A	Active	AS-100
ON	A	Inactive	No AS-100 detected
OFF	Any	Any	No device connected

Table: Finding the interface status.

Command "Read control-station interface status"

Transmission rate: xxxxx
Parity: x
Data bits: x
Stop bits: x
Timeout between 2 characters (s): x
Response time (s): x
Timeout for modem interface (min.): x
No. of attempts per control station: x
Waiting time between 2 call cycles (min.): xx
No. of rings: x
Time Window 1: hh:mm - hh:mm
Time Window 2: hh:mm - hh:mm

Command "Read control-station dialling method"

Dialling method: x (P=Pulse dialling, T=DTMF)

Command "Read control-station entry"

Control station 0:
Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Telephone number: xxxxxxxxxxxxxxxxxxxxxxxxx

Control station 1:
Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Telephone number: xxxxxxxxxxxxxxxxxxxxxxxxx

Control station 2:
Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Telephone number: xxxxxxxxxxxxxxxxxxxxxxxxx

Control station 3:
Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Telephone number: xxxxxxxxxxxxxxxxxxxxxxxx

Command "Read modem parameters"

Current modem type: x

Plain-text name: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Modem address (hex): xxxx
Dialling command: xxxxxxxx
Lift receiver: xxxxxx
Command mode: xxxxxxxx
Initialisation: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Modem test: xxxxxxxxxxxxxxx
Terminate modem test: xxxxxxxxxx

Command "Read back outputs"

Output	Current status
1	off/on
1	off/on
1	off/on
1	off/on

Explanation:
"off" means: Output terminals "+" and "-" isolated by high impedance.
"on" means: Output terminals "+" and "-" short circuited.

Command "Read signalling status of inputs"

Input	Present level	Level change	Event begin	Event end	Number
1	xxxxx	xxxxx->xxxxx	dd.mm.yy, hh:mm:ss	dd.mm.yy, hh:mm:ss	x
2	xxxxx	xxxxx->xxxxx	dd.mm.yy, hh:mm:ss	dd.mm.yy, hh:mm:ss	x
3	xxxxx	xxxxx->xxxxx	dd.mm.yy, hh:mm:ss	dd.mm.yy, hh:mm:ss	x
4	xxxxx	xxxxx->xxxxx	dd.mm.yy, hh:mm:ss	dd.mm.yy, hh:mm:ss	x

Explanation:

Present level:	Present applied level, level designation max. 5 characters, can be parameterised in set mode (see Chapter "Parameterisation").
Level change:	First level change after the last reset of the signal input status.
Event begin:	Date and time of first event (level change) after last reset of signal input status.
Event end:	Date and time of last event (level change).
Number	Number of events (level changes) since last reset of signal input status.

Command "Read action table for spontaneous messages"

Action no.	Service	Recipient telephone no.	Recipient plain text
1	x	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
2	x	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
3	x	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
4	x	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Explanation:

Service: "0" for "no service", "1" for "FAX service".

Command "Read spontaneous message table for entries"

A request appears for the entry of a number for the desired signalling input:

Input number (1..4): x (x = 1..4)

Input number (1..4): x (x = 1..4)
Designation of input level by x statuses (x = 2 or 4)
LOW level: xxxxx
UNDEF level: xxxxx
HIGH level: xxxxx
BREAK level: xxxxx
Action 1: x (x = 1..4)
Action 2: x (x = 1..4)
Plain-text message: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

4.5 Monitor / test functions

The DKM-100 provides ways of tracing the data traffic on the serial interfaces. There is the possibility of recording the data ("log function") and of displaying it later or it is possible to display the data on-line, i.e. during the data transmission.

With the log function the data arriving on each channel is acquired in a ring buffer designed as a FIFO. Depending on the operating mode (command or transparent mode), incoming data is acquired by the modem, terminal device or the DKM-100 itself. The DKM-100 itself is valid as a channel so that the data which it generates can also be acquired.

In order to be able to detect a change of direction on the display, unambiguous identification for the start of a new message and for the data source is saved at the start of each stored message.

Entry of the access code (see Chap. "DKM-100 terminal - Parameterisation - Send access code") is required for the activation of one of the following commands.

Submenu "Monitor / test functions":

ELSTER DKM-100
Monitor / test functions

> Switch log function on/off
Display ring buffer contents
Release / inhibit on-line display
Switch output
Reset signalling input status
Reset repetition counter for spontaneous message action

4.5.1 Command "Switch log function on/off"

The log function can be switched on and off with this command. Depending on the status the display changes to "Switch on ....." or "Switch off.....".

4.5.2 Command "Display ring buffer contents"

The characters which have been recorded in the ring buffer by the log function are displayed in two blocks consecutively. Here, the left block has 16 characters in each line shown directly in HEX coding and the right block contains decoded ASCII characters.

Each time the transmission direction changes, a new line is started with identification of the data source as follows: "LS" for control station (German "Leitstelle"), "DK" for the DKM-100 and "Kn" for a terminal-device channel.

The keys "PgUp" and "PgDn" can be used to page through the ring buffer.

4.5.3 Command "Release / inhibit on-line display"

In the on-line display the communication from the DKM-100 to the control station and the terminal devices can be directly traced on the monitor.

4.5.4 Command "Switch output"

The corresponding output statuses are inverted with <Key>.

Output	Present status	Key
1	off/on	<1>
2	off/on	<2>
3	off/on	<3>
4	off/on	<4>

<ESC> to terminate
[x] (x=1..4)

Explanation:
"off" means that the "+" and "-" terminals of an output exhibit high impedance.
"on" means that the "+" and "-" terminals of an output are short circuited.
External voltages of up to 40V and currents of up to 50mA can be switched.

4.5.5 Command "Reset signalling input status"

Input number (0..4; 0 = reset each signalling input status): _
Do you really want to execute the reset process? (<Y> yes; <N> no): _

Explanation:
Here, you can reset the status of a single or all four signalling inputs. Resetting a signalling input status causes:

- The active flag to be reset, i.e. any event registered at this input (level change) which has not yet been able to be signalled, will no longer cause any spontaneous message.
- The deletion of the date and time of the first event since the last reset of the signalling input.
- The deletion of the date and time of the last event on this input.
- The event counter for this input to be set to zero.

4.5.6 Command "Reset repetition counter for spontaneous message action"

In order that fax messages are not continuously generated when a an intermittent contact occurs on a signalling input, the number of fax messages for each signalling input is limited to 10 per calendar day. The four counters (one per signalling input) can be reset to the value zero with the command "Reset repetition counter for spontaneous message action".

4.6 Parameterisation

The DKM-100 has a comprehensive system of parameterisation. The parameters are permanently stored in the EEPROM. The data consistency of the whole parameter block is checked using a checksum. If corruption of the parameters is found via the check sum test (e.g. during initial operation), the set of parameters in the EEPROM is overwritten by the ex-works default set of parameters from the EPROM.

In order to prevent an unintentional or unauthorised modification of the parameters, the entry of parameters is only possible after first entering the access code. The access code set ex-works is "DKM100".

All entries are checked for validity, i.e. for conformance to the maximum number of places, value ranges and valid characters.

The valid characters and value ranges are shown, along with the default setting, in the list of parameters in Appendix A7.

All parameters with the exception of the serial number and the modem parameters can also be set from the control station.

Submenu "Parameterisation":

ELSTER DKM-100
Parameterisation

> Send access code

Set serial number
Set plain-text name
Set operating hours counter
Set date and time
Set access code
Configure terminal-device interface
Configure control-station interface
Set control-station dialling method
Enter control stations
Reset error status
Set correction value for real-time clock
Configure modem
Configure action for spontaneous message
Write complete set of parameters to DKM
Read complete set of parameters from DKM

4.6.1 Send access code

Access code: _____

The entry of the access code is required before parameters can be changed. When making the entry, attention must be given to the difference between upper and lowercase characters.

4.6.2 Set serial number

Serial number: _____

The serial number is entered before delivery and must not then be changed.

4.6.3 Set plain-text name

Plain-text name: _____

The possibility of entering a plain-text name for the device simplifies the identification of the device during data transmission. Here for example, the designation of the siting location, the measurement station, etc. can be entered. The plain-text name may be up to 30 characters long. The first 20 characters of these are used as the sender identification for a spontaneous fax message.

4.6.4 Set operating hours counter

Operating hours counter: _____

The operating hours counter is reset before delivery and should not then be changed.

4.6.5 Set date and time

Time: hh:mm:ss
Date: dd.mm.yy

The current time and date for the integral real-time clock are set with this entry.

4.6.6 Set access code

Access code: _____

The access code can be changed with this entry. Attention must be given to the difference between upper and lowercase characters.

Be careful: ***Remember or note the new access code!!! If the access code is lost, parameterisation of the DKM-100 is only possible on site after activating the ex-works setting with the configuration switches (works access code = "DKM100", note the difference in upper and lowercase letters!). Loading the ex-works setting from the EPROM into the EEPROM is described in the Chapter "Installation of the DKM-100 - Setting the configuration switches".***

4.6.7 Configure terminal-device interface

Terminal-device number (1..4): _
Plain-text name: _____
Transmission rate: _____
Parity (N, O, E): _
Data bits (7, 8): _
Stop bits (1, 2): _
Timeout between 2 characters (sec): _
Type of protocol (A, D): _

Each of the four terminal-device interfaces can be individually configured. The interface selection is made via the line "Terminal-device number...". The plain-text name is used for easy identification of the connected terminal-device. Here for example, "Volume Corrector Line 1", etc. can be entered.

The transmission parameters and the type of protocol are entered according to the requirements of the connected terminal device. The parameter "Timeout between 2 characters" indicates the maximum period which may occur between the reception of two characters before the link is interrupted. For the type of protocol an "A" for devices with the AS-100 protocol (AS-100) or "D" for devices with the DS-100 protocol (DS-100, EK...) must be entered.

4.6.8 Configure control-station interface

Transmission rate: _____
Parity: _
Data bits: _
Stop bits: _
Timeout between 2 characters (sec): _
Response time (sec): _
Timeout for modem interface (min.): _
No. of attempts per control station: _
Waiting period between 2 call cycles (min): __
No. of rings: _
Time window 1: hh:mm - hh:mm
Time window 2: hh:mm - hh:mm

The transmission parameters refer to the transmission on the telephone line and must agree with the parameters set at the control station end.

The parameter "Timeout between 2 characters" indicates the maximum period which may pass between the reception of two characters in order that the link is not interrupted.

The "Response time" describes the maximum period between sending a data block and the response message from the control station.

A timeout is introduced in order to prevent the continuation of a modem link although data communication has already finished or is prone to interference. The parameter "Timeout for modem interface" indicates the maximum period which may pass without a character being transmitted via the modem interface.

The parameter "No. of attempts per control station" and "Waiting period between 2 call cycles" refer to the spontaneous message function (see Chap. "Spontaneous message function" and "DKM-100 terminal - Parameterisation - Configure spontaneous messages for inputs").

The "No. of rings" indicates after how many rings the modem "lifts the receiver".

For dialling from the control station up to two time windows can also be specified in which the modem is allowed to take the call. A timed restriction of the modem reception can then, for example, be practicable if the DKM-100 with its modem uses the same telephone line as a telephone.

4.6.9 Set control-station dialling method

Dialling method (P=pulse dialling, T=DTMF): _

Explanation:
Here is specified which dialling method is used by the DKM-100 internal modem for dialling the number of the fax recipient for a spontaneous message. The dialling method to be used is determined by the telephone network connection. Information about the dialling method can be obtained by the telephone network operator, e.g. Deutsche Telekom.

Pulse dialling is set ex-works.

Note: DTMF = Dual-Tone Multi-Frequency

4.6.10 Enter control stations

Control station number (1..4): _
Plain-text name: _____
Telephone number: _____
Password: _____

The maximum of four control stations that can be entered can be assigned a plain-text name for easier identification. The telephone number is only needed for the spontaneous message function. A control station must be identified with its specific password before it can call or write data.

<u>Be careful:</u> Remember or note a new password!!! If the password is lost, the corresponding control station (1..4) does not obtain any access to the DKM-100!!! This can then only be made possible on site by activating the ex-works setting using the configuration switches (ex-works passwords for the control stations 1..4 = "Leist 1" ... "Leist 4". Take note of upper and lowercase characters!). Loading the works setting from EPROM into EEPROM is described in the Chapter "Installation of the DKM-100 - Setting the configuration switches".

4.6.11 Reset error status

Most components in the DKM-100 are self-monitoring. When an error occurs, an appropriate error code is saved in the variable "Error status". The meanings of the error codes are listed in the appendix.

With this command the error status is reset, i.e. the value "00" is written to it. The text "Error status has been reset" appears as confirmation.

Rectification of an error does not yet lead to the deletion of the error register. After rectifying an error, the error register must be reset either with the command "Reset error status" either from the control station or from the DKM-100 terminal.

4.6.12 Set correction value for real-time clock

Correction value: _____

A possibility of correction is provided to increase the accuracy of the real-time clock. The correction is made cyclically via a correction value: As a correction value (unit: 1 s), the time is entered after which the clock value must be corrected by one second upwards or downwards. A positive value indicates a correction of +1 s, a negative value a correction of -1 s. A value of 0 means that no correction is necessary.

4.6.13 Configure modem

Plain-text name: _____
Modem address (hex): _____
Dialling command: _____
Lift receiver: _____
Command mode: _____
Initialisation: _____
Modem test: _____
Terminate modem test: _____

The modem must be activated with the configuration switch S1/5=ON!

Ex-works setting for modem parameters:

Plain-text name: Modem 1
Modem address (hex): 03F8
Dialling command: ATDP
Lift receiver: ATA
Command mode: +++
Initialisation: AT&FEVX3&D2S0=0M1\N3\J\Q4
Modem test: AT
Terminate modem test: AT&T

4.6.14 Configure action for spontaneous message

Action number (1..4): _
Service action (0..1; 0=Delete complete action; 1=FAX service)
Telephone number: _____
Plain-text name: _____

Explanation:
Service action: 0=No action defined, 1=Fax service
Telephone number: Fax number of fax recipient (max. 20 characters)
Plain-text name: Designation of the fax recipient (max. 30 characters)

4.6.15 Configure spontaneous messages for inputs

Input number (1..4): _
No. of levels to be designated (2; 4): _
LOW level: _____
UNDEF level: _____ (only if no. of levels to be designated = 4)
HIGH level: _____
BREAK level: _____ (only if no. of levels to be designated = 4)

Action 1 (0..4; 0=No action): _
Action 2 (0..4; 0=No action): _
Plain-text message: _____ (max. 30 characters)

Explanation:
Two or four levels can be specified. If only two levels are used, the LOW and UNDEF levels are combined as are the HIGH and BREAK levels. The limits between the levels are defined in the Chapter "Technical data - Signalling inputs".

A maximum of two actions can be assigned to each signalling input. After an event (level change) on the signalling input an attempt is first made to carry out Action 1. If the fax recipient defined in the specified action cannot be reached, the fax recipient is called repeatedly. The number of repetitions can be set with the parameter "No. of attempts per control station" using the command "Configure control-station interface" (see above). Ex-works this value is set to three.

If all attempts to carry out Action 1 fail, then an attempt is made to carry out Action 2. If the fax recipient defined in this action can also not be reached at the first attempt, then the attempt is repeated. The number of repetitions is also defined by the parameter "No. of attempts per control station".

If neither Action 1 nor Action 2 can be carried out, the complete call cycle is repeated once after a parameterisable time period. The time between the call cycles can be set with the command "Configure control-station interface" (see above). Ex-works this time is set to 30 minutes.

With a spontaneous message the plain-text message, which can be up to 30 characters long, appears on the fax printout.

4.6.16 Write complete set of parameters to DKM

With this command there is the possibility of transferring all the parameters to the DKM-100. This can be useful for example, when commissioning a device or the device settings have become lost for some reason.

4.6.17 Read complete set of parameters from DKM

With this command all the parameters can be read from the device, for example, to save them in a file, enabling the defined parameters to be restored at any time.

4.7 Link to control station

Submenu "Link to control station"

ELSTER DKM-100
Link to the control station

> Establish transparent link to the modem
On-line display of modem link

4.7.1 Establish transparent link to the modem

With this command a logical connection between the monitor interface and the XT Bus interface is established, so that the commands for controlling the modem ("AT commands") can be directly entered. In this manner the modem can be manually controlled for test purposes.

4.7.2 On-line display of modem link

With the on-line display of the modem link the communication between the DKM-100 and the modem can be directly traced on the monitor. This function is for example useful with the installation of a new type of modem.

4.8 Log out

The "Log out" command is used as a security function. After this command is triggered, it is ensured that a change of parameters can only take place after entry of the access code.

5 Control station functions

With the control-station functions the DKM-100 is addressed from the control station via the integral modem.

Here, there are basically two operating modes: In the command mode the control station only communicates with the DKM-100 in order to set parameters or to interrogate statuses. The transparent mode is used for communication via the DKM-100 between the control station and a terminal device.

In the command mode the DKM-100 expects commands from the control station in order to then execute them. The device is then in the command mode from the point at which a link can be established from the control station. The command mode is left when

- The control station requests the device to switch through to a terminal device, i.e. to enter the transparent mode (see description of the command).
- The control station releases the modem link. The device then branches back to the standby mode.
- The modem link is interrupted by an error.

A calling control station must identify itself with a password in order to be able to communicate with the DKM-100 at all.

Only the primary control station, i.e. the one entered as the first in the list of control stations, is authorised for the write function. In addition, the commands for writing parameters are protected with an access code.

The device branches to the transparent mode after the control station has requested switching through to a terminal device. In the transparent mode the DKM-100 is quasi-transparent. This means that in this phase of data transmission it makes no difference to the control station software whether a terminal device is connected directly with the control station or via a DKM-100. Therefore, in the transparent mode the DKM-100 does not manipulate in any way the data traffic between the control station and the terminal device.

In the following the commands are listed which a control station can send to a DKM-100:

Group	Code	Command
Device information	?a	Read software version
	?b	Read device identification
	?c	Read serial number
	?d	Read plain-text name
	?e	Read error status
	?f	Read operating hours counter
	?g	Read date and time
	?h	Read terminal-device interface status
	?i	Read control-station interface status
	?j	Read control-station entry
	?k	Read inputs
	?l	Read back outputs
	?m	Read signalling status on inputs
	?n	Read spontaneous message table of inputs
	?o	Read action table for spontaneous messages
Access authorisation	$A	Send control-station password
Parameterisation	$B	Set control-station password
	$C	Set serial number
	$D	Set plain-text name
	$E	Reset error status
	$F	Set operating hours counter
	$G	Set date and time
	$H	Configure terminal-device interface
	$I	Configure control-station interface
	$J	Enter control stations
	$K	Send access code
	$L	Set access code
	$M	Set correction value for real-time clock
	$O	Set output
	$P	Configure spontaneous messages for input
	$Q	Enter action for spontaneous message
	$R	Trigger spontaneous FAX message
	$S	Reset signalling input status
	$T	Reset repetition counter for spontaneous message actions
Transparent mode	$N	Switch through to a terminal device

Table: Commands available in the command mode.

6 Spontaneous message function

6.1 General description

Using its built-in modem, the DKM-100 is able to send a spontaneous message to a spontaneous message recipient after an event (level change) on a signalling input.

In Version 1.2 of the DKM-100 software only fax recipients are accepted as spontaneous message recipients. Up to four fax recipients can be defined in the so-called "actions" with fax number and plain text (one fax recipient per action). Up to two of these four actions can be assigned to each signalling input.

If a level change is detected on a signalling input, an attempt is first made to carry out the first of the actions assigned to the input. If the fax recipient defined in this action cannot be reached even after a parameterised number of attempts, then an attempt is made to carry out the second action. If the fax recipient entered in this "substitute" action also cannot be reached at the first attempt, then repeat calls are also made.

If both fax recipients could not be reached even after repeated attempts, the complete call cycle is repeated after a set time period.

Ex-works the number of attempts is set to 3 and the period between call cycles is set to 30 minutes.

6.2 Parameterising the spontaneous message function

The fax recipients (max. 4), the assignment of the signalling inputs, the message texts, the level designations and all other necessary settings for the operation of the spontaneous fax message function can be made both from the control station and also from the DKM-100 terminal.

The parameterisation of the spontaneous fax message function from the control station is described in the operating instructions for the LSM-100 Control Station Software from V3.50 onwards.

The parameterisation of the spontaneous fax message function from the DKM-100 terminal is described in these operating instructions for the DKM-100 in the Chapter "DKM-100 terminal - Parameterisation".

6.3 Layout of a sample fax printout

TELEFAX

from

Sender ..... : DKM-100 in test station
DKM-100 device no. ..... : 000003100001
DKM-100 identification ..... : ELS DKM100/A

to

Recipient ..... : Fax machine in Control Station 1
FAX number ..... : 06134,605353

MESSAGE

Signalling input

No.	Plain text	Event	Begin	End	Quanty
2	Alarm output EK-87 Line 2	off > on	12.05, 11:59	12.05, 11:59	1
3	Door contact	closed > open	12.05, 12:02	12.05, 12:03	2

STATUS

Signalling input

No.	Plain text	Status
1	Alarm output, EK-87 Line 1	off
2	Alarm output, EK-87 Line 2	on
3	Door contact	closed
4	SAV (safety cut-off valve)	open

DKM-100 status register: Error No. 0

7 Technical data

7.1 V.24 terminal device interfaces

Terminals:	Screw terminals, 0.14 - 1.5 mm^2 wire thickness
Supply voltages:	+5V and +8V
Parameters:	
Baud rate:	1200, 2400, 4800, 9600 or 19200
Data bits:	7 or 8
Stop bits:	1 or 2
Parity:	Even, odd or none

7.2 V.24 monitor interface

Terminals:	9-pole SUB D connector
Baud rate:	1200, 2400, 4800 or 9600
Data bits:	7 or 8
Stop bits:	1 or 2
Parity:	Even, odd or none

7.3 Switching outputs

Terminals:	Screw terminals, 0.14 - 1.5 mm^2 wire thickness
Maximum switching voltage:	40 V (external voltage source)
Maximum switching current:	50 mA

7.4 Signalling inputs

Terminals:	Screw terminals, 0.14 - 1.5 mm^2 wire thickness

Evaluation when used as **Namur inputs:**

Ex-works designation	Evaluation	Terminal voltage / V	Current / mA	Generator resistance / kOhm
BREAK	Line fracture	> 7.9	< 0.07	> 113
HIGH	High level	6.8 - 7.9	0.07 - 1.1	6.18 ... 113
UNDEF	Invalid	5.8 - 6.8	1.1 - 2.1	2.76 ... 6.18
LOW	Low level	0 - 5.8	> 2.1	0 ... 2.76

Table: Level evaluation on the signalling inputs according to the Namur specification.

When used as **general analogue inputs** (in this case the 1 kOhm "Namur" resistances R39 - R42 must be removed!), the following values apply:

Voltage range: 0 - 8 V
Input resistance: 250 kOhm
Resolution: 8 bit ≡ 33 mV

7.5 Interface to telephone network

Terminals: Screw terminals, 0.14 - 1.5 mm^2 wire thickness
1st line interface: Contacts La, Lb to telephone network
Contacts a2, b2 for a parallel connected telephone set
2nd line interface: Contacts La, Lb, a2 and b2 to DKM-100 internal modem

1st and 2nd line interfaces are short circuited, i.e. interchangeable.

7.6 Modem interface

62-pole XT Bus slot connected via adapter board to 62-pole VG strip on the DKM-100 board. XT Bus cards in the short version (max. 15 cm long) can be inserted.

7.7 Electrical supply

Device supply

Terminals:	Screw terminals, 0.5 - 4.0 mm^2 wire thickness
Supply voltage:	230 VAC
Max. power consumption:	10 VA
Fuses:	F1, F2, size 5x20, each 100 mA slow-blow

Battery for real-time clock

Nominal voltage:	3.0 V
Capacity:	950 mAh

Terminal-device power supply +8V

Rated load:	200 mA
Fuse:	F3, size TR5, 500 mA quick-blow

Terminal-device power supply +5V

Rated load:	200 mA
Fuse:	F4, size TR5, 500 mA quick-blow

7.8 Ambient conditions

Operating temperature:	-10°C - +45°C
Storage temperature:	-25°C - +70°C
Relative humidity:	Non-condensing
Protection:	IP 64

7.9 Mechanical details

Wall-mounting housing with MS-PG/EMC union glands.

Housing dimensions including mounting frame, without PC union glands (W x H x D):	296 mm x 223 mm x 94 mm
Hole pitch for housing mounting (W x H):	296 x 120 mm
Hole diameter for housing mounting:	5.5 mm
Weight, without cable:	approx. 2.5 kg

8 Appendix

A1 Terminal assignment

Label		**Meaning**	
Signal group	**Signal**	**Signal group**	**Signal**
230 VAC		Electrical supply, 230 VAC	Line
			Neutral
	PE		Earth
A1	+	Switching Output 1	Input, external voltage
	-		Output, switched voltage
A2	+	Switching Output 2	Input, external voltage
	-		Output, switched voltage
A3	+	Switching Output 3	Input, external voltage
	-		Output, switched voltage
A4	+	Switching Output 4	Input, external voltage
	-		Output, switched voltage
E1	+	Signalling Input 1	Input
	-		Ground
E2	+	Signalling Input 2	Input
	-		Ground
E3	+	Signalling Input 3	Input
	-		Ground
E4	+	Signalling Input 4	Input
	-		Ground
Ser1	RxD	Terminal Device 1	Data from terminal device
	TxD		Data to terminal device
	RTS		Data-flow control line
	CTS		Data-flow control line

Terminal assignment (continued)			
	GND		Ground
	+8 V		+8 V permanent
	+5 V		+5 V switched
Ser2	RxD	Terminal Device 2	Data from terminal device
	TxD		Data to terminal device
	RTS		Data-flow control line
	CTS		Data-flow control line
	GND		Ground
	+8 V		+8 V permanent
	+5 V		+5 V switched
Ser3	RxD	Terminal Device 3	Data from terminal device
	TxD		Data to terminal device
	RTS		Data-flow control line
	CTS		Data-flow control line
	GND		Ground
	+8 V		+8 V permanent
	+5 V		+5 V switched
Ser4	RxD	Terminal Device 4	Data from terminal device
	TxD		Data to terminal device
	RTS		Data-flow control line
	CTS		Data-flow control line
	GND		Ground
	+8 V		+8 V permanent
	+5 V		+5 V switched
Line	a2	Telephone network	Line 0, a2
	La		Line 1, La
	Lb		Line 2, Lb
	b2		Line 3, b2
Line	a2	Modem link	Line 0, a2
	La		Line 1, La
	Lb		Line 2, Lb
	b2		Line 3, b2

A2 Layout of configuration switches, jumpers, interfaces

Modem card

XT adapter

Fig.: Circuit board layout.

Legends used in the circuit board layout:

Label	**Function**
B6	Reset solder pad
BT1	Battery for real-time clock
F1	Fuse for 230VAC electrical supply
F2	Fuse for 230VAC electrical supply
F3	Fuse for +8V supply to terminal devices
F4	Fuse for +5V supply to terminal devices
JP2	Socket connector for LED adapter
JP3	Jumper for +8V supply from Terminal Device 1
JP4	Jumper for +8V supply from Terminal Device 2
JP5	Jumper for +8V supply from Terminal Device 3
JP6	Jumper for +8V supply from Terminal Device 4
KL1	Terminal for 230VAC
S1	Configuration switch
S2	Configuration switch
X2	9-pole SUB D socket for monitor
X3	VG connector strip for XT adapter

A3 Error codes

Error status	Error source
0	No error
1	EEPROM
2	RAM, internal
3	RAM, external
4	RAM, in clock module
5	Switch position, DIP switches
6	Modem
7	QUART
8	Terminal device
9	Clock module
10	Output port

A4 Drawing of housing / housing dimensions

All dimensions in mm

A5 Fitting instructions for the cable screens

When connecting the cable screen of a DS-100 read-out cable (Ident. No. 73013328) or a AS-100 read-out cable (Ident. No. 73014540) to a PG/EMC union gland, the following drawing and fitting instructions should be followed:

Bild

oben, von links:
union nut
rubber sealing ring
wall of terminal compartment
sealing ring
core ferrules

unten, von links:
cable
open out cable screen
screen clamping ring
use brass counter nut
individual cores

*1: Length of individual cores different depending on termination !

Procedure when connecting the cable screen to the cable union gland:

1. Push the nut and sealing ring over the cable.
2. Remove the cable sheath to suit the distance between the housing wall and the terminal (e.g. approx. 10 cm).
3. Cut off the screen such that approx. 8-10 mm protrudes from the sheath.
4. Slightly open up the screen.
5. Push the screen clamping ring under the screen.
6. Strip the cores as required and fit with core ferrules.
7. Insert the cable into the union gland until the screen clamping ring butts up lightly against the union gland. Do not use force to pull the cable into the housing.
8. Push the sealing ring into the union gland (over the screen and clamping ring) and tighten the nut. The cable must then be firmly clamped to the gland.
9. Connect the cores to the terminals.

A6 Supplied items, accessories, ordering information

Supplied items:
The DKM-100 Data Concentrator is supplied with:
- Internal 14.4 kbit/s modem
- 2 terminal device cables for connection of DS-100/x or EK-8x, approx. 1.5 long.
- TAE telephone cable, approx. 2.7m long.
- DKM-100 operating instructions.

Order number: 83480405

Accessories:

- Connecting Lead, DKM-100 - DS-100/EK-8x	Order no.: 73013328
- Connecting Lead, DKM-100 - AS-100	Order no.: 73014540
- Adapter Lead DKM-100 - AS-100	Order no.: 73015525
- DKM-100 Operating Instructions	Order no.: 73015183

A7 List of parameters

Section	Designation	Length	Possible entries	Ex-works default setting (EPROM)
Each terminal device (4):	Plain-text name	30		Terminal device n
	Transmission rate	5	01200...09600	04800
	Parity	1	N/O/E	N
	No. of data bits	1	7/8	8
	No. of stop bits	1	1/2	1
	Timeout between 2 characters	1	1...9	2 (sec)
	Protocol	1	A/D	D
Interface control station:	Transmission rate	5	01200...38400	38400
	Parity	1	N/O/E	N
	No. of data bits	1	7/8	8
	No. of stop bits	1	1/2	1
	Timeout between 2 characters	1	1...9	5 (sec)
	Timeout for modem response (sec)	1	1...9	5 (sec)
	Timeout for modem interface	1	1...9	5 (min)
	No. of attempts per control station	1	1...9	3
	Waiting period between 2 call cycles (min)	2	01..99	30
	No. of rings	1	1...9	2
	Time Window 1, begin	4	0000...2400	0000
	Time Window 1, end	4	0000...2400	2400
	Time Window 2, begin	4	0000...2400	0000
	Time Window 2, end	4	0000...2400	2400
	Dialling method	1	P/T	P
Complete device	Serial number	12		0...0
	Plain-text name	30		DKM100
	Access control	8		DKM100
Real-time clock	Correction value	7		+000000
Each control station	Plain-text name	30		Control station n
	Telephone number	25		0
	Password	8		Control station n
Modem parameters	Plain-text name	30		Modem 1
	Modem card address	4	0000...FFFFH	03F8

List of parameters (continued)				
Section	**Designation**	**Length**	**Possible entries**	**Ex-works default setting (EPROM)**
	Dialling command	8		ATDP
	Lift receiver	6		ATA
	Command mode	8		+++
	Modem initialisation	30		AT&FEVX3&D2S0 =0M1\N3\J\Q4
	Execution of a local loop-back test (*)	15		AT
	Terminate loop-back test	10		AT&T
Only in EPROM	Software version	4	60xx	

*-AT - No test is executed.

A8 Declaration of conformance

(Translation of German document)

EC Declaration of Conformance

according to the "Law on the electromagnetic compatibility of equipment (EMCL)" and the EMC Guideline 89/336/EWG of the Council of 3rd May 1989 (EMC Guideline) as well as Articles 5 and 14 of the Guideline 93/68/EWG of the Council of 22nd July 1993 about the modification of Guideline 89/336/EWG.

The Data Concentrator with Modem

Type DKM-100

fulfils the EMC requirements according to

DIN EN 50082 Part 1
and
DIN VDE 0878 Part 3 or EN 55022

Mainz-Kastel, 24th January 1996

ELSTER

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