ZDUE-GSM-PLUS-IV
ZDUE-GPRS-PLUS-IV
ZDUE-LAN-PLUS-IV

User Manual

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Copyright Statement

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Specifications are subject to change without notice.

Product no. DNT8125 / DNT8140
Doc. no. 8125AD002, Version 2.4
Firmware-Version V1.310 or higher (ZDUE-GSM-PLUS-IV)
Firmware-Version V2.031 or higher (ZDUE-GPRS-PLUS-IV)
Firmware-Version V.1.000 or higher (ZDUE-LAN-PLUS-IV)

Safety Precautions ZDUE-GSM-PLUS-IV / ZDUE-GPRS-PLUS-IV

General: The ZDUE-GSM-PLUS-IV and ZDUE-GPRS-PLUS-IV products comply with European norm EN60950, 05.2003, Safety of Information Technology Equipment.

The ZDUE-GSM-PLUS-IV and ZDUE-GPRS-PLUS-IV are intended exclusively for fixed installation which must be carried out only by qualified electricians in accordance with the generally acknowledged technical regulations and stipulations governing the setting up of telecommunications facilities/terminals.

The ZDUE-GSM-PLUS-IV and ZDUE-GPRS-PLUS-IV are not suitable for connection to IT systems of the electrical power supply.

Read the installation instructions carefully before using the device.

Disconnecting the ZDUE-GSM-PLUS-IV / ZDUE-GPRS-PLUS-IV from the power supply circuit:

In the installation an easily accessible, all-pole disconnecting device is required in the power supply circuit. Alternatively, a 1-pole disconnecting device in the phase conductor of the power supply circuit must be used if a unique neutral conductor is inserted in the power supply circuit. In Germany, the disconnecting device must at least meet the requirements of the 0100-series DIN VDE standard.

Installation fusing:

In the installation, fusing in accordance with the 0100-series DIN VDE standard is to be provided which is adapted to the cable cross-section of the power supply cable. The additional short-circuit protection must have a fuse rating of $I \geq 1500A$.

Strain relief:

In the installation, suitable strain relief must be provided for the cables leading to the ZDUE-GSM-PLUS-IV or ZDUE-GPRS-PLUS-IV.

Installing the antenna:

When installing the supplied antenna outdoors it is essential that the antenna is fitted to the installation bracket correctly by qualified personnel.

Lightning Protection Standard VDE V 0185 Sections 1 to 4, in its current version and further standards must be observed.

Please observe the following:

Lightning protection category for buildings: For outdoor installation, antennas may be fitted only within the lightning protection zones O/E or 1. These lightning protection zones are prescribed by the lightning protection spherical radius.

The EMV lightning protection zone concept is to be observed. To avoid large induction loops a lightning protection equipotential bonding is to be used. If the antenna or antenna cable is installed near to the lightning protection system the minimum distances to the lightning protection system must be observed. If this is not possible, insulated installation as described in the Lightning Protection Standard VDE V 0185 Sections 1 to 4, in its current version, is essential.

Purpose of the devices:

ZDUE-GSM-PLUS-IV and ZDUE-GPRS-PLUS-IV are meter data transfer devices. They serve to perform the remote readout and remote monitoring of electricity, heat, gas and water meters. They are intended for operation in GSM networks.

Warning !

Please note that data packets are also exchanged each time a connection is (re-)established, an attempt is made to connect with the receiver (e.g. server switched off, incorrect destination address, etc.) and for keeping the connection alive. This is particularly important when you are using networks that levy a per-packet charge!

Safety Precautions ZDUE-LAN-PLUS-IV

General: The ZDUE-LAN-PLUS-IV product complies with European norm EN60950, 05.2003, Safety of Information Technology Equipment.

The ZDUE-LAN-PLUS-IV is intended exclusively for fixed installation which must be carried out only by qualified electricians in accordance with the generally acknowledged technical regulations and stipulations governing the setting up of telecommunications facilities/terminals.

The ZDUE-LAN-PLUS-IV is not suitable for connection to IT systems of the electrical power supply.

Read the installation instructions carefully before using the device.

Disconnecting the ZDUE-LAN-PLUS-IV from the power supply circuit:

In the installation an easily accessible, all-pole disconnecting device is required in the power supply circuit. Alternatively, a 1-pole disconnecting device in the phase conductor of the power supply circuit must be used if a unique neutral conductor is inserted in the power supply circuit. In Germany, the disconnecting device must at least meet the requirements of the 0100-series DIN VDE standard.

Installation fusing:

In the installation, fusing in accordance with the 0100-series DIN VDE standard is to be provided which is adapted to the cable cross-section of the power supply cable. The additional short-circuit protection must have a fuse rating of $I \geq 1500A$.

Strain relief:

In the installation, suitable strain relief must be provided for the cables leading to the ZDUE-LAN-PLUS-IV.

LAN interface, Ethernet connection, 10 BASE-T:

The Ethernet interface 10 BASE-T with the RJ45 socket is a safety circuit with extra-low voltage (Safety Extra Low Voltage, SELV). SELV circuits should only be connected to other SELV circuits. Connection to telephone network voltage (TNV) circuits is not permitted.

In installations where transient overvoltages cannot be ruled out, surge protection for low voltage in accordance with VDE 0845-3-1 or DIN EN 61643-21, IEC 61643-21 is to be used.

Purpose of the device:

The ZDUE-LAN-PLUS-IV is a meter data transfer devices. It serves to perform the remote readout and remote monitoring of electricity, heat, gas and water meters. It is intended for operation in Ethernet networks.

Warning !

Please note that data packets are also exchanged each time a connection is (re-)established, an attempt is made to connect with the receiver (e.g. server switched off, incorrect destination address, etc.) and for keeping the connection alive. This is particularly important when you are using networks that levy a per-packet charge!

Contents

1 Introduction

Purpose of the device

ZDUE-GSM-PLUS-IV, ZDUE-GPRS-PLUS-IV and ZDUE-LAN-PLUS-IV are meter data transfer devices. They serve to perform the remote readout and remote monitoring of electricity, heat, gas and water meters with an interface in accordance with DIN EN62056-21 (formerly: DIN EN61107 and IEC 1107).

The ZDUE devices are designed in such a way that the communication with the connected meter is identical, e.g. the RS-232 interface of the ZDUE-GPRS-PLUS-IV is identical to the RS-232 interface of the ZDUE-LAN-PLUS-IV.

Differences between the devices exist mainly concerning the communication networks used and the different connection options and settings and/or setting options due to the different communication networks.

The data (remote readout and remote monitoring) are transmitted via:

- a common GSM network (ZDUE-GSM-PLUS-IV)
- a common GPRS network (ZDUE-GPRS-PLUS-IV)
- an Intranet (LAN) or Internet (ZDUE-LAN-PLUS-IV).

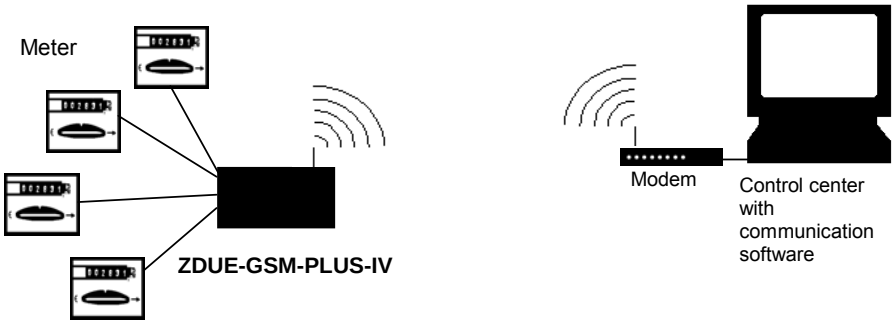
This manual starts with instructions on the ZDUE-GSM-PLUS-IV.

Information on the ZDUE-GSM-PLUS-IV with 4-wire RS-485, the ZDUE-GPRS-PLUS-IV and the ZDUE-LAN-PLUS-IV - connection options, parameters etc. that differ from and/or are additional to those of the ZDUE-GSM-PLUS-IV - follows thereafter (see *ZDUE-GSM-PLUS-IV with the 4-wire RS-485*, *ZDUE-GPRS-PLUS-IV and ZDUE-LAN-PLUS-IV*).

2 ZDUE-GSM-PLUS-IV

Overview

With ZDUE-GSM-PLUS-IV the data transfer for remote readout and remote monitoring takes place via one of the standard GSM networks.



The ZDUE-GSM-PLUS-IV has the following interfaces for the connection of meters: CL1, RS-232, RS-485 (or M-Bus) and 3 pulse inputs. The maximum permissible number of meters can be connected simultaneously to each of the interfaces.

For the remote readout of meters by the control centre the ZDUE-GSM-PLUS-IV can connect all the connected meters successively to the control centre during a single connection, as well as allowing the load profile of the pulse inputs to be read out. The modem of the ZDUE-GSM-PLUS-IV works transparently.

How does it work?

The integrated modem of the ZDUE-GSM-PLUS-IV takes data calls from the GSM network that have been initiated from the control centre.

The control centre can call

- from the GSM network via a GSM modem (up to 9600 bps)
- from the fixed network via an analogue modem (up to V.32; 9600 bps)
- from the fixed network via an ISDN terminal (V.110).

When called, the ZDUE-GSM-PLUS-IV reacts to the telegrams sent by the control centre as follows:

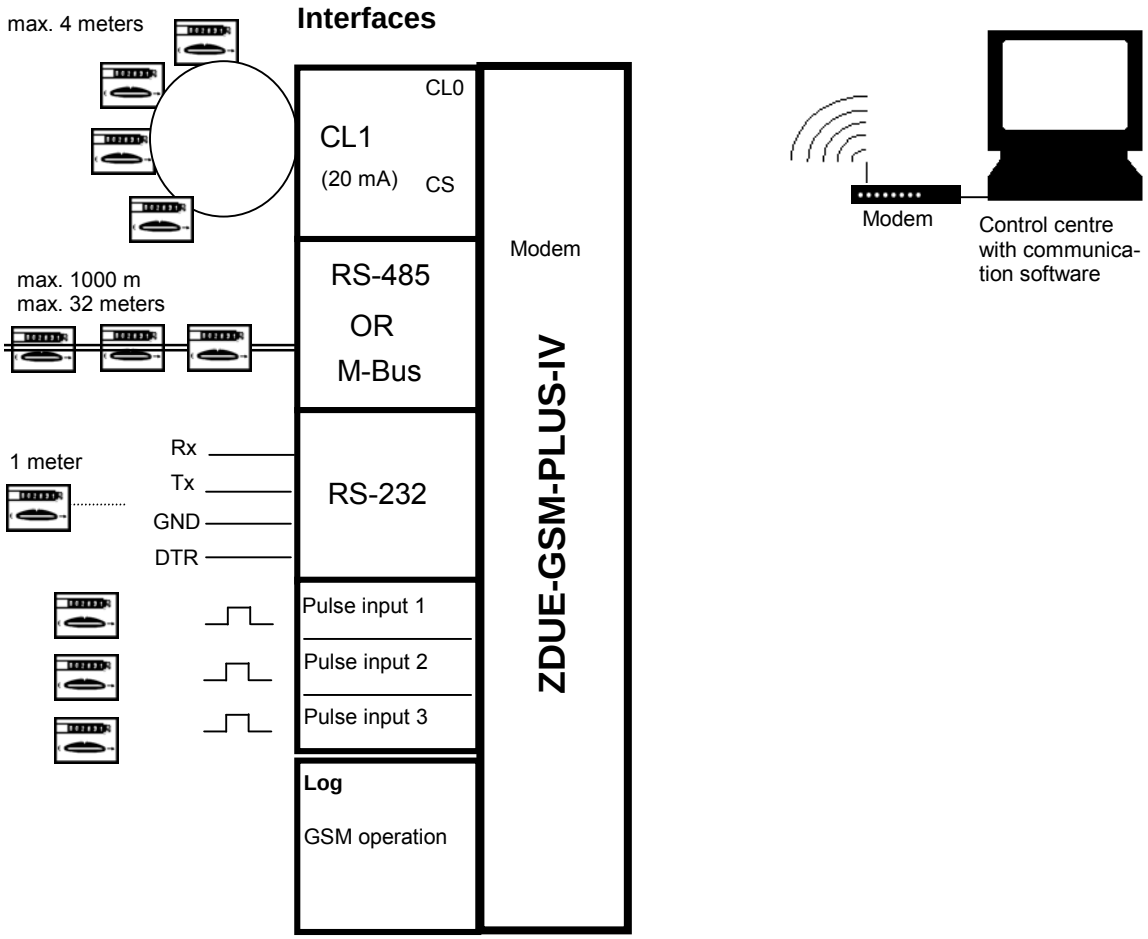
- It connects to the meters that are connected to its interfaces (CL1, RS-232, RS-485 (or M-Bus)).
- It connects to the stored load profile in order to transfer it to the control centre. The load profile records the consumption data of the meters that are connected to the pulse inputs of the ZDUE-GSM-PLUS-IV.
- It receives parameter commands and carries them out.

2.1.1 The interfaces of the ZDUE-GSM-PLUS-IV

The ZDUE-GSM-PLUS-IV has various interfaces for the connection of meters:

- CL1
- RS-485 (or M-Bus)
- RS-232
- 3 pulse inputs. One meter can be connected to each of these. For these the ZDUE-GSM-PLUS-IV creates a load profile in which the consumption data are recorded.

Meters can be connected to all interfaces simultaneously.



2.1.2 Access protection

Access protection ... by time windows

The ZDUE-GSM-PLUS-IV can be configured so that it accepts calls only at certain times.

and / or

... by password or password callback function

A password query can be configured to protect against unauthorised access. The ZDUE-GSM-PLUS-IV then asks the calling device for the agreed password that must be transmitted within the preconfigured time (password timeout). If the password is incorrect or the timeout is exceeded the ZDUE-GSM-PLUS-IV closes the connection.

The password callback function can also be activated. This works as follows: after a successful password check the ZDUE-GSM-PLUS-IV closes the connection, then itself makes a new connection to the control centre (the number of which must have been previously configured).

2.1.3 GSM log

The ZDUE-GSM-PLUS-IV keeps a log which records key events and status changes that occur in

- GSM communication
- the GSM operating parameters
- local communication with the connected meters
- special events.

The GSM log can be used to determine error sources.

2.1.4 Real-time clock for time-controlled functions and module reset

The integrated real-time clock contains a calendar that takes the changes in day, month, year and leap year into consideration - based on a configurable state table which is valid for 10 years.

The clock is used for time-controlled functions:

- correct storage of the load profile of the meters connected to the pulse inputs
- for access protection by time windows (see above)
- regular reset of the GSM module.

The power reserve of the clock bridges a period of up to 2 days during a power failure (buffering through supercap).

2.1.5 Configuration (parameterisation) and firmware update

Configuration by parameterisation

Configuration is done using the configuration software, which transmits parameterisation commands to the ZDUE-GSM-PLUS-IV.

The parameterisation commands can be transmitted to the ZDUE-GSM-PLUS-IV via the GSM network (remote configuration) or direct via the RS-232 interface (local configuration).

Firmware update

A firmware update can be made via the GSM network using the configuration software. It is also possible to load new firmware into the device from a computer that is locally connected direct to the RS-232 interface of the ZDUE-GSM-PLUS-IV.

2.2 Operating elements and function indicators

The ZDUE-GSM-PLUS-IV has no manual operating elements such as switches or buttons. Communication with the device takes place exclusively via software command.

To monitor the operating status the device is fitted with 4 LEDs. These serve to indicate the currently active functions and the current status.

LED	Colour / action	Meaning
Power	Green	Power is on
Status	Red flashing (0.5 / 0.5 sec)	PIN / SIM error (no SIM or wrong PIN)
	Orange flashing (0.5 / 0.5 sec)	Connection build-up (GSM) active
	Red	Malfunction (parameter checksum wrong, Data Flash error).
	Green flashing (0.5 / 0.5 sec)	Reinitialisation (device works with default configuration).
	Green	Normal operation (no malfunction, device works with customised parameterisation).
	Orange	Boot phase
Communication	Off	No communication (meter/GSM interface)
	Green (on for min. 0.25 sec)	Serial communication active: - data transfer control centre -> meter - data transfer meter -> control centre
GSM status	Beginning of display: When mobile is switched on and logged into the GSM network.	
	Off	GSM module off or not logged in.
	On	CSD connect
	flashes 1x in 2 sec	field strength <= -98 dBm
	flashes 2x in 2 sec	-98 dBm < field strength <= -83 dBm
	flashes 3x in 2 sec	-83 dBm < field strength <= -68 dBm
	LED flashes 4x in 2 sec	field strength > -68 dBm

2.3 Putting the device into operation

To put the ZDUE-GSM-PLUS-IV into operation, proceed as follows:

2.3.1 Inserting the SIM card

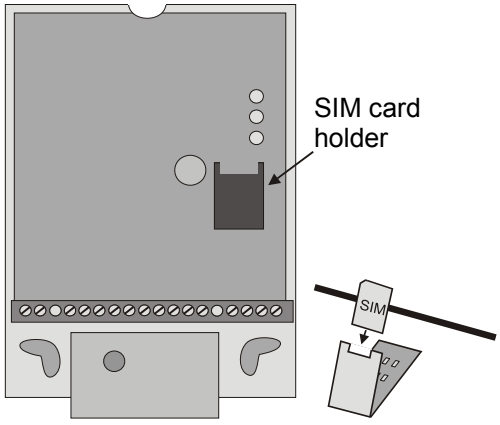
PIN

The PIN on the SIM card must be **0000**.

If your SIM card has a different PIN, please change it. You can do this using a mobile telephone.

With some network operators it is also possible to deactivate the SIM card PIN request. In this case the PIN can be anything because it is deactivated and the request is irrelevant.

To insert the SIM card, proceed as follows:

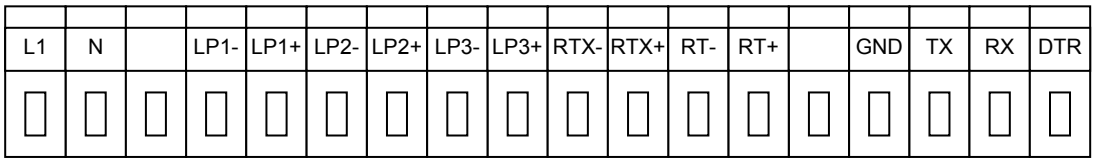


1. Disconnect the device (all poles) from the power supply if it is connected to it.
2. Loosen the screw of the clamp lid and remove the clamp lid.
3. Remove the lid of the device.
4. Open the SIM card holder and slide the SIM card into the flap of the holder. When the SIM card holder is closed the gold-plated contacts of the SIM card must be touching the gold-plated contacts of the holder.
5. Close the flap of the SIM card holder and lock the flap by sliding it carefully upwards until you feel it click into place.
6. Replace the device lid and the clamp lid.


Under no circumstances must the SIM card be inserted or removed during operation!

2.3.2 Screw-clamp terminal block connections

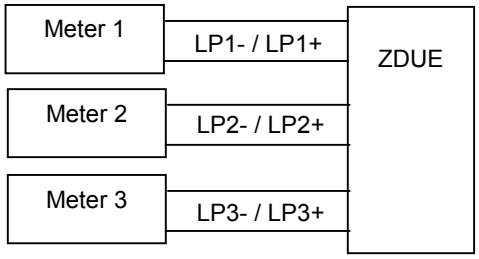
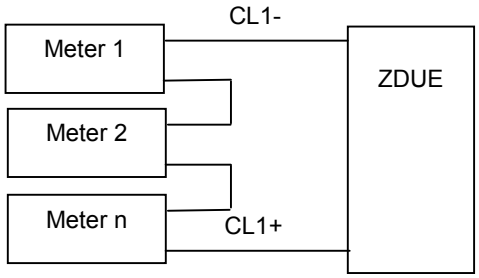
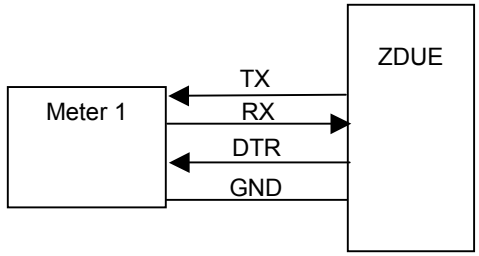
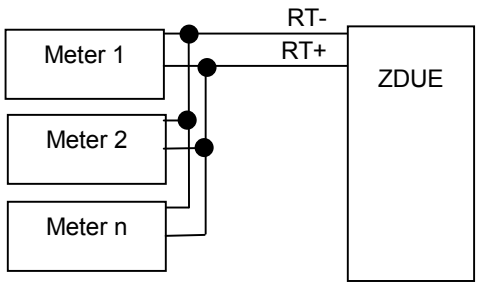
The connection of the ZDUE-GSM-PLUS-IV to the power supply and the connection of the meters to the ZDUE-GSM-PLUS-IV are made via the 18-pin screw-clamp terminal block.

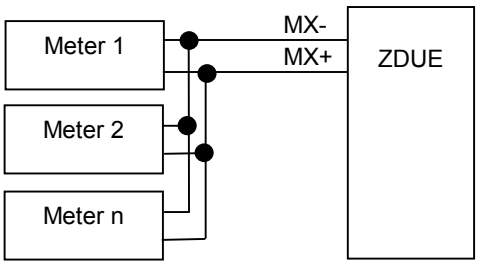


PIN No.	Signal	Function/comment
1	L1	Mains voltage connection
2	N	Mains voltage connection
3		Not wired
4	LP1-	Pulse input 1 -
5	LP1+	Pulse input 1 +
6	LP2-	Pulse input 2 -
7	LP2+	Pulse input 2 +
8	LP3-	Pulse input 3 -
9	LP3+	Pulse input 3 +
10	RTX-	Current loop CL1 -
11	RTX+	Current loop CL1 +
12	RT-/MX-	RS-485 RT-
13	RT+/MX+	RS-485 RT+
14		Not wired
15	GND	Signal GND / cable shield
16	Tx	RS-232 Tx (Output)
17	Rx	RS-232 Rx (Input)
18	DTR	RS-232 DTR (to supply a terminal device)

2.3.2.1 Connecting meters

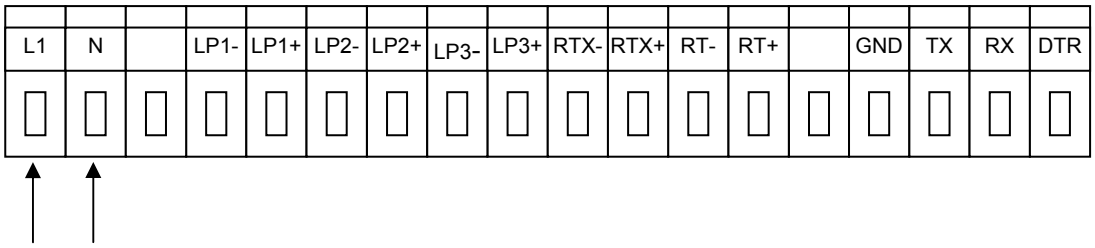
The meter interfaces of the ZDUE-GSM-PLUS-IV are listed below. Connect the meters to the terminal block as illustrated. All interfaces can be used simultaneously.

3 Pulse inputs For the connection of electricity meters with pulse outputs. These can be operated simultaneously. The pulses of the meters are counted by the ZDUE-GSM-PLUS-IV and stored in a load profile. This can then be read out from the control centre via a GSM connection. Further information: → page 20	
CL1 interface This **20mA current loop interface** is for the connection of meters with current loops in accordance with DIN EN 62056-21. About 4 meters can be connected to this interface. Further information: → page 18	
RS-232 interface For the connection of a meter with an interface in accordance with V.24/V.28 A maximum of 1 meter can be connected to this interface. Further information: → page 19	
RS-485 interface For the connection of meters with an RS485 interface. A maximum of 32 transceivers (meters) can be operated at the bus. Communication takes place on a half-duplex basis. The bus connection is terminated to Z=120 Ω (nominal) (RT+ to RT-) and the cable length limited to 1,000 metres. The interface is potential separated from the mains connection. Further information: → page 19	

M-Bus interface (optional instead of RS-485) This serves to connect meters with an M-Bus interface. A maximum of 25 M-Bus standard loads can be operated. Communication takes place on a half-duplex basis. Further information: → page 19	

2.3.2.2 Connecting the ZDUE-GSM-PLUS-IV to the power supply

The connection to the supply voltage is made via clamps L1 and N of the terminal block. These clamps are designed for cables with a cross-section of up to 1.5 mm².

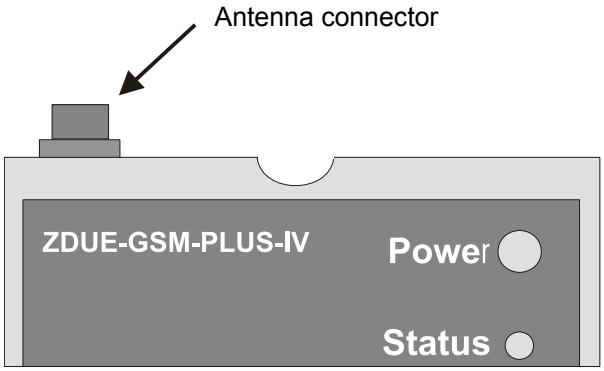


The ZDUE-GSM-PLUS-IV can be operated with either alternating current or direct current. The device complies with Protection Class 2. The supply of the interfaces is galvanically separated from the electronics.

Supply voltage	**Nominal values**	**Maximum values**
AC voltage:	100VAC to 230VAC without switching (50/60 Hz)	76VAC to 253VAC
DC voltage (protected against polarity reversal):	60VDC to 100VDC without switching	54VDC to 110VDC

The device complies with Protection Class 2. The power supply of the interfaces is separated galvanically from the electronics.

2.3.3 Attaching and connecting the antenna



The antenna is connected to the FME antenna socket.

The antenna should be installed so that sufficient signal quality is attained. Make sure that there are no large metal objects near the antenna (e.g. reinforced concrete) as these have a negative effect on signal quality.

When an external antenna is installed outdoors it must be grounded against lightning on the installation bracket. This must be done by a qualified technician.

Please consult the instructions included with your antenna.

2.3.4 Configuring the device where required

Delivery default setting

The default pre-setting of the ZDUE-GSM-PLUS-IV is such that the following meter interface serves as the primary interface:

CL1 during a GSM connection with the control centre

RS-232 if there is no GSM connection (to the local configuration)

This means that meter readouts by the control centre are automatically directed to the CL1 interface so that the control centre can communicate with the meters connected to this interface.

During the same GSM connection the control centre can be connected to other interfaces and the meters connected there when the control centre sends a corresponding switch-over command to the ZDUE-GSM-PLUS-IV. (See *Switching between interfaces during remote readout*, page 21.)

Configuration options

The primary interface and various other settings can be altered.

Other important possible settings regarding security are:
access protection by time window
password request and
password with callback

See *Configuration*, page 25.

2.4 Operation

2.4.1 The GSM interface

Properties

Communication with the GSM network takes place via a GSM/GPRS module from Sagem. Data transfer takes place according to the following standards:
GSM Rec. 7.02 asynchronous, RLP in acc. with GSM Rec. 4.22,
ISDN type V.110, analogue modem type V.32

Default setting for the internal GSM module interface:
Transmission speed: 19200 Bps
Data format: 7E1 (optional 8N1 configurable)
Flow control: Hardware (RTS/CTS)

The device can be set up for communication via GPRS.

2.4.2 Time management with real-time clock

The ZDUE-GSM-PLUS-IV has a real-time clock. A supercap bridges a power failure of up to 2 days.
The real-time clock contains a calendar that takes the changes in day, month, year and leap year into consideration. Automatic switching between summer and winter time is based on a configurable state table which is valid for 10 years.
The control centre has to set the time when putting the device into operation and also after a power failure of 2 days or longer.
The clock is used for

- correct recording of the load profile,
- time-controlled call acceptance, if activated,
- periodic resets of the GSM module (default: 1xdaily, 23 h),
- time stamp in the GSM logbook.

2.4.3 Controlling communication

Control properties

The ZDUE-GSM-PLUS-IV controls communication between the control centre and the meters connected to the ZDUE-GSM-PLUS-IV in accordance with Protocol EN 62056-21 (Annex A):

- in mode A/C,
- in data readout and programming mode,
- including data backup (reception) and acknowledgement.

The start baud rate and the data format can be adjusted for the following interfaces: CL1 (Current Loop Interface), RS-232, RS-485/M-Bus

➲ In ModeC operation, the baud rate is switched according to the baud rate ID received in the acknowledge telegram from the control centre.

Detection of the end of a communication cycle

During the data readout the end of a communication cycle is detected when

- no meter data are received for >= 3 seconds (mode A/C → timeout)
- the sequence ‘CR LF ETX‘ is detected (mode C → normal end)

In programming mode the end of a communication cycle is detected when

- a ‘break‘ telegram is recognised (mode A/C → break).

Once a communication cycle is completed the connection is closed and the baud rate of the serial interface driver of the meter interfaces is reset to the parameterised start value.

Normal connection release

Connection release after transfer timeout:
The ZDUE-GSM-PLUS-IV ends a normal data connection following expiry of the transfer timeout. This means that if no data transfer takes place between the control centre and the ZDUE-GSM-PLUS-IV or the meters connected to the ZDUE-GSM-PLUS-IV during an existing connection within the fixed timeout (standard: 20 seconds), the ZDUE-GSM-PLUS-IV closes the connection.

Connection release by the control centre:
The control centre can terminate the connection at any time.

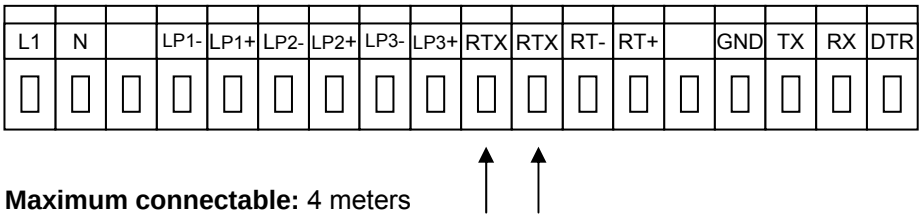
Connection terminated due to errors

If a connection is terminated during a meter readout due to errors (e.g. network failure), the ZDUE-GSM-PLUS-IV ends data output by means of a 'break' as described in the VDEW specifications.
If a meter does not support this feature it may happen that, after the connection has been re-established, the control centre wishes to communicate with an external meter, but this meter is still in 'data transfer' status. In this case, the request telegram for the (one) external meter is rejected and the communication cycle is ended by timeout.

2.4.4 Meter interfaces

CL1

The interface CL1 corresponds to the current loop interface in accordance with DIN EN 62056-21.
It is an active 20 mA interface with a 2-wire connection via the clamps RTX- and RTX+ (clamps 10 and 11) on the terminal block.



Maximum connectable: 4 meters

The interface is separated from the modem via an optocoupler.

Data format: Default: 7E1
Setting options: 7E1, 7O1, 8N1, 8E1

Handshake: No hardware/software handshake.

Interface speed: Default: 300 baud (mode C)
Setting options: 300, 600, 1200, 2400, 4800, 9600, 19200 baud.

When communicating with the connected meters the following methods are possible:

Fixed baud rate
The speed is fixed to a particular value by parameterisation. The communicating meter and the control centre connected via modem exchange data at the selected speed, i.e. the ZDUE-GSM-PLUS-IV works transparently. The speed is the same as or slower than the GSM speed (9600bps).

Variable baud rate
Corresponds to baud rate switching in accordance with Mode C as per

DIN EN 62056-21.

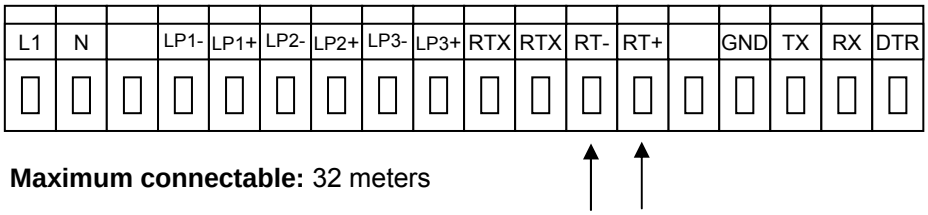
The starting speed is 300 baud. The speed is increased when the communicating meter requests this from the CL1 interface and the interface confirms the requested baud rate. If there is no confirmation, communication is continued at the current speed.

➲ The speed of the meter interface should not exceed the speed of the GSM connection (9600bps) as this could cause transfer problems.

During a meter readout all the characters sent to the meter are sent back as an echo via the CL1 interface. These characters are normally transferred to the superordinated system. The echo is suppressed by the modem.

RS-485

The meters are connected to the clamps RT- and RT+ (clamps 12, 13) of the terminal block via a 2-wire bus connection.



Maximum connectable: 32 meters

Interface speed: Default: 300 baud (mode C)

Setting options: 300, 600, 1200, 2400, 4800, 9600, 19200 baud

Data format: Default: 7E1

Setting options: 7E1, 7O1, 8N1, 8E1

Handshake No hardware/software handshake

➲ The speed of the meter interface should not exceed the speed of the GSM connection (9600bps) as this could cause data loss.

Communication can take place as with the CL1 interface.

Communication takes place on a half-duplex basis.

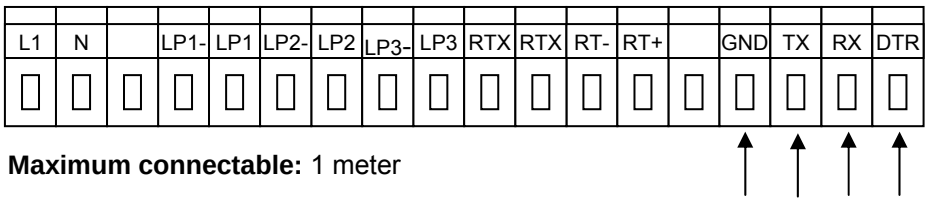
The bus connection has been terminated to 120 ohms and the cable length limited to 1,000 metres.

The interface is potential separated from the mains connection.

RS-232

The interface corresponds to the V.24 / V.28 specification.

A meter is connected to the RS-232 interface by a 3 or 4-wire connection via the clamps RX, TX, GND and DTR (clamps 15, 16, 17, 18) of the terminal block.



Maximum connectable: 1 meter

Use a shielded cable. The connection of the *signal ground* and of the cable shield is made at GND, the cores for the reception data at RX, for transmission at TX.

In addition, the ZDUE-GSM-PLUS-IV can signal to the connected meter via the signal DTR whether it is connected to the control centre.

Interface speed: Default: 300 baud (mode C)

Setting options: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 baud

Data format: Default: 7E1

Setting options: 7E1, 7O1, 8N1, 8E1

Handshake: No hardware/software handshake

➲ The speed of the meter interface should not exceed the speed of the GSM connection (9600bps) as this could cause data loss.

The interface is potential separated from the mains connection.

Local configuration:

The ZDUE-GSM-PLUS-IV can be configured using a computer connected to this interface.

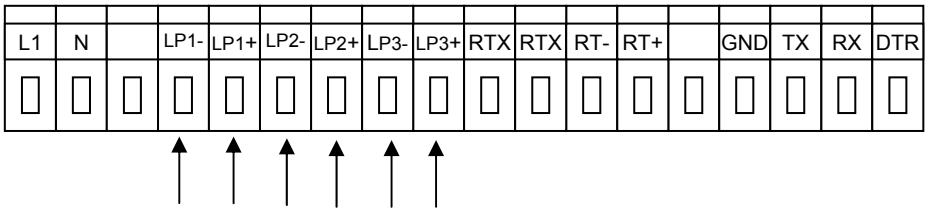
The appropriate setting is: 19200 baud, 8N1.

The RS-232 interface is automatically set to these values when there is no GSM connection.

Pulse inputs (load profile inputs)

The pulse inputs correspond to DIN EN 62053-31 Class B.

The ZDUE-GSM-PLUS-IV has 3 pulse inputs (load profile inputs). The connection is made via the clamps LP1-,LP1+; LP2-, LP2+; LP3-,LP3+ (clamps 4, 5; 6, 7; 8, 9).



The incoming pulses are recorded in the load profile (see *Load profile for meters at the pulse inputs,* page 23).

Different kinds of pulse sources can be used as the following can be configured separately for each pulse input:

- active pulse edge (rising, falling) and
- minimum pulse duration (10ms to 150ms).

If the pulse edge is 'rising', pulse counting takes place upon closure of the electrical circuit through the pulse output. With an active, 'falling' pulse edge, pulse counting takes place when the electrical circuit is opened.

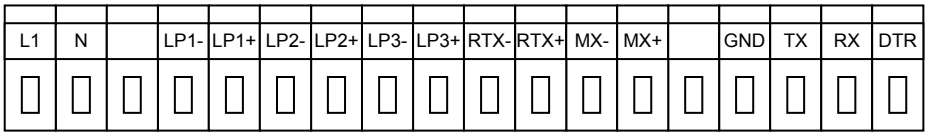
➲ The pulse duration setting should be at least 20 ms less than the actual pulse duration.

The pulse inputs are potential separated from the mains and, all taken together, have a common reference potential.

M-Bus (optional instead of RS-485)

The ZDUE-GSM-PLUS-IV is also optionally available with an M-Bus interface according to EN1434-3. These devices do not have the RS-485 interface.

The meters are connected via a 2-wire bus connection to the MX and MX+ terminals (terminal 12, 13) on the terminal strip.



Maximum connection: 25 M-Bus standard loads

Interface speed: Default: 300 baud (ModeC)
Setting options: 300, 600, 1200, 2400 baud

Data format: Default: 7E1
Setting options: 7E1, 7O1, 8N1, 8E1

Handshake No hardware/software handshake

Active 2-wire interface according to EN1434-3 up to 2400 baud, half-duplex, including the supply of a maximum of 25 M-Bus meters (Minimaster)

M-Bus voltage: 31V (core without load)

M-Bus quiescent current: 37.5mA (25 M-Bus standard loads)

Galvanic insulation

2.4.5 Switching between interfaces during remote readout

Automatic activation of the primary interface

Once the connection between the ZDUE-GSM-PLUS-IV and the control centre is established, the modem of the ZDUE-GSM-PLUS-IV activates the interface that is configured as the primary interface. The control can then communicate with the connected meter(s), i.e. read out their data.

The default setting for the primary interface is as follows:

with a GSM connection (Connect) (GSM online condition): **CL1**

without a GSM connection (GSM offline condition): **RS-232**

Switching to other interfaces during a connection

The ZDUE-GSM-PLUS-IV also offers the possibility to switch temporarily to other interfaces during a connection. The control centre can then also communicate with the meters connected to the other interfaces and read out their data.

Switching is triggered by a command sent from the control centre. When the command is sent the parameters previously determined for the interface now selected take effect.

Switching to another interface can be done any number of times during a connection.

To switch interfaces there is a special address mode for the request telegram sent by the control centre.

With the two special addresses COMPORT# and DM600# as well as of the appended number (**1**=CL1, **2**=RS-232, **3**=RS-485, **4**=M-Bus), switching to the desired interface takes place. This means that the ZDUE-GSM-PLUS-IV recognises this special address in the request telegram from the control centre and switches accordingly to the requested interface. If the desired interface does not exist or if there is a transfer error this is acknowledged with <NAK>, otherwise with a dummy billing dataset (from FW-Version 1.205) or with <ACK> (up to FW-Version 1.204).

Example:

Command to switch to the RS-232 interface (=**2**):

Switch command

Control centre transmits:		Reply from the ZDUE-GSM-PLUS-IV:
HHU	/?**COMPORT#2**!<CR><LF>	<ACK>
OR		(up to FW-Version 1.204)
HHU	/?**DM600#2**!<CR><LF>	*or* /ABB5\@4.20<cr><lf><STX> F.F(00000000)<cr><lf><ETX> <BCC> (from FW-Version 1.205)

Reset to primary interface

If the connection is interrupted (e.g. by a power failure) or closed in the regular manner, the modem - provided that it has been configured accordingly - can transmit a *break* signal to the interface last used. The ZDUE-GSM-PLUS-IV then switches back to the primary interface, i.e. to the interface configured as primary.

2.4.6 Load profile for meters at the pulse inputs

For the three pulse inputs the ZDUE-GSM-PLUS-IV records an internal load profile indicating the consumption measured by the meter concerned. The memory for the load profile is implemented as a circulating memory, i.e. when the end of the memory is reached the oldest load profile entry is overwritten.

The recording of the load profile and the load profile status takes place in accordance with the parameterised measurement period pattern. The control centre provides the measurement period values for the readout in VDEW format (for 3 channels in each case).

The following parameters can be set:

- Pulse duration 10-150ms
- Flank rising or falling
- Measurement period duration: 1, 5, 15, 30, 60 minutes
- ID and unit in acc. with EDIS
- Medium acc. with EDIS (ZDUE-GSM-PLUS-IV from FW-Version 1.210 / 07.12.2004)

Load profile specifications

Protocol depth: min. 40 days with 15-minute measurement period,

No. of channels: 3

Meter width: 6 decades (without decimal places)

Meter mode: feed

In addition to the measuring values a status byte is stored at every measuring point in the circulating memory in which the following events relevant to the load profile are recorded:

- time switching (summer ←→ winter time (standard time))
- measurement period changed (deletes the entire load profile)
- incomplete measurement period
- power failure (when power returns all affected entries are completed and the current measurement period marked accordingly - see page 23)
- time reset.

The bit coding of the status byte is described in the section *Status commands*, page 45.

2.4.7 Effects on the load profile of power failure or change in time or measurement period

Power failure

In the event of a power failure the current measurement period is not completed. When power returns the measurement period interrupted by the power failure is continued and completed by the measurement period pattern determined by the device's clock. The meter values attained during the measurement period up to the power failure are lost, as are meter pulses during the power failure. At the first measuring point after power returns only the meter pulses between the return of power and the measuring point are stored. Immediately after power returns and at the first measuring point after this a timestamp is entered in the load profile.

In the event of a power failure between 2 measuring points the current measurement period is marked with the status entry '*Power failure*'.

In the event of a power failure skipping one or more measuring points no measurement periods are entered subsequently. The current measurement period (from return of power to measuring point) is given the status entry '*Power failure*'.

Setting the clock

Putting the clock forward/back without exceeding a measuring point:

If the device's clock is changed (put forward/back) without exceeding a measuring point, this has no influence on the measurement value recording. At the next measuring point the status entry '*Time reset*' is recorded.

Putting the clock forward/back in excess of one measuring point:

Forward: The device's clock is, for example, put forward in excess of one measuring point from 13:12:10 to 13:16:00 given a 15-minute measurement period.

A recording with a new date/time (i.e. 13:16:00 here) is immediately prompted and given the status entry '*Time reset*' in the load profile. The next recording then takes place in the measurement period raster, i.e. at 13:30:00.

Back: The device's clock is, for example, put back by more than one measuring point from 11:02:05 to 10:59:00 given a 15-minute measurement period.

The last entry in the circulating memory (11:00:00) is deleted, and the meter values of this entry are added to the current values and registered at the next measuring point (11:00:00) with the entry '*Time reset*' in the load profile memory.

Putting the clock forward/back in excess of several measuring points:

Example: The device's clock is put forward or back in excess of several measuring points (e.g. from 13:12.10 to 13:32:00 given a 15-minute measurement period).

When putting the clock forward or back in excess of several measuring points, no changes are made in the circulating memory. The next recording (here: 13:45:00) is made with the status entry '*Time reset*'.

Changing between summer and winter time

Change summer time → winter time

In the course of the automatic change from summer to winter time (standard time) - the clock is put back by 1 hour - the measurement period which ends at the time of the change is given the status entry '*Time change*'.

Measurement period sequence:
02:00 02:15 02:30 02:45 **02:00** 02:15 02:30 02:45 **03:00**.

Change winter time → summer time

In the course of the automatic change from summer to standard (= winter) time - the clock is put forward by 1 hour - the measurement period which ends at the time of the change is given the status entry '*Time change*' (03:00). No measurement periods are entered subsequently (as with status '*Power failure*').

Measurement period sequence:
01:30 01:45 **03:00** 03:15 03:30.

Measurement period sequence

Altering the measurement period duration automatically results in the deletion of the entire load profile and meter value registers.

2.5 Configuration

The most important configurable settings and functions

Security settings
- Time window
- Password
- Password callback function

Device time

Primary interface

Data format and transfer rates of the different interfaces

Module reset

2.5.1 Configuration by parameterisation

Configuration is done with the software that is used to operate the control centres. Parameter commands are transferred to the ZDUE-GSM-PLUS-IV using this software.

The software commands are described on page 29 ff.

The parameter commands can be transferred to the ZDUE-GSM-PLUS-IV via the GSM network (remote configuration) or direct via the RS-232 interface (local configuration).

Remote configuration via the GSM network

Remote configuration is performed by the control centre which sends parameter commands to the ZDUE-GSM-PLUS-IV via the GSM network. Transfer takes place in accordance with DIN EN 62056-21 using a BCC protocol. The parameter commands must be sent explicitly to the address of the ZDUE-GSM-PLUS-IV.

The default device address is as follows: **99999999**

The device address is configurable. It has 16 digits; numbers and letters are permissible.

Local configuration

The device can also be configured using a computer that is connected direct via its COM port to the RS-232 interface of the ZDUE-GSM-PLUS-IV.

Prerequisite: There is no active GSM connection between the ZDUE-GSM-PLUS-IV and the control centre.

GSM offline status: RS-232 interface settings

As soon as there is no active GSM connection the RS-232 interface is set by default to the following settings:

19200 baud

8 data bits, no parity, 1 stop bit

Make sure that the settings of the COM port being used on the connected configuration computer correspond to the above settings and switch off any flow control (hardware (RTS/CTS), XON-XOFF).

When the computer connected to the RS-232 interface sends request telegrams with the device address of the ZDUE-GSM-PLUS-IV (default: **99999999**), the ZDUE-GSM-PLUS-IV reacts exactly as if it were receiving the

request telegrams from the remote control centre via the GSM network.
During local configuration via the RS-232 interface the ZDUE-GSM-PLUS-IV will not accept calls from the GSM network.

GSM online status: RS-232 interface settings

As soon as a GSM connection is established the RS-232 interface is set by default to the following settings:

19200 baud

7 data bits, even parity, 1 stop bit

These settings remain in effect for the duration of the GSM connection.

➲ The settings of the RS-232 interface for GSM online status are configurable.

2.5.2 Saving the configuration in the file *para.ini*

All the settings of the ZDUE-GSM-PLUS-IV are stored in the file *para.ini*.
The parameter file *para.ini* illustrated below shows
the adjustable parameters (settings)
their explanations and
their possible values.
The parameter file, para.ini, is divided into sections ([SEKTION]). The parameter classes in communication according to DIN EN 62056-21 on these sections is illustration in the table on page 29. The parameter classes (C51 to C58) are to be indicated in parameter commands.

```
[MOBILE_CONFIG]
SIMPIN=pin_number                          ;For SIM cards with activated PIN function the PIN number
                                           ;must be
                                           ;entered here (max. 9 digits)
OPERATOR=network_operator                  ;GSM Location Area Identification Number of the network
                                           ;operator
                                           ;under which the module is to book itself in (e.g. '26201‘ for
                                           ;D1)
OP_SET_DELAY=operator_select_interval      ;Interval [05..99 minutes] that determines how often an
                                           attempt is
                                           ;made to reset the operator (if parameterised and if the
                                           ;current operator differs from the parameterised operator).
BEARER_SERVICE=0 | 7 | 14 | 71 | 75        ;Bearer service type (AT+CBST=), default: 7 (9600 bps
                                           ;(V.32)):
                                           ;   0 = autobauding
                                           ;   7 =   9600 bit/sec (V.32)
                                           ; 14 = 14400 bit/sec (V.34)
                                           ; 71 =   9600 bit/sec (V.110)
                                           ; 75 = 14400 bit/sec (V.110)
RESTART_TIME=hh:mm                         ;Start time for module reset (default: 23:00)
RESTART_IV=hh                              ;Interval for module reset (01 .. 48 hours, default: 24 hours)
BAUDRATE=9600 | 19200 | 38400 | 57600      ;Baud rate of the serial mobile interface driver (max. 6 digits)
DATABITS=7 | 8                             ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1                                 ;No. of stop bits (only ‘1‘ permitted)
PARITY=NO | EVEN | ODD                     ;Parity (only NO, EVEN or ODD permitted)

CCFC_QUERY=YES | NO                        ;Status query Perform call forwarding

Internally generated entries:
SIMSTATE=SIM_PROBLEM | SIM_ERROR           ;Entry is only created by the mobile handler when the first
                                           ;(SIM_PROBLEM) or second (SIM_ERROR) PIN handoff to
                                           ;the mobile is acknowledged as an ERROR.
```

```
NEW_SIMPIN=new_pin_number          ;Entry is only created by the application when a new PIN is
                                   ;to be set in the mobile. Mobile handler checks after each
                                   ;disconnect (NO CARRIER) for this entry and
                                   ;changes the PIN in the mobile. After successful execution,
                                   ;parameter SIMPIN is set on the new PIN and the parameter
                                   ;NEW_SIMPIN is deleted.
STEADY_IMSI_CHECK=mode             ;Controls the functionality of the cyclical (per second) IMSI
                                   ;poll ;(AT+CIMI)

[GSMLOG_CONFIG]
KENNZIFFER=50..98                  ;Index no. of the GSM logbook in communications
                                   ;(default: '98')
ENABLED=YES | NO                   ;Record in the GSM logbook active/inactive
TIMEOUT=2..15                      ;Timeout to generate cyclical GSM logbook entries [min.]


[CSD_CONFIG]                       ;CSD-Parameter
CSD_DIAL_STRING= number            ;Control centre number (max. 30 characters)

[LS]                               ;Control centre parameters
PROTECTION= NO | PASSWORD | CALLBACK
                                   ;NO: no password protection, PASSWORD: password
                                   ;callback, CALLBACK: password with callback
PASSWORD=control_centre_password   ;Control centre password (max. 16 characters)
TRANSFER_TO=10 .. 99               ;If inactivity for > timeout [sec] => close connection
                                   ;(from V1.207 in area 10 .. 99 sec adjustable, formerly to
                                   ;max. ;60sec)

[DEVICE_CONFIG]
IEC_ADR=iec_address_ZDUE           ;IEC address of ZDUE (max. 16 characters,
                                   ;def.: ‘99999999‘)
IEC_IDENT=identification_ZDUE      ;Device identification of ZDUE
                                   ;(max. 16 characters, def.: TBD)
IEC_SET_PW=set_password_ZDUE       ;Set password of ZDUE (max. 16 characters,
                                   ;def.: ‘00000000‘)
IEC_TA=2 ... 20                    ;ta in acc. with EN 62056-21 (default: 9 [sec],
                                   ;ZDUE-GSM-PLUS-IV from V1.210 : 15 sec).
IEC_TR=2 ... 20                    ;tr in acc. with EN 62056-21 (default: 9 [sec] ],
                                   ;ZDUE-GSM-PLUS-IV from V1.210 : 15 sec).
EXT_IF=CL1 | RS232 | RS485 | M_BUS ;Determination of external interface (meter interface)
EVU_IDENT=property_no              ;Property no of the ZDUE-GSM-PLUS-IV for invoicing data
                                   ;record (ZDUE-GSM-PLUS-IV from V1.210)

[CLOCK_CONFIG]
SOWI_TIME1=date_time               ;Next switch time summer/winter time
                                   ; e.g.: SOWI_TIME1=28.10.2002 03:00
SOWI_TIME2=date_time               ; 2nd switch time summer/winter time (3,03,30,2)
SOWI_TIME3=date_time               ; 3rd switch time summer/winter time (3,10,26,3)
        :     =   :
SOWI_TIME20=date_time              ;20th switch time summer/winter time (12,03,25,2)
TIME_WINDOW=hh:mm hh:mm            ;Call acceptance time window, e.g. 03:00 to 05:40

[RS232D]                           ;RS232 section for ZDUE
BAUDRATE=300 ...115200             ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                     ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1 | 2                     ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD             ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                   ;No=do not send physical break in case of GSM disconnect
                                   ;Yes=send physical break in case of GSM disconnect
BREAK_TIME=20...3000               ;Duration of physical break in msec (Def.: 300 msec)
MODE=MODEC | TRANSPARENT           ;ModeC monitoring (Def.) or direct transparent (without baud
                                   ;rate switching)
DTR_MODE=ALWAYS | ONLINE           ;DTR-activation: always active | only when device is online
                                   ;(Def.)

[CL1]                              ;Current Loop Interface (active)
BAUDRATE=300 ...19200              ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                     ;No. of data bits (max. 1 digit and only numbers permitted)
```

```
STOPBITS=1 | 2                          ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD                  ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                        ;No=do not send physical break in case of GSM disconnect
                                        ;Yes=send physical break in case of GSM disconnect (Def.)
BREAK_TIME=20...3000                    ;Duration of physical break in msec (Def.: 300 msec)
MODE=MODEC | TRANSPARENT                ;ModeC monitoring (Def.) or direct transparent (without baud
                                        ;rate switching)

[RS485_MBUS]                            ;RS485-/M-Bus Interface
BAUDRATE=300 ...57600                   ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                          ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1 | 2                          ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD                  ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                        ;No=do not send physical break in case of GSM disconnect
                                        ;Yes=send physical break in case of GSM disconnect (Def.)
BREAK_TIME=20...3000                    ;Duration of physical break in msec (Def.: 300 msec)
MODE=MODEC | TRANSPARENT                ;ModeC monitoring (Def.) or direct transparent (without baud
                                        ;rate switching)

[LPRF]                                  ;LPRF = Load profile
MEASURE_PERIOD=5 | 15 | 30 | 60         ;Measurement period duration (5 / 15 / 30 / 60 [minutes])
ACTIVE_EDGE_LP1=FALL | RISE             ;Active edge LP1
ACTIVE_EDGE_LP2=FALL | RISE             ;Active edge LP2
ACTIVE_EDGE_LP3=FALL | RISE             ;Active edge LP3
ACTIVE_TIME_LP1=10...150                ;Minimum pulse duration LP1 (10 ... 150 [msec])
ACTIVE_TIME_LP2=10...150                ;Minimum pulse duration LP2 (10 ... 150 [msec])
ACTIVE_TIME_LP3=10...150                ;Minimum pulse duration LP3 (10 ... 150 [msec])
EDIS_KZ_LP1=edis_index_no._channel1     ;EDIS index no. channel 1 (LP1) (e.g.: ‘1.5‘, max. 7
                                        ;characters)
EDIS_KZ_LP2=edis_index_no._channel2     ;EDIS index no. channel 2 (LP2) (e.g.: ‘1.5‘, max. 7
                                        ;characters)
EDIS_KZ_LP3=edis_index_no._channel3     ;EDIS index no. channel 3 (LP3) (e.g.: ‘1.5‘, max. 7
                                        ;characters)

EDIS_MWE_LP1=edis_measuring_unit1       ;Measuring unit channel1 (e.g.: ‘kW‘, max. 7 characters)
EDIS_MWE_LP2=edis_measuring_unit2       ;Measuring unit channel2 (e.g.: ‘kW‘, max. 7 characters)
EDIS_MWE_LP3=edis_measuring _unit3      ;Measuring unit channel 3 (e.g.: ‘kW‘, max. 7 characters)
MEDIUM_LP1=medium channel 1             ;Medium for channel (e.g.: '1-', max. 4 characters)
                                        ;(ZDUE-GSM-PLUS-IV from V1.210)
MEDIUM_LP2=medium channel 2             ; Medium for channel (e.g.: '1-', max. 4 characters)
                                        ;(ZDUE-GSM-PLUS-IV from V1.210)
MEDIUM_LP3=medium channel 3             ; Medium for channel (e.g.: '1-', max. 4 characters)
                                        ;(ZDUE-GSM-PLUS-IV from V1.210)
LP3_FUNCTION=IMPULS | SYNC              ;LP3 can be used as a pulse input (def.) or as a
                                        ;synchronisation input (MP termination)

[GENERAL]
PAR_STATUS=DEFAULT | USER               ;System works with default configuration / user
                                        ;parameterisation (may only be changed by the system)
PAR_VERSION=002                         ;parameter version no.
SEASON=WINTER | SUMMER                  ;Winter/summer time active
PLATFORM=ZDUE_CSD                       ;System-dependent parameter (must not be changed)
```

2.5.3 Parameters and classes, class numbers

The following table shows the section, i.e. classes contained in the parameter file *para.ini*. Numbers are assigned to these classes and must be included in the parameter commands.

Section in 'para.ini'	Class	Permitted access types (R=Read/W=Write)
[MOBILE_CONFIG] [CSD_CONFIG]	51	R/W
[LS]	52	R/W
[DEVICE_CONFIG]	53	R/W
[CLOCK_CONFIG]	54	R/W
[RS232D]	55	R/W
[CL1]	56	R/W
[RS485_MBUS]	57	R/W
[LPRF]	58	R/W
[GENERAL]	59	R

The writing of parameters can only be done by writing a complete class (offset and length must be given as '0000').
When extending a class the new parameters must be appended in order to guarantee downward compatibility.

The **parameter checksum** in the RAM is checked hourly. If there are checksum deviations in the non-volatile memory the parameters are reloaded from the non-volatile memory. This check does not take place during an active communication and is performed, where appropriate, following communication. A deviation in the checksums is entered in the operating status word (parameter reload from the non-volatile memory).

Each parameter class embraces a reserved area for possible extensions. **Parameter extensions** covered by this reserve area do not result in incompatibility between different firmware versions. If the space for extensions is not sufficient a new parameter class must be created. This also does not lead to incompatibility because a command to set/read this new parameter class would be acknowledged with ERROR by an older firmware version. The reserved parameter areas are filled with '0' (0x30) during communication.

2.5.4 Parameters sorted according to classes; notation

In the following, the parameters are sorted according to classes in a way that corresponds to their notation in parameter commands. **Default configuration:** the default configuration is highlighted in **bold** face. The terms *Offset, RAM, COM* and *Values (ASCII)* require explanation:

Offset	Contains the relative address of a parameter within the parameter class with regard to the RAM structure.
RAM	Indicates the memory length required for a parameter in the RAM. With string parameters the length of the string is always listed as a separate parameter.
COM	Indicates the number of ASCII characters required to signify the parameter during communication. With strings only the fixed number of ASCII characters determined as the 'string length' is significant (decimal coded); any unused string area must be filled.
Values (ASCII)	Contains permissible values (areas) for the individual parameters when writing (W1 command) and reading by means of an R3 command.

2.5.4.1 Parameter class 51 [Mobile_Config] / [CSD_CONFIG]

Length of the Class 51 data record in the RAM: 84 bytes (**0x0054**)
Length of the Class 51 data record during communication: 90 bytes

Class 51 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
BAUD RATE	0x00	1	1	‘5‘ **‘6‘** ‘7‘ ‘8‘ ‘9‘	9600 baud **19200 baud** 38400 baud 57600 baud 115200 baud
DATA FORMAT	0x01	1	1	‘0‘ ‘1‘ **‘2‘**	7 data bits, even parity, 1 stop bit 8 data bits, no parity, 1 stop bit **7 data bits, even parity, 1 stop bit (software emulation via 8N1)**
String length SIMPIN	0x02	1	1	‘0‘ .. ‘9‘	Length of SIMPIN (Def.: **‘4‘**)
SIMPIN	0x03	9	9	Max. 9 numbers	SIMPIN (Def.: **‘0000‘**)
OP_SET_DELAY	0x0C	1	2	‘05‘ .. ‘99‘	[minutes] Interval for module request ‘Operator Select‘, when parameterised and actual operator are different. (Def.: **‘15‘**)
String length OPERATOR	0x0D	1	1	‘0‘ .. ‘5‘	String length of network operator ID (Def.: **‘0‘**)
OPERATOR	0x0E	5	5	Max. 5 numbers	Network operator ID (Def.: **‘empty ‘**)
BEARER_SERVICE	0x13	1	2	‘00‘, ‘07‘, ‘14‘, ‘71‘, ‘75‘	GSM speed: 00=autobauding, **07=9600bps(V.32)**, 14=14400bps(V.34), 71=9600bps(V.110), 75=14400bps(V.110)
RESTART_TIME	0x14	2	4	‘0000‘ .. ‘2359‘	Start time for the module reset cycle (hhmm), default: **23:00**
RESTART_IV	0x16	1	2	‘01‘ .. ‘24‘	Interval for the module reset [hours] default: **24**
String length CSD_DIAL_STRING	0x17	1	2	‘00‘ .. ‘30‘	Length of CSD dial string (control centre number) (Def.: **‘00‘**)
CSD_DIAL_STRING	0x18	30	30	Max. 30 characters '0' to '9', '*', '#', '+' 'A', 'B' und 'C	CSD dial string (control centre number) (Def.: **‘empty ‘**)
Reserved for additional parameters	0x3A	26	24	TBD	TBD

2.5.4.2 Parameter class 52 [LS]

Length of the Class 52 data record in the RAM: 39 bytes (**0x0027**)
Length of the Class 52 data record during communication: 41 bytes

Class 52 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
PROTECTION	0x00	1	1	**'0'** '1' '2'	**No access protection** Password Password with callback
TRANSFER_TO	0x01	1	2	'10' .. '99'	Transfer timeout (Def.: **20 sec**) (from V1.207, old 10..60sec)
String length PASSWORD PASSWORD	0x02 0x03	1 16	2 16	'00' .. '16' Max. 16 characters	String length password (Def.: **'00'**) Password (Def.: **empty**)
Reserved for additional parameters	0x13	20	20	TBD	TBD

➲ If the parameter PROTECTION is set to '1' a PASSWORD must previously have been determined or have been set in the same W1 command (string length != 0). Otherwise the W1 command is acknowledged with ERROR.

➲ If the parameter PROTECTION is set to '2' a PASSWORD must previously have been determined or have been set in the same W1 command (string length != 0). In addition, a control centre number (CSD_DIAL_STRING, see section *Parameter class 51 [Mobile_Config] / [CSD_CONFIG]*, page 30) must have been determined. Otherwise the W1 command is acknowledged with ERROR.

2.5.4.3 Parameter class 53 [DEVICE_CONFIG]

Length of the Class 53 data record in the RAM: 74 bytes (**0x004A**)
Length of the Class 53 data record during communication: 79 bytes

Class 53 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
String length IEC_ADR	0x00	1	2	'01' .. '16'	Length of IEC address default: **'08'**
IEC_ADR	0x01	16	16	Max. 16 characters ('0' .. '9', 'a' .. 'z', 'A' .. 'Z')	IEC address of ZDUE default: **'99999999'**
String length length IEC_ IDENT	0x11	1	2	'01' .. '16'	Default: **'15'**
IEC_ IDENT	0x12	16	16	Max. 16 characters [' ' .. '~' (20h .. 7Eh)]	Default: **'1KGL922920R0001'** The last four digits are codes for the interface variants: **0000**: Hardware-Detection-Error **0001**: ZDUE-Standard (1MB) (CL1-, RS232-, RS485-IF) **0002**: ZDUE-Standard (2MB) (2MB Flash/512kB RAM) (CL1-, RS232-, RS485-IF) **0102**: ZDUE-GPRS-Standard (CL1-, RS232-, RS485-IF) **0012**: ZDUE-GPRS-4WRS485 (RS232-, 4-W-RS485-IF) **1002**: ZDUE-GPRS-MBus (CL1-, RS232-, M-Bus-IF)
String length IEC_SET_PW	0x22	1	2	'00' .. '16'	Default: **'08'**
IEC_SET_PW	0x23	16	16	Max. 16 characters [' ' .. '~' (20h .. 7Eh) without '(' , ')']	Default: **'00000000'**
IEC_TA	0x33	1	2	'02' .. '20'	Timeout Ta in acc. with EN 62056-21, Default: **'15'** (from V1.210, old '09')
IEC_TR	0x34	1	2	'02' .. '20'	Timeout Tr in acc. with EN 62056-21, Default: **'15'** (from V1.210, old '09')
EXT_IF	0x35	1	1	'0' '1' '2' '3'	Current Loop (CL1) RS232 RS485 M-Bus Meter interface for remote reading
String length EVU_IDENT	0x36	1	2	'00' .. '16'	Default: **'08'**
EVU_IDENT	0x37	16	16	Max. 16 characters [' ' .. '~' (20h .. 7Eh) without '(' , ')']	Default: **'00000000'** Property number of the ZDUE-GSM-PLUS-IV in the billing data record
Reserved for additional parameters	0x36	20	20	TBD	TBD

- If, when writing this class, the control centre selects an external COM interface which is not physically present in the device (e.g. M-Bus) the write command (W1 C5300000000) is acknowledged with 'ERROR13'.
- When setting the IEC_ IDENT the firmware of the ZDUE-GSM-PLUS-IV always sets the last four digits (referring to the string length of the IEC_ IDENT) to the values specified by the hardware identification.

2.5.4.4 Parameter class 54 [CLOCK_CONFIG]

Length of the Class 54 data record in the RAM: 104 bytes (**0x0068**)
Length of the Class 54 data record during communication: 188 bytes

Class 54 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
1. Switch time Su <-> Wi	0x00	4	8	'YYMMDDhh'	Switch time (Index 0)
2. Switch time Su <-> Wi	0x04	4	8	'YYMMDDhh'	Switch time (Index 1)
3. Switch time Su <-> Wi	0x08	4	8	'YYMMDDhh'	Switch time (Index 2)
4. Switch time Su <-> Wi	0x0C	4	8	'YYMMDDhh'	Switch time (Index 3)
5. Switch time Su <-> Wi	0x10	4	8	'YYMMDDhh'	Switch time (Index 4)
6. Switch time Su <-> Wi	0x14	4	8	'YYMMDDhh'	Switch time (Index 5)
7. Switch time Su <-> Wi	0x18	4	8	'YYMMDDhh'	Switch time (Index 6)
8. Switch time Su <-> Wi	0x1C	4	8	'YYMMDDhh'	Switch time (Index 7)
9. Switch time Su <-> Wi	0x20	4	8	'YYMMDDhh'	Switch time (Index 8)
10. Switch time Su <-> Wi	0x24	4	8	'YYMMDDhh'	Switch time (Index 9)
11. Switch time Su <-> Wi	0x28	4	8	'YYMMDDhh'	Switch time (Index 10)
12. Switch time Su <-> Wi	0x2C	4	8	'YYMMDDhh'	Switch time (Index 11)
13. Switch time Su <-> Wi	0x30	4	8	'YYMMDDhh'	Switch time (Index 12)
14. Switch time Su <-> Wi	0x34	4	8	'YYMMDDhh'	Switch time (Index 13)
15. Switch time Su <-> Wi	0x38	4	8	'YYMMDDhh'	Switch time (Index 14)
16. Switch time Su <-> Wi	0x3C	4	8	'YYMMDDhh'	Switch time (Index 15)
17. Switch time Su <-> Wi	0x40	4	8	'YYMMDDhh'	Switch time (Index 16)
18. Switch time Su <-> Wi	0x44	4	8	'YYMMDDhh'	Switch time (Index 17)
19. Switch time Su <-> Wi	0x48	4	8	'YYMMDDhh'	Switch time (Index 18)
20. Switch time Su <-> Wi	0x4C	4	8	'YYMMDDhh'	Switch time (Index 19)
Time window for call acceptance	0x50	4	8	$Hhmm_{start}$ to $hhmm_{end}$	Default configuration: **'00002400'** (time window start: 00:00 time window end: 24:00)
Reserved for additional parameters	0x54	20	20	TBD	TBD

- The default configuration for the switching table corresponds to currently valid legal regulations and is given in code by a default table.
- The switch times must be parameterised in chronologically ascending order. The order is not checked by the firmware!

2.5.4.5 Parameter class 55 [RS232D]

Length of the Class 55 data record in the RAM: 17 bytes (**0x0011**)
Length of the Class 55 data record during communication: 19 bytes

Class 55 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
BAUD RATE	0x00	1	1	**'0'**	**300 baud**
				'1'	600 baud
				'2'	1200 baud
				'3'	2400 baud
				'4'	4800 baud
				'5'	9600 baud
				'6'	19200 baud
				'7'	38400 baud
				'8'	57600 baud
				'9'	115200 baud
DATA FORMAT	0x01	1	1	**'0'**	**7 data bits, even parity, 1 stop bit**
				'1'	8 data bits, no parity, 1 stop bit
				'2'	8 data bits, even parity, 1 stop bit
BREAK	0x02	1	1	'0'	Disabled
				'1'	**Enabled**
BREAK_TIME	0x03	2	4	'0020' to '3000'	20 to 3000 msec, **default: 300msec**
MODE	0x05	1	1	**'0'**	Mode C monitor (EN 62056-21) (switch baud rate where appropriate)
				'1'	Direct transparent operation with fixed baud rate.
DTR_MODE	0x06	1	1	**'0'**	DTR only active when online
				'1'	DTR always active
Reserved for additional parameters	0x07	10	10	TBD	TBD

2.5.4.6 Parameter class 56 [CL1]

Length of the Class 56 data record in the RAM: 16 bytes (**0x0010**)
Length of the Class 56 data record during communication: 18 bytes

Class 56 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
BAUD RATE	0x00	1	1	**'0'**	**300 baud**
				'1'	600 baud
				'2'	1200 baud
				'3'	2400 baud
				'4'	4800 baud
				'5'	9600 baud
				'6'	19200 baud
DATA FORMAT	0x01	1	1	**'0'**	**7 data bits, even parity, 1 stop bit**
				'1'	8 data bits, no parity, 1 stop bit
				'2'	8 data bits, even parity, 1 stop bit
BREAK	0x02	1	1	'0'	disabled
				'1'	**enabled**
BREAK_TIME	0x03	2	4	'0020' to '3000'	20 to 3000 msec, **default: 300msec**
MODE	0x05	1	1	**'0'**	Mode C monitor (EN 62056-21) (switch baud rate where appropriate)
				'1'	Direct transparent operation with fixed baud rate.
Reserved for additional parameters	0x06	10	10	TBD	TBD

2.5.4.7 Parameter class 57 [RS485_MBUS]

Length of the Class 57 data record in the RAM: 16 bytes (**0x0010**)
Length of the Class 57 data record during communication: 18 bytes

Class 57 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
BAUD RATE	0x00	1	1	**'0'**	**300 baud**
				'1'	600 baud
				'2'	1200 baud
				'3'	2400 baud
				'4'	4800 baud
				'5'	9600 baud
				'6'	19200 baud
				'7'	38400 baud
				'8'	57600 baud
DATA FORMAT	0x01	1	1	**'0'**	**7 data bits, even parity, 1 stop bit**
				'1'	8 data bits, no parity, 1 stop bit
				'2'	8 data bits, even parity, 1 stop bit
BREAK	0x02	1	1	'0'	disabled
				'1'	**enabled**
BREAK_TIME	0x03	2	4	'0020' to '3000'	20 to 3000 msec, **default: 300msec**
MODE	0x05	1	1	**'0'**	Mode C monitor (EN 62056-21) (switch baud rate where appropriate)
				'1'	Direct transparent operation with fixed baud rate.
Reserved for additional parameters	0x06	10	10	TBD	TBD

2.5.4.8 Parameter class 58 [LPRF]

Length of the Class 58 data record in the RAM: 86 bytes (**0x0056**)
Length of the Class 58 data record during communication: 93 bytes

Class 58 Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
MEASUREMENT PERIOD	0x00	1	2	‘05‘ **‘15‘** ‘30‘ ‘60‘	5 minutes **15 minutes** 30 minutes 60 minutes
ACTIVE PULSE EDGE LP1	0x01	1	1	‘0‘ ‘**1**‘	Falling edge **Rising edge**
ACTIVE PULSE EDGE LP2	0x02	1	1	‘0‘ ‘**1**‘	Falling edge **Rising edge**
ACTIVE PULSE EDGE LP3	0x03	1	1	‘0‘ ‘**1**‘	Falling edge **Rising edge**
MINIMUM PULSE DURATION LP1	0x04	1	3	‘010‘ to ‘150‘	Default configuration: **20 msec**
MINIMUM PULSE DURATION LP2	0x05	1	3	‘010‘ to ‘150‘	Default configuration: **20 msec**
MINIMUM PULSE DURATION LP3	0x06	1	3	‘010‘ to ‘150‘	Default configuration: **20 msec**
Length of EDIS INDEX NO. LP1 EDIS INDEX NO. LP1	0x07 0x08	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘3‘** Default configuration: **‘1.5‘**
Length of MEASURING UNIT LP1 MEASURING UNIT LP1	0x0F 0x10	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘2‘** Default configuration: **‘kW‘**
Length of EDIS INDEX NO. LP2 EDIS INDEX NO. LP2	0x17 0x18	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘3‘** Default configuration: **‘1.5‘**
Length of MEASURING UNIT LP2 MEASURING UNIT LP2	0x1F 0x20	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘2‘** Default configuration: **‘kW‘**
Length of EDIS INDEX NO. LP3 EDIS INDEX NO. LP3	0x27 0x28	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘3‘** Default configuration: **‘1.5‘**
Length of MEASURING UNIT LP3 MEASURING UNIT LP3	0x2F 0x30	1 7	1 7	‘1‘ .. ‘7‘ Max. 7 characters (20h .. 7Eh)	Default configuration: **‘2‘** Default configuration: **‘kW‘**
LP3-FUNCTION	0x37	1	1	**‘0‘** ‘1‘	**Pulse input** Sync input for load profile
Length MEDIUM LP1 MEDIUM LP1	0x38 0x39	1 4	1 4	‘0‘ .. ‘4‘ Max. 4 characters (0x20h .. 0x7E)	Default configuration: **‘3‘** Default configuration: **‘1.5‘**
Length MEDIUM LP2 MEDIUM LP2	0x3D 0x3E	1 4	1 4	‘0‘ .. ‘4‘ Max. 4 characters (0x20h .. 0x7E)	Default configuration: **‘2‘** Default configuration: **‘kW‘**
Length MEDIUM LP3 MEDIUM LP3	0x42 0x43	1 4	1 4	‘0‘ .. ‘4‘ Max. 4 characters (0x20h .. 0x7E)	Default configuration: **‘3‘** Default configuration: **‘1.5‘**
Reserved for additional parameters	0x38	30	30	TBD	TBD

2.5.5 Billing data of the ZDUE devices

2.5.5.1 General

If the control centre responds to the ZDUE's identification telegram with the following answer telegram **'<ACK>0Z0<CR><LF>'**, the ZDUE sends its billing data record. This billing data record is structured in accordance with the subsequent table:

EDIS index no.	Field length	Format	Function
1-1:F.F	8	hexadecimal	Error status
1-1:0.0.0	16 (Def. 8)	Character string	Property no. of the ZDUE [1)]
1-1:0.2.0	8	Character string	Program version
1-1:0.9.1	6	hhmmss	Time
1-1:0.9.2	6	jjmmtt	Date
[2)] Parameterisation	10	Number	Meter reading 1 (current measurement period)
[2)] Parameterisation	10	Number	Meter reading 2 (current measurement period)
[2)] Parameterisation	10	Number	Meter reading 3 (current measurement period)
1-1:C.90.1	15	Number	MAC address of the ZDUE-LAN-PLUS IV or IMEI of the ZDUE-GSM-PLUS-IV/ZDUE-GPRS-PLUS-IV
1-1:C.90.2	15	Number	IMSI with ZDUE-GSM-PLUS-IV/ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.91.0	15	Character string	Version of GSM module when ZDUE-GSM-PLUS-IV/ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.92.0	3	Number	GSM signal strength when ZDUE-GSM-PLUS-IV/ZDUE-GPRS-PLUS-IV; otherwise empty
Connection data (ZDUE-GPRS-PLUS-IV only)			
1-1:C.93.1	20	Number	Tx-Bytes, current month when using ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.93.2	20	Number	Rx-Bytes, current month when using ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.94.1	20	Number	Tx-Bytes, previous month when using ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.94.2	20	Number	Rx-Bytes, previous month when using ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.95.1	20	Number	Tx-Bytes, total when using ZDUE-GPRS-PLUS-IV; otherwise empty
1-1:C.95.2	20	Number	Rx-Bytes, total when using ZDUE-GPRS-PLUS-IV; otherwise empty

[1)] The property number provided in the billing data record is being gathered from the parameter entry EVU_IDENT in class 53.

[2)] The EDIS index nos. for the meter readings are being gathered from the parameterisation (class 58), LP1-LP3). They are structured as follows: '<Medium LPx><EDIS index no. LPx>'

Example (Default parameterisation):

'1-1.5'

2.5.5.2 Format of the error status

The error status is a hexadecimal-coded 32-bit number, which consists of the following status bits (displayed in brackets is the Bit no. in the operating status word of the ZDUE, see section *Status commands*):

Bit 0 (Bit 08):Return of power
Bit 1 (Bit 09):Load profile memory deleted
Bit 2 (Bit 10):Parameter reloaded
Bit 8 (Bit 04):Parameter checksum incorrect
Bit 16 (Bit 05):Parameter write / read error
Bit 17 (Bit 06):AVR read/write error
Bit 18 (Bit 07):Data Flash write / read error
Bit 24 (Bit 00):Time difference while setting up the clock larger than 1 minute
Bit 25 (Bit 01):Clock is reset to default due to depleted power reserve
Bit 26 (Bit 02):Switching between winter and summer time

Example: Billing data of the ZDUE-LAN-PLUS IV

1-1:F.F(00000001)	Error status
1-1:0.0.0(12345678)	Property no. of ZDUE
1-1:0.2.0(1.000)	Firmware version ZDUE-LAN-PLUS IV
1-1:0.9.1(182305)	Time (hhmmss)
1-1:0.9.2(050823)	Date (yymmdd)
1-1.5(0000000000)	Current meter reading LP1
1-1.5(0000000000)	Current meter reading LP2
1-1.5(0000000000)	Current meter reading LP3
1-1:C.90.1(00604CC7100B)	MAC address (right-aligned, 12 digits, without ‘ : ‘)
1-1:C.90.2( )	[IMSI]
1-1:C.91.0( )	[Firmware version GSM module]
1-1:C.92.0( )	[Field strength]
1-1:C.93.1( )	
1-1:C.93.2( )	
1-1:C.94.1( )	
1-1:C.94.2( )	
1-1:C.95.1( )	
1-1:C.95.2( )	

2.5.6 Communication commands in acc. with DIN EN 62056-21

The following sections document the commands supported by the ZDUE-GSM-PLUS-IV. The data record elements they contain are described in the following.
The command descriptions use symbolic data record elements (e.g. for timestamps). Their structure is the same for all command categories.

1. Timestamp ZSTs13: yYYMMDDhhmmss

y	= time zone	(0=winter time, 1 =summer time)
YY	= year	(00..99)
MM	= month	(01..12)
DD	= day	(01..31)
hh	= hour	(00..23)
mm	= minute	(00..59)
ss	= second	(00..59)

2. Timestamp ZSTs11: yYYMMDDhhmm

y	= time zone	(0=winter time, 1=summer time)
YY	= year	(00..99)
MM	= month	(01..12)
DD	= day	(01..31)
hh	= hour	(00..23)
mm	= minute	(00..59

3. Timestamp ZS7: yhhmmss

y	= time zone	(0=winter time, 1=summer time)
hh	= hour	(00..23)
mm	= minute	(00..59)
ss	= second	(00..59)

4. Timestamp DS7: yYYMMDD

y	= time zone	(0=winter time, 1=summer time)
YY	= year	(00..99)
MM	= month	(01..12)
DD	= day	(01..31)

5. Set password: String with max. 16 characters excluding the characters '(', ')', '/', '!' or empty string
6. n: Blockette length in R6 commands (1 .. 99)
7. KZ: EDIS index no.:
   ‘P.01‘ for load profile
   ‘0.9.1‘ for time
   ‘0.9.2‘ for date
8. S: Profile status word (bit-coded, bit 7 ..... bit 0)

Bit	Meaning
B7	Power failure
B6	Return of power
B5	Time reset
B4	Measurement period changed
B3	Time switch (winter time <-> summer time)
B2	Incomplete measurement period
B1	*reserved*
B0	Fatal error

9. RP: Registration period
10. z: No. of different measured values in a registration period
11. KZ_n : Index nos. of measured values (not giving rate / previous value index no.)
12. E_n : Unit of measured values
13. Mw_n : Measured values

2.5.6.1 Error messages

The ZDUE-GSM-PLUS-IV may respond to a command with an error message:

<STX>(ERRORnn)<ETX><BCC>

The following error numbers ‘nn‘ can be generated by the ZDUE-GSM-PLUS-IV:

Error numbers (nn)	Error
00	Command invalid (construction / contents of data record)
01	Command unknown (command ID, command type ID)
02	-
03	-
04	Class invalid
05	-
06	-
07	-
08	-
09	-
10	-
11	Time/date invalid (inadmissible values)
12	-
13	Parameter for ‘External COM interface‘ invalid
14	Maximum numbers of service commands exceeded
99	Malfunction when executing a debug command

2.5.6.2 Set password

In order to execute various commands it is necessary to transfer a set password (as a 2nd data record). Depending on the parameterisation, the following cases can arise during communication between the ZDUE-GSM-PLUS-IV and the control centre:

- No set password parameterised in the ZDUE-GSM-PLUS-IV (string length = 0):

  In this case the ZDUE-GSM-PLUS-IV will not perform an evaluation of the transferred set passwords (all password-protected commands can be executed).
  The request to send the password (P0-Operand) when the programming mode is activated may in this case be answered with the password command (P1 command, any password). Alternatively, the control centre can also continue communication by transferring another permissible VDEW command.

- Set password parameterised in the ZDUE-GSM-PLUS-IV (default: ‘00000000‘)

  All the passwords sent from the control centre must correspond to the parameterised password, otherwise communication is interrupted by a break command from the ZDUE-GSM-PLUS-IV. The request to send the password (P0-Operand) when the programming mode is activated must be answered with the password command (P1 command). The direct sending of another VDEW command is not permitted.

2.5.6.3 Load profile commands

R5 commands:

1. Read load profile (time domain)
Command format: <SOH>**R5**<STX>**P.01(ZSTs11;ZSTs11)**<ETX><BCC>

2. Read load profile (from a start time to the end of recording)
Command format: <SOH>**R5**<STX>**P.01(ZSTs11;)**<ETX><BCC>

3. Read load profile (from the beginning of recording to an end time)
Command format: <SOH>**R5**<STX>**P.01(;ZSTs11)**<ETX><BCC>

4. Read load profile (complete load profile)
Command format: <SOH>**R5**<STX>**P.01(;)**<ETX><BCC>
The season ID 'y' is ignored when requesting data.

R6 commands:

1. Read load profile in blockettes (time domain)
Command format: <SOH>**R6**<STX>**P.01(ZSTs11;ZSTs11;n)**<ETX><BCC>

Answer format:
<STX>KZ(ZSTs13)(S)(RP)(z)(KZ_1)(E_1)...(KZ_z)(E_z)(Mw_1)....(Mw_z)

Example: Readout of load profile from 26.08.2000 13:30.00 to end of recording (here 27.08.2000 00:30.00) in blockettes @ 4 lines:

```
HHU   <SOH>R6<STX>P.01(10008261330;;4)<ETX><BCC>
MTM   <STX>P.01(1000826133000)(00)(15)(3)(1.5)(kW)(1.5)(kW)(1.5)(kW)<CR><LF>
      (000000)(000124)(001521)<CR><LF>
      (000000)(000098)(000952)<CR><LF>
      (000000)(000128)(001232)<CR><LF>
      <EOT><BCC>
HHU   <ACK>
MTM   (000000)(000324)(001961)<CR><LF>
      (000000)(000498)(003052)<CR><LF>
      (000000)(000428)(002132)<CR><LF>
      (000000)(000299)(002143)<CR><LF>
      <EOT><BCC>
HHU   <ACK>
        :
        :
        :
MTM   <STX>P.01(1000827001500)(00)(15)(3)(1.5)(kW)(1.5)(kW)(1.5)(kW)<CR><LF>
      (000000)(000124)(001521)<CR><LF>
      (000000)(000098)(000952)<CR><LF>
      <ETX><BCC>
HHU   <ACK>
```

2. Read load profile (from a start time to the end of recording)
Command format: <SOH>**R6**<STX>**P.01(ZSTs11;;n)**<ETX><BCC>

3. Read load profile (from the beginning of recording to an end time)
Command format: <SOH>**R6**<STX>**P.01(;ZSTs11;n)**<ETX><BCC>

4. Read load profile (complete load profile)
Command format: <SOH>**R6**<STX>**P.01(;;n)**<ETX><BCC>
n: no. of elements per blockette

W5 commands:

1. Delete load profile (completely)
Command format: <SOH>**W5**<STX>**P.01(;)**(set password)<ETX><BCC>

2.5.6.4 Parameter commands

Setting and reading parameters is done via W1 / R3 commands (ASCII-code characters).
With **Class** the individual parameter segments are selected, with the command parameters **'Offset'** and **'Length'** individual parameters or parameter areas in a class can be accessed. This, however, is not supported by the ZDUE-GSM-PLUS-IV; the classes can only be written or read completely (Class 'Offset' and 'Length' equals '0000').

W1 commands:

Write class (completely)
Command format:
<SOH>**W1**<STX>**C<class>**00000000(<data>)(set password)<ETX><BCC>

Example: Setting the parameters of the subgroup [DEVICE_CONFIG] (Class 53) to the following values:

Device address:	'12345678'	
Communication ID:	'**1KGL922920R0102**'	(device with CL1 and RS-232)
Set password:	'87654321'	
IEC timeout Ta:	'09'	
IEC timeout Tr:	'09'	
External interface:	'1'	(RS-232 interface)

HHU /?99999999!<CR><LF>
MTM /ABB61KGL922470R0002<CR><LF>
HHU <ACK>061<CR><LF>
MTM <SOH>P0<STX>(00000001)<ETX><BCC>
HHU <SOH>P1<STX>(00000000)<ETX><BCC>
MTM <ACK>
HHU <SOH>W1<STX>C5300000000(08123456780000000151KGL922920R01020
088765432100000000090910800000000000000000)(00000000)<ETX><BCC>
MTM <ACK>
HHU <SOH>B0<ETX><BCC>

R3 commands:

1. Read class in blockettes

Command format: <SOH>**R3**<STX>**C<class<**00000000( )<ETX><BCC>

Answer format: <STX>0000(<data record>)[<EOT> | <ETX>]<BCC>

0000 = offset (ASCII characters hexadecimal-coded)
<data record> = class data (max. 64 ASCII characters per blockette)

Example: Reading Class 55 with offset '0000', length '0000' (reading of RS232-/RS485 parameters):

HHU /?99999999!<CR><LF>
MTM /ABB61KGL922920R0002<CR><LF>
HHU <ACK>061<CR><LF>
MTM <SOH>P0<STX>(00000001)<ETX><BCC>
HHU <SOH>P1<STX>(00000000)<ETX><BCC>
MTM <ACK>
HHU <SOH>R3<STX>C5500000000( )<ETX><BCC>
MTM <STX>0000(6010300000000000000)<ETX><BCC>
HHU <ACK>

Example: Reading Class 54 with offset '0000', length '0000' (reading clock parameters -> several blockettes required, repetition of the last blockette due to transfer error):

HHU /?99999999!<CR><LF>
MTM /ABB61KGL922920R0002<CR><LF>
HHU <ACK>061<CR><LF>
MTM <SOH>P0<STX>(00000001)<ETX><BCC>
HHU <SOH>P1<STX>(00000000)<ETX><BCC>
MTM <ACK>
HHU <SOH>R3<STX>C5400000000( )<ETX><BCC>
MTM <STX>0000(01102803020331020210280303033002031026030403280204103103050327 02)<EOT><BCC>
HHU <ACK>
MTM <STX>0040(05103003060326020610290307032502071028030803300208102603090329 02)<EOT><BCC>
HHU <ACK>
MTM <STX>0080(09102503100328021010310311032702000024000000000000000000000000)<ETX><BCC>
HHU <NAK>
MTM <STX>0080(09102503100328021010310311032702000024000000000000000000000000)<ETX><BCC>
HHU <ACK>

2.5.6.5 Parameter transfer command

In order for newly written parameters to be adopted at a particular time the following command is defined.

With the execution of this command the data of the previously transferred "Write class" commands are transferred to the non-volatile memory.

Until this command is executed the old parameters remain active.

A readout of the data prior to acceptance by means of the command outputs the old values.

Sending a *Break* deletes the temporary data set in the device by "Write class" commands. In this way, incorrect "Write class" commands can be undone as long as the W1 command defined here has not been given. The temporary data are also deleted by a disconnect or an inactivity timeout (60 s).

Command format: <SOH>**W1**<STX>**P01**()(set password)<ETX><BCC>

2.5.6.6 Time / date commands

Set time:

Command format: <SOH>**W5**<STX>**0.9.1**(ZS7)(set password)<ETX><BCC>

Set data:

Command format: <SOH>**W5**<STX>**0.9.2**(DS7) (set password) <ETX><BCC>

Read time:

Command format: <SOH>**R5**<STX>**0.9.1**()<ETX><BCC>
Response format: <STX>0.9.1(ZS7)<ETX><BCC>

Read date:

Command format: <SOH>**R5**<STX>**0.9.2**()<ETX><BCC>
Response format: <STX>0.9.2(DS7)<ETX><BCC>

2.5.6.7 Status commands

Events and error messages are recorded in the ZDUE-GSM-PLUS-IV in an operating status word. This is stored in the volatile SRAM, i.e. it is lost in the event of a power failure.
The status word can be read out of the device in order to determine the current operating status.

Bit in status word	Displayed error condition / event	Error status (LED red)
Bit 0	Deviation > +/- 1 minute when setting clock	No
Bit 1	Device clock initialised to 01.01.2000 00:00.00 due to exhausted power reserve	No
Bit 2	Time switch-over (summer time <-> standard time)	No
Bit 3	*Reserved*	
Bit 4	Parameter checksum incorrect (Data Flash)	Yes
Bit 5	Parameter write / read error	Yes
Bit 6	*Reserved* (e.g. AVR write / read error)	Yes
Bit 7	Data Flash error	Yes
Bit 8	Return of power	No
Bit 9	Load profile memory deleted	No
Bit 10	Parameter reload from non-volatile memory	No
Bit 11	*Reserved*	
Bit 12	*Reserved*	
Bit 13	*Reserved*	
Bit 14	*Reserved*	
Bit 15	*Reserved*	

Other status information that can be read out of the ZDUE are:

- GSM field strength
- GSM network operator (z. B. MOVISTAR)
- GSM location area ID
- GSM cell ID
- IMEI (International Mobile station Equipment Identity): serial number of the GSM module
- IMSI (International Mobile Subscriber Identity): ID number of the SIM card

The ZDUE-GSM-PLUS-IV allows the readout and resetting of the status word. During reading the highest-value bit is transferred first, with each bit represented by an ASCII character ‘0‘ or ‘1‘.

Read status word:

Command format: <SOH>**R3**<STX>**S70()**<ETX><BCC>

Response: <STX>S70($b_{16}b_{15}b_{14}$ ..... b_{00})<ETX><BCC>

b_{nn} : ‘0‘ = no event/status occurred / inactive
‘1‘ = event/status occurred / active

Example: In the status word, bit 0 (deviation >+/- 1 minute when setting the clock) and bit 8 (return of power) are set.

```
HHU   /?99999999!<CR><LF>
MTM   /ABB61KGL922920R0002<CR><LF>
HHU   <ACK>061<CR><LF>
MTM   <SOH>P0<STX>(00000001)<ETX><BCC>
HHU   <SOH>P1<STX>(00000000)<ETX><BCC>
MTM   <ACK>
HHU   <SOH>R3<STX>S70()<ETX><BCC>
MTM   <STX>S70(0000000100000001)<ETX><BCC>
MTM   <ACK>
HHU   <SOH>B0<ETX><BCC>
```

Reset status word:

Command format: <SOH>**W1**<STX>**S70()**<ETX><BCC>

2.5.6.8 Service commands

W1 commands:

1. **Parameter reset to default configuration**:

This command loads the default parameters. All customer-specific settings are overwritten.

Command format: <SOH>**W1**<STX>**S98( )**<ETX><BCC>

- ➲ The overwritten parameters are stored in the non-volatile memory. The LED is set to 'red flashing'.
- ➲ This command is also permissible via the network (GSM interface, LAN interface).
- ➲ This command is executed immediately (without an additional break being transmitted) upon completion of the command.
- ➲ The manufacturer's passwords and the manufacturer's device address are **not** reset by this command.

R3 commands:

1. **Readout parameter checksum**:

Command format: <SOH>**R3**<STX>**S61( )**<ETX><BCC>

Response: <STX>S61(cccc)<ETX><BCC>
cccc : Hex-coded 16-bit parameter checksum

2. **Readout current status of load profile pulse inputs**:

Command format: <SOH>R3<STX>S62( )<ETX><BCC>
Response: <STX>S62(S1S2S3)<ETX><BCC>
S_1 = status of pulse input 1: '0' = open, '1' = closed
S_2 = status of pulse input 2: '0' = open, '1' = closed
S_3 = status of pulse input 3: '0' = open, '1' = closed

3. **Readout firmware version of ZDUE**:

Command format: <SOH>R3<STX>S63( )<ETX><BCC>

Response: <STX>S63(DNT8109_V1.320)<ETX><BCC>

4. **Read firmware version of GSM module**:

Command format: <SOH>R3<STX>S64( )<ETX><BCC>

Response (examples): <STX>S64(03.10)<ETX><BCC> or
<STX>S64(Sagem KY3,XG)<ETX><BCC>

5. **Read GSM operating/module parameters**:

Command format: <SOH>**R3**<STX>**S65( )**<ETX><BCC>

With this command the following GSM operating/module parameters can be requested:

GSM field strength (3-digit, decimally coded, e.g. '078' => -78dBm, 'na' => not available)
Mobile handler supplies field strength as 'Char' (module format) -> conversion necessary.

GSM network operator (max. 20 characters, alphanumerical format, e.g. 'D1-Telekom'),

GSM location area ID (max. 8-digit, hex-coded),

GSM cell ID (max. 8-digit, hex-coded),

IMEI (International Mobile station Equipment Identity):
serial number of GSM module (max. 25 characters),

IMSI (International Mobile Subscriber Identity):
ID number of SIM card (max. 25 characters).

Response: <STX>S65(078)(D1-Telekom)(43AC)(8AD1)(500031283001278)(73427464820212334)<ETX><BCC>

This command is also permissible via the GSM interface.

6. **Readout most recent measurement period values**:

Command format: <SOH>**R3**<STX>**S90( )**<ETX><BCC>

Response: <STX>S90(000000090000001200000023)<ETX><BCC>

---------- MP value LP1 (decimal)

---------- MP value LP2 (decimal)

---------- MP value LP3 (decimal)

2.6 The GSM log

Purpose and benefits

In the GSM log the ZDUE-GSM-PLUS-IV records key events and status changes that occur in

GSM communication
GSM operating parameters
local meter communication
special events.

The readout of the GSM log takes place in acc. with DIN EN 61107 and the definitions of the VDEW specifications.

The GSM log can be used to ascertain error sources.

The memory for the load profile is implemented as a circulating memory, i.e. when the end of the memory is reached a new entry overwrites the oldest load profile entry. Up to 1,372 entries can be stored. This is equivalent to about 14 days given a recording period of 15 minutes.

Information elements of each entry

Each entry in the GSM log contains the following information elements:

Date / time
Cause of the entry
Registration status (GSM)
- Network operator (alphanumerical, GSM)

Location area ID (GSM)
Cell ID (GSM)
Field strength (GSM)

2.6.1 Causes for an entry in the GSM log

The following events or condition changes result in a log entry (fields on a grey background apply to the ZDUE-GPRS-PLUS-IV only):

Cause	Description
GSM operating parameters	
001	Change / init of the registration status.
002	Change of Cell ID and / or Location Area.
003	Change of operator / addition of operator after every module reset / PowerUp.
004	PIN change (successful): the command to change the PIN (AT+CPWD=) was acknowledged with OK.
005	PIN error: the PIN parameterised in ‘para.ini‘ does not match the one on the SIM card. This entry is generated following the 2nd PIN transfer with ERROR acknowledgement.
GSM/GPRS communication	
101	Incoming call
102	CSD connect
103	Outgoing call
104	GPRS-CONNECT (ATD*99***1#)
105	Mobile handler received ‘NO CARRIER‘ from the mobile or carrier signal loss
106	Socket-CONNECT
107	Socket-DISCONNECT
108	TSC-CONNECT
109	TSC-DISCONNECT
110	Watchdog-packet sent to TSC (currently marked as commentary only)
111	PPP-CONNECT
112	PPP-DISCONNECT
113	RING from TSC (from V2.031)
114	CONNECT between control centre and DM600-GPRS via TSC (from V2.031)

115	DISCONNECT between control centre and DM600-GPRS via TSC (from V2.031)
Local communication	
201	Meter communication: billing data readout successful.
202	Meter communication: data readout in programming mode without using P1 command.
203	Meter communication: data readout in manufacturer mode without using P1 command.
204	Meter communication: communication closed after acknowledgement telegram (data readout).
205	Meter communication: communication closed after acknowledgement telegram (programming mode).
206	Meter communication: communication closed after acknowledgement telegram (manufacturer-specific)
207	Meter communication: communication closed after identification telegram of meter
208	Meter communication: communication closed after request telegram from control centre
Parameterisation / firmware updates	
301	Device parameterised (ZDUE: execution of parameter transfer command).
302	Firmware update carried out successfully.
303	Operating status word of ZDUE reset by control centre.
Time / date	
401	Automatic entry due to timeout (by default every 10 minutes if no other event occurs).
402	Time reset in device (RTC).
403	Date reset in device (RTC).

Although events 201 to 208 are registered in the online phase the log entry does not take place until the connection is established. If there are several communication cycles during the online (transparent) phase the CAUSE therefore describes only the sequence of the last cycle.

2.6.2 EDIS index no. of the GSM log

Default setting: P.98

The GSM log is treated like a profile. The default setting for the index number for the GSM log is “98". This index number can be parameterised between 50 and 98. In the following sections the default value 98 is always used.

In accordance with draft DIN 43863-3 : 1998-12 (EDIS), section 6.2 the index numbers 50 to 89 are manufacturer-specific.

2.6.3 Readout of the GSM log with R5 commands

The readout of the GSM log is done via the formatted commands "R5" or "R6". As supplements to DIN EN 62056-21 these are determined as follows:

R5 triggers the output of a log formatted with EDIS in programming mode. The answer generated by the ZDUE is given as a closed telegram.

R6 corresponds to the command "R5", with the answer split into blockettes to enable blockette-wise readouts.

Command "R5", GSM log:

Analogous to the load profile readout, the GSM log is transferred:

Task	EDIS index number; template: GG.AA	Required parameters (the brackets are the separators in acc. with DIN EN 62056-21)	Remarks
Readout GSM log	Index no.: GG ⇔ P AA ⇔ 98.	Readout of the full operating log available in the ZDUE-GSM-PLUS-IV: (;) Readout of an interval: (ZSTs11 ; ZSTs11) Readout from the beginning of the log recording to an end time: (; ZSTs11) Readout from a start time to the end of the recording in the ZDUE-GSM-PLUS-IV: (ZST11 ;)	1) The semicolon must also be transferred as a special separator. 2) The timestamp before the semicolon marks the beginning of the interval to be read out. 3) The timestamp after the semicolon marks the end of the interval to be read out. 4) Both timestamps are within the interval limits. 5) If a timestamp is omitted (the separators brackets and semicolon follow in direct succession or vice versa) the beginning or the end of the log recording in the device is used as the interval limit.

Table: Log readout with R5

The telegram supplied as the answer corresponds to the form, given in EDIS, of a log profile.
If the task requests a time zone for which there are no entries the ZDUE replies with "P.98 (ERROR)".

Examples of the command "R5", GSM log:

Task sent to the ZDUE-GSM-PLUS-IV: "Supply all entries in the recorded GSM log"

SOH	R	5	STX	P.98	(	;	)	ETX	BCC

Response from the ZDUE-GSM-PLUS-IV (output of profile):

STX	Log profile	ETX	BCC

Response from the ZDUE-GSM-PLUS-IV (values not available):

STX	P.98	(ERROR)	ETX	BCC

Task sent to the ZDUE-GSM-PLUS-IV: "Supply an extract of the GSM log"

SOH	R	5	STX	P.98	(	ZSTs11	;	ZSTs11	)	ETX	BCC

Response from the ZDUE-GSM-PLUS-IV:

STX	Extract of the log profile	ETX	BCC

The section described as "log profile" is composed from a chain of log entries. As with profiles in general, the number of these entries cannot be recognised at the beginning of the telegram. Each log entry is structured as followed:

KZ	(ZSTs13)	(BS)	( )	(6)	(KZ_1)(E_1) ... (KZ_6)(E_6)	(Element $_1$)	...	(Element $_6$)
←	Log entry header				→	←	Log entry content	→

- KZ EDIS index no. '**P.98**',
- ZSTs13 timestamp of log entry,
- **BS** operating status word of the ZDUE-GSM-PLUS-IV
- ( ) corresponds to "RP" in load profiles; not required here,
- **6** no. of elements in a log entry, fixed at '6'
- KZ_1 index no. of the element '(cause)' of the log entry: ( )
- E_1 unit of the element '(cause)' of the log entry: ( )
- KZ_2 index no. of the element '(field strength)' of the log entry: ( )
- E_2 unit of the element '(field strength)' of the log entry: (dBm)
- KZ_3 index no. of the element '(registration status)' of the log entry: ( )
- E_3 unit of the element '(registration status)' of the log entry: ( )
- KZ_4 index no. of the element '(location area ID)' of the log entry: ( )
- E_4 unit of the element '(location area ID)' of the log entry: ( )
- KZ_5 index no. of the element '(cell ID)' of the log entry: ( )
- E_5 unit of the element '(cell ID)' of the log entry: ( )
- KZ_6 index no. of the element '(network operator)' of the log entry: ( )
- E_6 unit of the element '(network operator)' of the log entry: ( )
- Element $_1$ cause [e.g.: (001)]
- Element $_2$ field strength [e.g.: (068)]
- Element $_3$ registration status [e.g.: (1)]
- Element $_4$ location area ID [e.g.: (A0C8)]
- Element $_5$ cell ID [e.g.: (20BE)]
- Element $_6$ network operator [e.g.: (T-D1)]

The total length of the response telegram depends on the magnitude of the desired interval.

Example: GSM log output:

<STX>P.98(1030604132509)(0100)( )(6)( ) ( )( ) (dBm)( )( )( )( )( )( )( )(001)(-068)(1)(A0C8)(20BE)(T-D1)<cr><lf>
P.98(1030604133006)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(003)(-067)(1)(A0C8)(20BE)(T-D1) <cr><lf>
P.98(1030604133528)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(002)(-063)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604134528)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(401)(-065)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604135528)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(401)(-065)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604140343)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(101)(-063)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604140354)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(102)(-067)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604140622)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(204)(-067)(1)(A0C8)(22D1)(T-D1) <cr><lf>
P.98(1030604141622)(0100)( )(6)( )( )( )(dBm)( )( )( )( )( )( )( )(401)(-067)(1)(A0C8)(22D1)(T-D1) <cr><lf>
<ETX><BCC>

2.6.4 Readout of the GSM log in blockettes with R6 commands

Command "R6", readout of profiles using blockettes:
The following tasks can be sent to the ZDUE-GSM-PLUS-IV:

Task	EDIS index number; template: GG.AA	Required parameters (the brackets are the separators in acc. with DIN EN 62056-21)	Remarks
Blockette readout of GSM log	See *Table: Log readout with R5*, page 51	The structure and significance of the timestamps correspond to the agreements given with "Readout GSM log". In addition, a third parameter is added to the timestamps via a further semicolon. Here the parameter entries marked 'Option' in the table on page 51 are to be transferred analogously. Example: "Readout of an interval" (ZSTs11 ; ZSTs11 ; n)	1) Both semicolons must also be transferred as special separators. 2) The text under 'Readout of operating log' applies to the timestamps. 3) The third parameter 'n' indicates the number of elements per blockette. Element means exactly one GSM log entry.

The answers to both tasks correspond to the answers to the tasks described under "R5". The answer telegrams agreed there of indeterminate length are transferred here in blockettes each containing 'n' elements. The principle corresponds to DIN EN 62056-21, chapter. 5.4.6, "Communication using blockettes".

2.6.5 Deleting the GSM log with the W5 command

Command "W5":

The tasks listed below can be sent to the ZDUE:

Task	EDIS index number; template: GG.AA	Required parameters (the brackets are the separators in acc. with DIN EN 62056-21)	Remarks
Delete all GSM log entries	Index no.: GG ⇔ P, AA ⇔ 98.	See 'Readout log' (page 50) with additionally appended password; only the complete deletion of the GSM log is permissible. "(;)"	See 'Readout log' (page 50)

The password is appended in acc. with the following telegram structure:

SOH	W	5	STX	P.98	(	;	)	(	Password	)	ETX	BCC

The password is also required as a character chain in accordance with password agreement of DIN EN 62056-21. Following execution of the command, regardless of whether it is successful or not, the lock opened with the password is reactivated.

An 'ACL', a 'NAK' in acc. with DIN EN 62056-21 Mode C or a telegram containing a character chain is given as an answer. 'ACK' documents the positive confirmation of the delete action and 'NAK' signifies a transmission error. The character chain containing the text "ERROR" is always sent as an answer if no section could be deleted (e.g. because the GSM logbook in the required section is empty or the interval limits given are not permissible).

Example of command "W5":

Task sent to the ZDUE: "Delete the GSM log"

SOH	W	5	STX	P.98	(	;	)	(	Password	)	ETX	BCC

Response from the ZDUE if the command could not be executed (example):

STX	P.98	(ERROR)	ETX	BCC

2.7 Updating the firmware

Firmware update by control centre (remote) or local

The latest firmware can be transferred to the ZDUE-GSM-PLUS-IV

- from the control centre via the GSM network or
- from a computer that is connected direct to the RS-232 interface of the ZDUE-GSM-PLUS-IV.

The same conditions apply as for configuration: See *Remote configuration via the GSM* network, page 25 and *Local configuration*, page 25.

Procedure

Command to upload the firmware:

<SOH>W1<STX>S97()(set password)>ETX><BCC>

The ZDUE-GSM-PLUS-IV acknowledges the correct reception of this command with <ACK>. Then the ZDUE-GSM-PLUS-IV switches the data format of the interface to the GSM module from 7E to 8N where applicable.

Then, after a delay of 250 msec, the transfer begins, using the XMODEM 1k protocol. The ZDUE-GSM-PLUS-IV sends ‘C‘ 10 times at intervals of 4 sec.

Following reception of a 'C' the XMODEM driver of the computer from which the firmware update is being conducted sends the first blockette that is secured by a CRC 16 checksum.

The protocol data unit is stored by the ZDUE-GSM-PLUS-IV in a non-volatile intermediate memory and checked for validity and correct checksum following complete transfer. If the download was successful the successful reception of the firmware is acknowledged by the following text:

<CR><LF>

- Download successful ! -<CR><LF><LF>
- Starting disconnect and reboot procedure -<CR><LF>

The ZDUE-GSM-PLUS-IV closes the connection and begins, after a reboot, to write the firmware data from the non-volatile intermediate memory into the program flash.

- ➲ The blockette size for the XMODEM protocol is fixed at 1024 bytes. Due to its superior error recognition only the variant with CRC-16 is supported (no blockette checksum).
- ➲ If an error occurs during transfer of the file (e.g. if no 'ACK' is transferred even after the nth repetition of a blockette, if a data overrun occurs in the ZDUE-GSM-PLUS-IV or if the file is damaged following the transfer) the ZDUE-GSM-PLUS-IV will immediately close the GSM connection where applicable.
- ➲ As long as the new firmware has not been completely transferred to the flash a new programming attempt will be launched following a possible breakdown in operating power. Following a successful update the file is deleted in the non-volatile memory and a restart is executed.

2.8 ZDUE-*GSM*-PLUS-IV with the 4-wire RS-485

2.8.1 Product description

Interfaces

The ZDUE-GSM-PLUS-IV is also available in a version with a 4-wire RS-485 interface. This version is also equipped with 3 impulse inputs and the RS-232 interface (cf. Chapter 2.1.1). The CL1 interface connection terminals are used for the additional RS-485 signals.

AT commands

To control the device from the application connected (e.g. the meter), the ZDUE-GSM-PLUS-IV with the 4-wire -RS-485 also responds to a set of AT commands.

2.8.2 Deviations in the default configuration

GSM module interface

In the default configuration, the interface to the GSM module is set to 9600Baud, 8 data bits, no parity (Class 51 -> BAUDRATE, -> DATAFORMAT).

Transfer timeout

The transfer timeout is deactivated (Class 52 -> TRANSFER_TO).

Default meter interface

The default meter interface is the RS232 instead of the CL1 (Class 53 -> EXT_IF)

RS232 interface

The RS232 interface (Class 55) is pre-set to

- 9600 Baud, 8 data bits, even parity
- send no break and
- direct transparent
- DTR only active when the device is ONLINE.

RS485 interface

The RS485 interface (Class 57) is set to

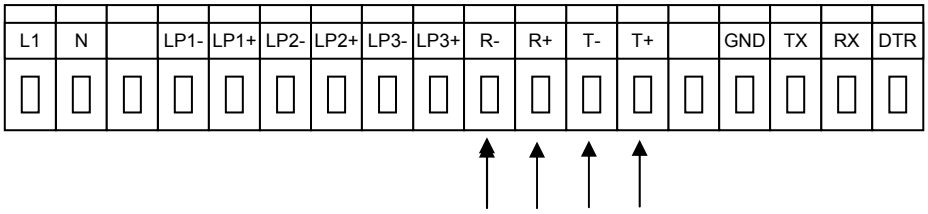
- 9600 Baud, 8 data bits, even parity
- send no break and
- direct transparent.

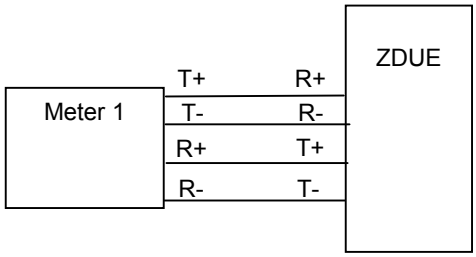
2.8.3 RS-485 4-wire interface

4-wire RS-485

The meter is connected via a 4-wire bus connection to the terminals R-, R+, T-, T+ (terminals 10, 11,12, 13) on the terminal strip.

PIN allocation





Interface speed: Default: **9600 Baud**
Setting options: 300, 600, 1200, 2400, 4800, 9600, 19200 Baud

Data format: Default: **8E1**
Setting options: 7E1, 7O1, 8N1, 8E1

➲ The speed of the meter interface should not exceed the speed of the GSM connection (9600 bps) as this could result in data loss.

Communication takes place on a full duplex basis.

The bus connection was actively terminated on 120 ohms (nominally) and the cable length limited to 1000m.

The interface is potential separated from the mains connection.

2.8.4 Operating elements and function indicators

The 4 light-emitting diodes operate on the ZDUE-GSM-PLUS-IV with 4-wire RS-485 as follows:

LED	Colour/action	Meaning
Power	Green	Power is on
Status	Red flashing (0.5 / 0.5 sec)	PIN / SIM error (no SIM or wrong PIN)
	Orange flashing (0.5 / 0.5 sec)	Connection set-up (CSD call) active
	Red	Malfunction (Parameter checksum incorrect, Error-error).
	Green flashing (0.5 / 0.5 sec)	Reinitialisation (device operates with default configuration).
	Green	Normal operation (no malfunctions, device operates with customer parameterisation).
	Orange	Boot phase
Communication	OFF	No communication (meter interface)
	Red flickering Green flickering	Outgoing data to meter Incoming data from meter
	Red flickering	Outgoing/incoming data on meter interface
GSM status	Beginning of the display: When mobile is switched on and logged into the GSM network.	
	OFF	GSM module is switched off or not logged in
	ON	CSD-CONNECT (ZDUE-GSM-PLUS-IV)
	flashes 1x in 2 sec	Field strength <= -98 dBm
	flashes 2x in 2 sec	-98 dBm < field strength <= -83 dBm
	flashes 3x in 2 sec	-83 dBm < field strength <= -68 dBm
	flashes 4x in 2 sec	Field strength > -68 dBm

2.8.5 AT commands supported

Allgemeine Funktionen / General Purpose Commands		
Kommando / Command	**Function**	**Funktion**
AT+CGMI	Request manufacturer identification	Abfrage der Herstellerinformation
AT+CGMM	Request model identification	Abfrage der Modellinformation
AT+CGMR	Request revision identification	Abfrage der Revisionsinformation
AT+CGSN	Request of serial number (IMEI)	Abfrage der Seriennummer (IMEI)
AT+CIMI	Request of SIM IMSI	Abfrage der IMSI des eingelegten SIM
AT+CFUN	Set phone functionality	Setzen der Funktionalität im Sleep Mode
AT+CPAS	Modem activity status	Abfrage des Verbindungsstatus
AT+CMEE	Report mobile equipment errors	Setzen des Ausgabeformats für Result Codes
AT&V	Shows the configuration	Anzeigen der Konfiguration
ATI	Request identification information	Abfrage der Geräte-Identifikation
Rufkontrolle / Call Control Commands		
Kommando / Command	**Function**	**Funktion**
ATD	Dial a number	Wählen einer Rufnummer
ATH	Terminate a call	Verbindung beenden
ATDL	Dial last number	Wiederwahl der letzten Rufnummer
ATS0	Automatic answer mode	Automatische Rufannahme
GSM-Netz Konfiguration / GSM Network Commands		
Kommando / Command	**Function**	**Funktion**
AT+CSQ	Request of signal quality value	Abfrage der Signalqualität
AT+COPS	Operator selection	Auswahl des Netzbetreibers
AT+CREG	Request of network registration	Abfrage des Netzwerkstatus des Telefons
AT+CPOL	Preferred operators list	Liste der bevorzugten Netzbetreiber
AT+COPN	Read operator name	Liste der Netzbetreiber anzeigen
Sicherheitseinstellungen / Security Commands		
Kommando / Command	**Function**	**Funktion**
AT+CPIN	Sets PIN	Setzen der PIN
AT+CLCK	Lock and unlock device and network functions (SC, AO, OI, AI)	Sperren und Freischalten von Geräte- und Netzwerkfunktionen (SC, AO, OI, AI)
AT+CPWD	Change Password (PIN)	Passwort ändern (PIN)
Konfiguration von Zusatzdiensten / GSM Supplementary Services Commands		
Kommando / Command	**Function**	**Funktion**
AT+CCFC	Number and conditions for call-forwarding	Rufnummern und Bedingungen für Anrufweiterleitung
AT+CCWA	Holds a call	Halten eines Rufes
AT+CLIR	Caller Id. restriction	Anonym anrufen
AT+CLIP	Caller Id. presentation	Anzeige der anrufenden Rufnummer
AT+COLP	Connected line presentations	Anzeige der verbundenen Rufnummer
AT+CAOC	Call charge advise	Gebührenanzeige
AT+CPUC	Price per unit and currency table	Gebühreneinheit und Währungstabelle
AT+CHLD	Call hold and multiparty	Ruf halten und Multi-Party
AT+CLCC	List current call	Anzeige der aktiver Verbindungen
AT+CSSN	Notifies Supplementary Services	Spontane Meldungen zu Supplementary Services

Konfiguration der Datenübertragung / Data Commands		
Kommando / Command	**Function**	**Funktion**
AT+CBST	Select bearer service type	Dienstauswahl für den nächsten Datenruf
AT+CR	Service reporting control on/off	Detaillierte Rückmeldung während des Verbindungsaufbaus an/aus
AT+CRLP	Select radio link protocol parameter	Auswahl Radio link protocol parameter
AT+IPR	Sets Baudrate of local interface	Einstellen der Baudrate auf der Zählerschnittstelle
AT+ICF	Sets Dataformat / Parity of local interface	Einstellen des Datenformats / Parität auf der Zählerschnittstelle
AT+IFC	Sets flow-control: Only XON/XOFF	Setzen der Flusskontrolle: Nur XON/XOFF
ATQ	No result codes on/off	Rückmeldungen an/aus
ATV	Set result code format mode	Format der Rückmeldungen einstellen
ATZ	Recalls a stored configurations	Zurücksetzen auf die gespeicherte Konfiguration
AT&W	Saves the configuration	Speichern der aktuellen Konfiguration
ATE	Local echo on/off	Lokales Echo an/aus
AT&F	Return to factory settings	Werkskonfiguration laden
Konfiguration des Datenformats / Data Format Local Interface		
Kommando / Command	**Function**	**Funktion**
AT+ZICF	Set the data format and baudrate on metering interface	Setzen des Datenformats und der Baudrate auf der Zähler-Schnittstelle
AT+ZIF	Set the metering-interface for remote access	Setzen der Zählerschnittstelle für Fernzugriff

3 ZDUE-*GPRS*-PLUS-IV and ZDUE-*LAN*-PLUS-IV

3.1 Introduction

The meter modems ZDUE-GPRS-PLUS-IV and ZDUE-LAN-PLUS-IV are part of TAINY Connect, a transmission system for wired and wireless M2M (Machine to Machine) communication based on IP networks.

Made up of several TAINY Connect terminal devices – a number of different AT, meter and leased-line modems for TCP/IP networks - and a central “switching center” – the TAINY SwitchingCenter respectively the TAINY ModemServer – this system uses wired and wireless TCP/IP networks for transfer of the data.

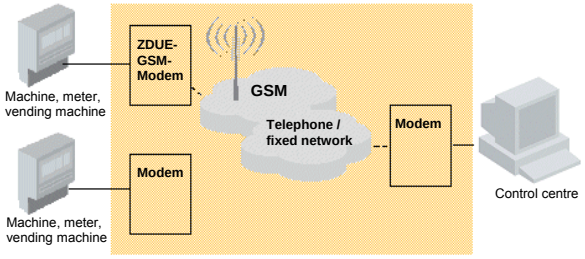
Using the TAINY SwitchingCenter / TAINY ModemServer and the TAINY Connect terminal devices – based on hard and software - it is possible to set up an individual “TCP/IP private branch exchange”, which machines, programmable logic controllers (PLC), vending machines, meters, control centres and other devices can use to communicate with one another – with connections all over the world, anywhere where there is access to a TCP/IP network (Internet, Intranet or GPRS).

The machines, PLCs, vending machines, meters and control centres, etc., are connected to the TAINY Connect terminal devices via their serial interfaces. The TAINY Connect terminal devices respond just like conventional analogue or GSM modems that are connected to public switching centres or private branch exchanges. The connection is established in combination with the TAINY SwitchingCenter/ModemServer, whereby the TAINY SwitchingCenter or TAINY ModemServer serves as a switching centre and allows data exchange between the devices via leased line or dial-up connection.

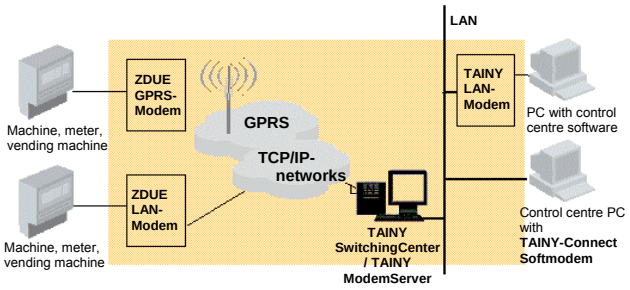
Example:

Data communication Process <-> Control centre

Previously



Today



ZDUE-GPRS-PLUS-IV: GPRS data communication

The ZDUE-GPRS-PLUS-IV establishes bi-directional data connections via the GPRS (**G**eneral **P**acket **R**adio **S**ervice) of a GSM network (**G**lobal **S**ystem for **M**obile Communications).

ZDUE-LAN-PLUS-IV: data communication via LAN

The ZDUE-LAN-PLUS IV establishes bi-directional data connections via such wired TCP/IP networks as the Intranet and/or the Internet.

TCP/IP data communication for machines that do not support TCP/IP

The communication required via TCP/IP protocol is provided by the ZDUE-GPRS-PLUS-IV and/or ZDUE-LAN-PLUS-IV. They transmit the data from electricity, gas and water meters that are not TCP/IP compatible.

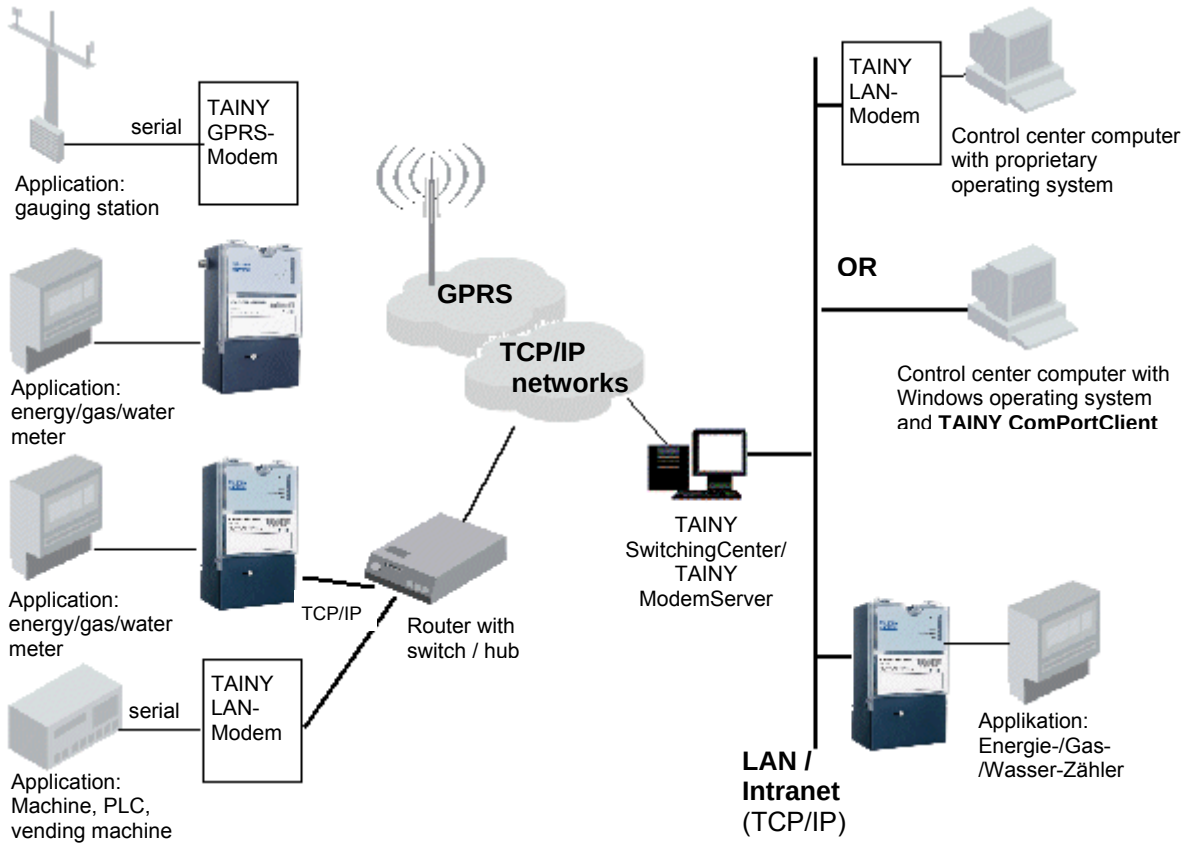
Both devices - ZDUE-***GPRS***-PLUS-IV and the ZDUE-***LAN***-PLUS-IV- operate more or less in the same way as the ZDUE-***GSM***-PLUS-IV described in the above. The special features are described in the following sections.

3.1.1 Connection Routes

Connection routes via the TAINY SwitchingCenter / TAINY ModemServer:

The TAINY SwitchingCenter / TAINY ModemServer can be used for data communication via the TCP/IP protocol in the following ways:

Application ←→ Control centre and Application ←→ Application



TAINY SwitchingCenter

or

TAINY ModemServer

All the connections made by the ZDUE-GSM-PLUS-IV are directed via a PC with access to the Internet/Intranet as the switching centre. This PC executes the TAINY SwitchingCenter / TAINY ModemServer. These software versions each function in practically the same way as a telecom private branch exchange: they can be used to establish dial-up connections or leased lines between any TAINY Connect clients. TAINY Connect clients include other ZDUE-GPRS-PLUS-IV, ZDUE-LAN-PLUS-IV, TAINY LMOD-S1, TAINY GMOD-Sx (with wireless connection via GPRS) or a PC with control centre software and a TAINY ComPortClient (CPC) installed. It makes no difference whether the TAINY Connect clients can be reached via GPRS, Internet or Intranet.

A PC with control-centre software and the TAINY ComPortClient (CPC) installed is able to establish a connection to any active ZDUE-GPRS-PLUS-IV/ ZDUE-LAN-PLUS-IV via TSC and read out the desired data from the meter(s) connected.

Control centre

There are two options with respect to the control centre:

- The control centre software is executed on a PC running on a Windows operating system.
  In this case, the PC also executes the TAINY ComPortClient (CPC). This software provides the control centre software with up to 255 virtual COM ports. These ports are used as before to access the remote applications, but now they do so via TCP/IP-based networks (Intranet, Internet, GPRS), via dial-up connection or via leased line, switched through the TAINY SwitchingCenter / TAINY ModemServer.
- The control centre software is installed on a computer without a Windows operating system (using a proprietary operating system).
  In this case, a TAINY LMOD-S1 is connected to the computer's serial interface to connect the computer, or rather the control centre software executed on it, to the TAINY SwitchingCenter/TAINY ModemServer via the TCP/IP network and the computer can now communicate via dial-up connections or leased lines.

CS Dial-up connection mode

A (TSC) call number is assigned to every ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV registered at the TAINY SwitchingCenter or TAINY ModemServer. The control centre dials the (TSC) call number of the ZDUE-GPRS-PLUS-IV and is then connected with this device.

The data communication that follows is almost the same as that for a GSM connection.

In this case, the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV operates in the **CS** (**C**ircuit **S**witched) dial-up mode.

LL dedicated line mode

It is also possible to use the TAINY SwitchingCenter or TAINY ModemServer to establish a dedicated line between a ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV and a control centre. In this case, the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV operates in the dedicated line mode - **LL** (**L**eased **L**ine). Each time the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV is restarted, the connection will be established automatically.

Creating the connection to the TSC

The connection to the TAINY SwitchingCenter or TAINY ModemServer is established automatically each time the device is restarted.

To establish a successful connection, you will have to configure the appropriate access data in their respective classes. For information please see the product descriptions:

ZDUE-GPRS-PLUS-IV
ZDUE-LAN-PLUS-IV

Important !

Please note that data packets are also exchanged each time a connection is (re-)established, an attempt is made to connect with the receiver (e.g. server switched off, incorrect destination address, etc.) and for keeping the connection alive. This is particularly important when you are using networks that levy a per-packet charge!

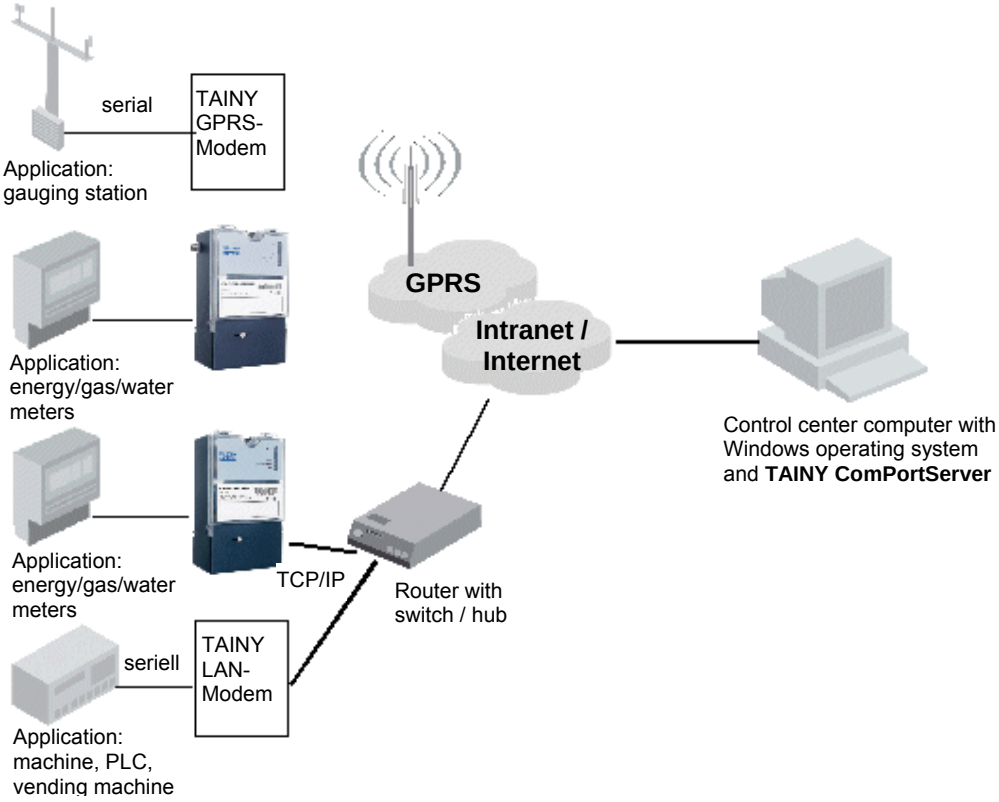
TAINY SwitchingCenter - Further information

For more information on the features and functioning of the TAINY SwitchingCenter and the TAINY ModemServer, please refer to the information provided in "The TAINY SwitchingCenter (TSC)".

Connection routes via the TAINY ComPortServer (CPS):

The TAINY ComPortServer can be used for data communication via the TCP/IP protocol in the following ways:

Application ←→ Control centre



Any application connected to the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV can communicate with the control centre – and vice versa. The TCP/IP connection is routed via the Intranet and/or Internet.

The receiver for the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV is a computer with Internet access on which the TAINY ComPortServer (CPS) is executed. This software provides the control centre software with up to 255 virtual COM ports. These ports are used as before to access the remote applications, but now they do so via TCP/IP-based networks (Intranet, Internet, GPRS).

LL dedicated line mode

A leased line connection is established virtually between the ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV and the control centre computer on which the TAINY ComPortServer is installed. The ZDUE-GPRS-PLUS-IV/ZDUE-LAN-PLUS-IV is operating in **LL** (LL = **L**eased **L**ine).

3.2 ZDUE-*GPRS*-PLUS-IV

3.2.1 General

GPRS data communications

The ZDUE-GPRS-PLUS-IV establishes bi-directional data connections via the GPRS (**G**eneral **P**acket **R**adio **S**ervice) of a GSM network (**G**lobal **S**ystem for **M**obile Communications).

Creating the connection to the TSC

The connection to the TAINY SwitchingCenter or TAINY ModemServer is established automatically each time the device is restarted.

To establish a successful connection, you will first have to configure the GPRS access data in the parameter class 60 – 69:

- Provider (select the GPRS network operator, e.g. T-D1, Vodafone)
- PDP_Context (GPRS network operator's access parameter)
- APN (GPRS network operator's access parameter)
- USER (user name for registration in the GPRS network)
- PASSWORD (password for registration in the GPRS network)
- DNS1 (primary domain name server in the GPRS network)
- DNS2 (secondary domain name server in the GPRS network; optional)

After that, you will have to configure the access data to the TAINY SwitchingCenter (TSC) or TAINY ModemServer (TMS) in the parameter class 70:

- IP (IP address of the TSC/TMS or its host name)
- DESTPORT (port number of the TSC/TMS)
- USER (device's registered user name for the TSC/TMS)
- PASSWORD (device's registered password for the TSC/TMS)
- MODE (select dial-up or leased-line mode).

Important !

Please note that data packets are also exchanged each time a connection is (re-)established, an attempt is made to connect with the receiver (e.g. server switched off, incorrect destination address, etc.) and for keeping the connection alive. This is particularly important when you are using networks that levy a per-packet charge!

GSM data communications

As an alternative (should the GPRS connection fail) or in addition, the ZDUE-GPRS-PLUS-IV can also provide for communication via the GSM network using CSD calls (**C**ircuit**S**witched**D**ata calls).

In this case, it works like a conventional ZDUE-GSM-PLUS-IV to transmit data via the GSM network to any other modem in the GSM or landline network. In this GSM mode, the ZDUE-GPRS-PLUS-IV is able to accept calls.

Switching between the GPRS and GSM mode

Switching between the GPRS and the GSM mode manually is not required. GSM data calls will be accepted regardless of whether or not the ZDUE-GPRS-PLUS-IV has established a GPRS connection. The GPRS line will be disconnected in order to accept the GSM data call.

When the GSM data call has been completed, the device will automatically set up the GPRS connection once again.

Remote configuration via the GSM data connection

The remote configuration of the ZDUE-GPRS-PLUS-IV can also be done via a GSM connection.

➲ There may be restrictions on GPRS transmission for time-critical applications.
As a rule, the transmission time in the GPRS network only lasts a few 100 milliseconds, but because of the packet-transmitting infrastructure of the GPRS network, individual data packets may take longer, i.e. they may take up to several seconds.
This can also lead to problems when time-critical control centre software is used if this software expects a response to commands it has transmitted within a specific time period.

3.2.2 Operating elements and function indicators

The ZDUE-GPRS-PLUS-IV's 4 light-emitting diodes operate in GPRS mode as follows:

LED	Colour / action	Meaning
Power	Green	Power is on.
Status	Red flashing (0.5 / 0.5 sec)	PIN / SIM error (no SIM or wrong PIN)
	Orange flashing (0.5 / 0.5 sec)	Connection build-up (CSD call or GPRS dial-In) active
	Red	Malfunction (parameter checksum wrong, Data Flash error).
	Green flashing (0.5 / 0.5 sec)	Re-initialisation (device works with default configuration)
	Green	Normal operation (no malfunction, device works with customised parameterisation)
	Orange	Boot phase
Communication	OFF	No communication (meter/GPRS interface)
	Green (on for min. 0.25 sec)	Serial communication active: - Data transfer control centre -> meter - Data transfer meter -> control centre
	Green flashing (every 8 sec)	Connected and registered at the TAINY SwitchingCenter/TAINY ModemServer/TAINY ComPortServer
GSM-status	Beginning of the display: When mobile is switched on and logged into the GSM network.	
	OFF	GSM module is switched off or not logged in
	ON	CSD-CONNECT (ZDUE-GSM-PLUS-IV) CONNECT control centre <-> ZDUE-GPRS-PLUS-IV via TAINY SwitchingCenter/TAINY ModemServer/TAINY ComPortServer
	flashes 1x in 2 sec	Field strength <= -98 dBm
	flashes 2x in 2 sec	-98 dBm < field strength <= -83 dBm
	flashes 3x in 2 sec	-83 dBm < field strength <= -68 dBm
	flashes 4x in 2 sec	Field strength > -68 dBm

3.2.3 Upgrading the ZDUE-GSM-PLUS-IV for the GPRS mode

If you have bought ZDUE-GSM-PLUS-IV type devices that are already ready for GPRS service ('GPRS-prepared'), you will have to perform the following steps before you can use the devices for GPRS communications:

1. Update the device with GPRS-enabled firmware.
2. Have Dr. Neuhaus Telekommunikation GmbH activate the GPRS functionality (subject to a fee, required for each device).
3. Operate the device with the SIM card of a network operator that supports GPRS.
4. Have the network operator activate GPRS for the user concerned.

3.2.4 Configure the device where required

Delivery default setting

The default pre-setting of the ZDUE-GPRS-PLUS-IV is such that the following meter interface serves as the primary interface:

CL1 during a GPRS connection to the control centre

RS-232 if there is no GPRS connection (for local configuration)

This means that meter readouts by the control centre are automatically directed to the CL1 interface so that the control centre can communicate with the meters connected to this interface.

During the same GPRS connection, the control centre can be connected to other interfaces and the meters connected there when the control centre sends a corresponding switch-over command to the ZDUE-GPRS-PLUS-IV. (See *Switching between interfaces during remote readout*, page 18.)

Configuration options

The primary interface and various other settings can be altered.

Other important setting options regarding security include:

- access protection provided by time window and/or
- password request

The ZDUE-GPRS-PLUS-IV is not equipped with the 'password request with callback' function.

Local configuration

The ZDUE-GPRS-PLUS-IV can be configured using a computer that is connected direct via its COM port to its RS-232 interface – same as the ZDUE-GSM-PLUS-IV – see *Local configuration*, page 25.

Remote configuration via the GSM data connection

See ZDUE-GSM-PLUS-IV, *Remote configuration via the GSM network*, on page 25.

Remote configuration via TAINY SwitchingCenter / TAINY ModemServer / TAINY ComPortServer

In addition to the aforementioned configuration methods, the ZDUE-GPRS-PLUS-IV can also be configured via the TAINY SwitchingCenter/TAINY ModemServer or TAINY ComPortClient connection.

Configuration is done with the software that is used to operate the control centres or respective configuration software. This software transfers the parameter commands to the ZDUE-GPRS-PLUS-IV via the TAINY SwitchingCenter/TAINY ModemServer or TAINY ComPortClient.

Transfer takes place in accordance with DIN EN 62056-21 using a BCC protocol.
The parameter commands must be sent explicitly to the address of the ZDUE-GSM-PLUS-IV.

The default device address is as follows: **99999999**

The device address is configurable. It has 16 digits; numbers and letters are permissible

3.2.5 Additional sections in the *para.ini* parameter file

Compared to the ZDUE-GSM-PLUS-IV's parameter file (cf. Section 2.5.2), the following sections have been added to the ZDUE-GPRS-PLUS-IV's parameter file:

```
[IP_CONFIG]
IP=                                   ;e.g.: 62.225.63.6
DESTPORT=26862                        ;TCP-destination port
SOURCEPORT=26863                      ;TCP-source port: when the value is set to 'RANDOM', the
                                      ;source port addresses is determined at random.
CONNECT_ATTEMPTS=05                   ;Number of connection attempts until a module reset is
                                      ;performed

[GPRS_CONFIG]
SPECIAL_CGATT=NO                      ;Special GPRS disattach behaviour can be activated
                                      ;(Mobile restart instead of AT+CGATT=0)
RECONNECT_TIME=03                     ;Waiting time in [min] before a new GPRS
                                      ;dial-up attempt in the event of an error or after
                                      ;connection loss.
COLLECT_TO=20                         ;[10 msec]: The application sends meter data to the control
                                      ;centre when 1024 bytes were received or when no further
                                      ;meter data was received during the stipulated data collect
                                      ;timeout.

Internally generated:
PROVIDER=CLASSx                       ;Based on the first 5 number of the IMSI (= GSMNETID),
                                      ;the network operator was recognized and the GPRS
                                      ;access parameters were found in 'CLASSx' (x = 0..9).
[SERVER]
MODE=TSC | CPS                        ;TSC (TAINY SwitchingCenter) -> dial-up connection mode
                                      ;CPS (COM-Port-Server) -> leased-line mode (LL)
USER=user                             ;User name for TSC/CPS login
PASSWORD=password                     ;Password for TSC/CPS login

[CLASS0]
PROVIDER=T-D1                         ;Name of the network operator
GSMNETID=26201                        ;Operator's GSM network ID (MCC, here 262 -> Germany)
USER=guest                            ;User name for GPRS dial-up
PASSWORD=guest                        ;Password for GPRS dial-up
PDP_CONTEXT=1,"IP","internet.t-d1.de","0.0.0.0",0,0 ;Network operator's PDP context data
DNS1=193.254.160.001                  ;DomainNameServer 1 IP address
DNS2=194.025.002.131                  ;DomainNameServer 2 IP address
DIAL=*99***1#                         ;Dial string for GPRS dial-up

[CLASS1]
PROVIDER=VODAFONE
GSMNETID=26202
USER=guest
PASSWORD=guest
PDP_CONTEXT=1,"IP","web.vodafone.de","0.0.0.0",0,0
DNS1=139.007.030.125
DNS2=139.007.030.126
DIAL=*99***1#

[CLASS2]
PROVIDER=Eplus
GSMNETID=26203
```

USER=guest
PASSWORD=guest
PDP_CONTEXT=1,"IP","internet.eplus.de","0.0.0.0",0,0
DNS1=212.023.097.002
DNS2=212.023.097.003
DIAL=*99***1#

[CLASS3]
PROVIDER=O2
GSMNETID=26207
USER= guest
PASSWORD= guest
PDP_CONTEXT=1,"IP","internet","0.0.0.0",0,0
DNS1=195.182.096.028
DNS2=195.182.096.061
DIAL=*99***1#

[CLASS4]
DNS1=000.000.000.000
DNS2=000.000.000.000

[CLASS5]
DNS1=000.000.000.000
DNS2=000.000.000.000

[CLASS6]
DNS1=000.000.000.000
DNS2=000.000.000.000

[CLASS7]
DNS1=000.000.000.000
DNS2=000.000.000.000

[CLASS8]
DNS1=000.000.000.000
DNS2=000.000.000.000

[CLASS9]
DNS1=000.000.000.000
DNS2=000.000.000.000

3.2.6 Parameters and classes, class numbers

The following table shows the section, i.e. classes contained in the parameter file *para.ini*. Numbers are assigned to these classes and must be included in the parameter commands.

Section in 'para.ini'	Class	Permitted access types (R=Read/W=Write)
[MOBILE_CONFIG] [CSD_CONFIG]	51	R/W
[LS]	52	R/W
[DEVICE_CONFIG]	53	R/W
[CLOCK_CONFIG]	54	R/W
[RS232D]	55	R/W
[CL1]	56	R/W
[RS485_MBUS]	57	R/W
[LPRF]	58	R/W
[GENERAL]	59	R
[CLASS1 … CLASS9]	60-69	R/W
[IP_CONFIG] [GPRS_CONFIG] [SERVER] [MOBILE_CONFIG]	70	R/W

For information on classes 51 to 58, please see the description for the ZDUE-GSM-PLUS-IV.

Classes 60 to 70 – specific ZDUE-GPRS-PLUS-IV classes, are explained more closely in the sections below.

3.2.6.1 Parameter classes 60 – 69 [GPRS access parameters]

Length of Class 6* data record in the RAM: 321 bytes (**0x0141**)
Length of the Class 6* data record during communication: 327 bytes

Default configuration: The default configuration for **Class60 (C60)** is indicated in **bold print**.

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
String length PROVIDERNAME PROVIDERNAME [CLASS*] -> PROVIDER	0x00 0x01	1 32	2 32	‘00‘ .. ‘32‘ Max. 32 characters (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**C60**: ‘04‘ **C60**: ’T-D1’
String length GSMNETID GSMNETID [CLASS*] -> GSMNETID	0x21 0x22	1 9	1 9	‘1‘ .. ‘9‘ Max. 9 characters [‘0‘ .. ‘9‘]	**C60**: ‘5‘ **C60**: ‘26201‘ for T-MOBILE
String length PDP_CONTEXT PDP_CONTEXT [CLASS*] -> PDPCONTEXT	0x2B 0x2C	1 128	3 128	‘000‘ .. ‘128‘ [(20h .. 7Eh)]	**C60** : ‘039’ **C60**: ‘1,"IP","internet.t-d1.de","0.0.0.0",0,0
String length APN-USERNAME APN- USERNAME [CLASS*] -> USER	0xAC 0xAD	1 32	2 32	‘00‘ .. ‘32‘ Max. 32 characters (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**C60**: ‘04‘ **C60**: ‘guest’
String length APN-PASSWORD APN-PASSWORD [CLASS*] -> PASSWORD	0xCD 0xCE	1 32	2 32	‘00‘ .. ‘32‘ Max. 32 characters (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**C60**: ‘04‘ **C60**: ‘guest’
String length DIAL DIAL [CLASS*] -> DIAL	0xEE 0xEF	1 32	2 32	‘00‘ .. ‘32‘ Max. 32 characters (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**C60**: ‘08‘ **C60**: ‘*99***1#‘
DNS1 [CLASS*] -> DNS1	0x10F	15	15	‘0‘ .. ‘9’ und ‘.’	**C60**: ‘193.254.160.001‘
DNS2 [CLASS*] -> DNS2	0x11E	15	15	‘0‘ .. ‘9’ und ‘.’	**C60**: ‘194.025.002.131‘
Reserved for additional parameters	0x12D	20	20	TBD	TBD

In the parameter classes 60 to 69, it is possible to store up the provider-specific GPRS access parameters for up to 10 different network providers. Based on the IMSI of the SIM card inserted into the device, the firmware automatically recognises the GSMNETID (first 5 numbers of the IMSI) of the provider responsible and searches for this GSMNETID in the sections [CLASS0] to [CLASS9]. If it finds this information, the parameters contained in this section will be used and the section name (e.g. ‘CLASS0’) will be entered as the ‘PROVIDER’ parameter in the section [GPRS_CONFIG].

In the default configuration, the GPRS access parameters for 4 German network operators are entered in Classes 60 to 63:

Class60 (Section [CLASS0]) contains the access parameters for **T-D1**.
Class61 (Section [CLASS1]) contains the access parameters for **VODAFONE**.
Class62 (Section [CLASS2]) contains the access parameters for **E-PLUS**.
Class63 (Section [CLASS3]) contains the access parameters for **O2**.

3.2.6.2 Parameter-Class 70 [GPRS general parameters]

Length of Class 70 data record in the RAM: 169 bytes (**0x00A9**)
Length of Class 70 data record during communication : 181 bytes

Default configuration: The default configuration for **Class70** is indicated in **bold print**.

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
String length IP * IP * [IP_CONFIG]	0x00 0x01	1 64	2 64	‘00‘ .. ‘64‘ (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**Default: ‘00‘** **Default: leer** IP or host name of the TSC / TMS e.g.: ‘172.068.255.003’/‘test.dyndns.org’
DESTPORT [IP_CONFIG]	0x41	2	5	(‘0‘ .. ‘9’)	**Default: ‘26862’** Port number of the TSC / TMS
SOURCEPORT [IP_CONFIG]	0x43	2	5	(‘0‘ .. ‘9’)	**Default: ‘26863’** Port number that announces the ZDUE-GPRS-PLUS-IV. The **random** function of the socket-IF is activated with the source port **‘00000‘**!
CONNECT_ATTEMPTS [IP_CONFIG]	0x45	1	2	‘01‘ .. ‘99‘	**Default: ‘05‘** Registration attempts at the TSC / TMS
RECONNECT_TIME [GPRS_CONFIG]	0x46	1	2	‘00‘ .. ‘99‘	**Default: ‘03‘ [minutes]** Delay for new GPRS attach
String length USER USER [SERVER]	0x47 0x48	1 32	2 32	‘00‘ .. ‘32‘ (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**Default: ‘00‘** **Default: blank** User name for registration at the TSC/TMS as entered at the TSC/TMS
String length PASSWORD PASSWORD [SERVER]	0x68 0x69	1 32	2 32	‘01‘ .. ‘32‘ (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	**Default: ‘03‘** **Default: ‘PW0’** Password for registration at the TSC/TMS as entered at the TSC/TMS
MS_CLASS [MOBILE_CONFIG]	0x89	1	2	‘08‘ | ‘10’	**Default: ‘08’** **‘08’** = 4 Downlinks/ 1 Uplink ‘10’ = 3 Downlinks/ 2 Uplinks GPRS link control
SPECIAL_CGATT [GPRS_CONFIG]	0x8A	1	1	‘0‘ | ‘1‘	**Default: ‘0‘** = NO Special GPRS attach
MODE [SERVER]	0x8B	1	1	‘0‘ | ‘1‘	**Default: ‘0‘** **‘0‘ = Dial-up connection mode** ‘1‘ = Leased-line mode Depending on the operating mode used, the parameters for the DM600 must be set accordingly.
COLLECT_TO [GPRS_CONFIG]	0x8C	2	3	‘000’ ... ‘999’	**Default: ‘020’** = 200 msec Data-collect timeout [10msec]: The application sends meter data to the control centre when 1024 bytes have been received or after a data-collect timeout. ‘000’ = Feature deactivated !
Reserved for additional parameters	0x8E	27	26	TBD	TBD

*: If the IP destination address is parameterised as a ‘blank string’ or ‘000.000.000.000’, the device will not make a GPRS attach (-> CSD operation).

If necessary, the firmware will automatically generate the ‘PROVIDER’ parameter in Section [GPRS_CONFIG]. This parameter can be neither set nor read via communication.

3.2.6.3 Updating the firmware of the ZDUE-GPRS-PLUS-IV

Firmware update by control centre (remote) or local

The latest firmware can be transferred to the ZDUE-GPRS-PLUS-IV

- from a computer that is connected direct to the RS-232 interface of the ZDUE-GSM-PLUS-IV
- from the control centre via the GSM network
- from the control centre via the TAINY SwitchingCenter, TAINY ModemServer, TAINY ComPortServer

The same conditions apply as for configuration: See chapter *Configure the device where required,* page 68, and chapter *Configuration by parameterisation,* page 23.

Procedure

The procedure is basically identical to that described for ZDUE-GSM-PLUS-IV, see *Updating the firmware*, page 55.

3.3 ZDUE-*LAN*-PLUS-IV

3.3.1 General

LAN data communication

The ZDUE-LAN-PLUS-IV establishes bi-directional data connections via such wired TCP/IP networks as the Intranet and/or the Internet.

Creating the connection to the TSC

The connection to the TAINY SwitchingCenter, TAINY ModemServer or TAINY ComPortServer (CPS) is established automatically each time the device is restarted.
To establish a successful connection, you will first have to configure the LAN access data in parameter classes 77 (LAN parameters) and class 78 (Delay parameters).

After that, you will have to configure the access data to the TAINY SwitchingCenter, TAINY ModemServer or TAINY ComPortServer in the parameter class 75:

- IP (IP address of the TSC/TMS or its host name)
- DESTPORT (port number of the TSC/TMS)
- USER (device's registered user name for the TSC/TMS)
- PASSWORD (device's registered password for the TSC/TMS)
- MODE (select dial-up or leased-line mode).

Important !

Please note that data packets are also exchanged each time a connection is (re-)established, an attempt is made to connect with the receiver (e.g. server switched off, incorrect destination address, etc.) and for keeping the connection alive. This is particularly important when you are using networks that levy a per-packet charge!

3.3.2 Operating elements and function indicators

The ZDUE-LAN-PLUS IV's 4 light-emitting diodes operate in GPRS mode as follows:

LED	Colour / action	Meaning
Power	Green	Power is on.
Status	Red flashing (0,5 / 0,5 sec)	Network configuration error
	Orange flashing (0,5 / 0,5 sec)	Connection build-up
	Red	Malfunction (MAC address not available, parameter checksum wrong, Data Flash error).
	Green flashing (0,5 / 0,5 sec)	Reinitialisation (device works with default configuration)
	Green	Normal operation (no malfunction, device works with customised parameterisation)
	Orange	Boot phase
Communication	OFF	No communication (meter/LAN interface)
	Green (on for min. 0,25 sec)	Serial communication active: - Data transfer control centre -> meter - Data transfer meter -> control centre
	Green flashing (every 8 sec)	Connected and registered at the TAINY SwitchingCenter/TAINY ModemServer/TAINY ComPortServer
LAN	OFF	No network connection
	ON	CONNECT control centre <-> ZDUE-LAN-PLUS- IV via TAINY SwitchingCenter/TAINY ModemServer/TAINY ComPortServer
	flashes 1x in 2 sec	Waiting for network IP allocation (DHCP)
	flashes 2x in 2 sec	IP address allocated (DHCP) or set, no connection to server
	flashes 3x in 2 sec	Connection to server (TAINY SwitchingCenter, TAINY ModemServer or TAINY ComPortServer)

3.3.3 Putting the device into operation

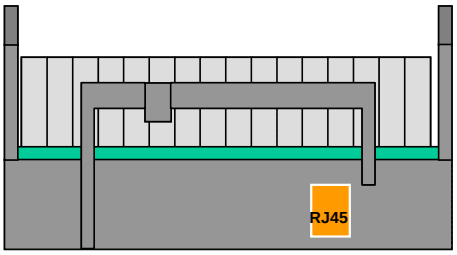
To put the ZDUE-LAN-PLUS-IV into operation, proceed as follows:

3.3.3.1 Connecting the ZDUE-LAN-PLUS-IV to the network (LAN)

LAN:
To connect the device to the TCP/IP network

The ZDUE-LAN-PLUS-IV is equipped with an RJ45 interface to connect the device to the TCP/IP network (LAN) via Ethernet cable.

ZDUE-LAN-PLUS-IV
Front view lower part of housing



Position RJ45

➲ Please make sure that the connection cable you use is a shielded twisted pair (STP) cable.

Please also see chapter *Technical Data ZDUE-LAN-PLUS-IV* .

3.3.4 Configuring the device

Delivery default setting

The default pre-setting of the ZDUE-LAN-PLUS IV is such that the following meter interface serves as the primary interface:

CL1 during a connection to the control centre

RS-232 if there is no connection (for local configuration)

This means that meter readouts by the control centre are automatically directed to the CL1 interface so that the control centre can communicate with the meters connected to this interface.

During the same LAN connection, the control centre can be connected to other interfaces and the meters connected there when the control centre sends a corresponding switch-over command to the ZDUE-LAN-PLUS IV. (See *Switching between interfaces during remote readout*, page 18.)

The default pre-setting of the network parameters (LAN) of the ZDUE-LAN-PLUS-IV are such that the device will retrieve the following parameters from a DHCP server:

DHCP=1	get network parameters from DHCP server
LOCALIP	no entry
SUBNET	no entry
GATEWAY	no entry
DNS1	no entry
DNS2	no entry

Configuration options

The primary interface and various other settings can be altered.

Other important setting options regarding security include:

- access protection provided by time window and/or
- password request

The ZDUE-LAN-PLUS IV is not equipped with the ‘password request with callback’ function.

The ZDUE-LAN-PLUS-IV can be configured:

- using a computer that is connected direct via its COM port to the RS-232 interface of the ZDUE-LAN-PLUS-IV – like the ZDUE-GSM-PLUS-IV (see *Local configuration*, page 25) or
- via TAINY SwitchingCenter, TAINY ModemServer, TAINY ComPortServer – like the ZDUE-GPRS-PLUS-IV (see *Remote configuration via TAINY SwitchingCenter / TAINY ModemServer / TAINY ComPortServer*, page 69).

3.3.5 The parameter file *para.ini*

```
; ZDUE-LAN-PLUS IV  Parameter File

[LS]                                    ;Control centre parameters
PROTECTION= NO | PASSWORD               ;NO: no password protection, PASSWORD: password
                                        ;without callback
PASSWORD=control_centre_password        ;Control centre password (max. 16 characters)
TRANSFER_TO=10 .. 99                    ; If inactivity for > timeout [sec] => close connection

[DEVICE_CONFIG]
IEC_ADR=iec_adr_zdue_lan                ; IEC address of ZDUE-LAN-PLUS-IV (max. 16 ;characters,
                                        ;def.: '99999999')
IEC_IDENT=identification_zdue_lan       ; Device identification of ZDUE-LAN-PLUS IV
                                        ;(max. 16 characters, def.: TBD)
IEC_SET_PW=set_password_zdue_lan        ; Set password of the ZDUE-LAN-PLUS IV
                                        ;(max. 16 characters, def.: '00000000')
IEC_TA=2 ... 20                         ;ta in acc. with EN 62056-21 (default: 15 [sec]).
IEC_TR=2 ... 20                         ;tr in acc. with EN 62056-21 (default: 15 [sec]).
EXT_IF=CL1 | RS232 | RS485 | M_BUS      ;Determination of external interface (meter interface)
EVU_IDENT=property_no_ZDUE_LAN          ;Property no for billing data record (type ‚String'; fixed
                                        ;length) (def.: 00000000)

[CLOCK_CONFIG]
SOWI_TIME1=date_time                    ;Next switch time summer/winter time
                                        ;e.g.: SOWI_TIME1=28.10.2002 03:00
SOWI_TIME2=date_time                    ;2nd switch time summer/winter time (3,03,30,2)
SOWI_TIME3=date_time                    ;3rd switch time summer/winter time (3,10,26,3)
        :       =       :
SOWI_TIME20=date_time                   ;20th switch time summer/winter time (12,03,25,2)
TIME_WINDOW=hh:mm hh:mm                 ;Call acceptance time window, e.g. 03:00 to 05:40

[RS232D]                                ;RS232 section for ZDUE-LAN-PLUS IV
BAUDRATE=300 ...115200                  ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                          ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1 | 2                          ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD                  ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                        ;No=do not send physical break in case of GSM disconnect
                                        ;Yes=send physical break in case of GSM disconnect
BREAK_TIME=20...3000                    ;Duration of physical break in msec (Def.: 300 msec)
MODE=MODEC | TRANSPARENT                ;ModeC monitoring (Def.) or direct transparent (without baud
                                        ;rate switching)
DTR_MODE=ALWAYS | ONLINE                ;DTR-activation: always active | only when device is online

[CL1]                                   ;Current Loop Interface (active)
BAUDRATE=300 ...19200                   ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                          ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1 | 2                          ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD                  ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                        ;No=do not send physical break in case of disconnect
                                        ;Yes=send physical break in case of disconnect
BREAK_TIME=20...3000                    ;Duration of physical break in msec
MODE=MODEC | TRANSPARENT                ;ModeC monitoring or direct transparent (without baud ;rate
                                        ;switching)

[RS485_MBUS]                            ;RS485-/M-Bus Interface
BAUDRATE=300 ...115200                  ;Start baud rate in acc. with EN 62056-21 (ModeC)
DATABITS=7 | 8                          ;No. of data bits (max. 1 digit and only numbers permitted)
STOPBITS=1 | 2                          ;No. of stop bits (max. 1 digit and only numbers permitted)
PARITY=NO | EVEN | ODD                  ;Parity (only NO, EVEN or ODD permitted)
BREAK= YES |  NO                        ;No=do not send physical break in case of disconnect
                                        ;Yes=send physical break in case of disconnect
BREAK_TIME=20...3000                    ;Duration of physical break in msec
MODE=MODEC | TRANSPARENT                ;ModeC monitoring or direct transparent (without baud rate
                                        ;switching)
```

```
[LPRF]                                  ;LPRF = Load profile
MEASURE_PERIOD=5 | 15 | 30 | 60         ;Measurement period duration (5 / 15 / 30 / 60 [minutes])
ACTIVE_EDGE_LP1=FALL | RISE             ;Active edge LP1
ACTIVE_EDGE_LP2=FALL | RISE             ;Active edge LP2
ACTIVE_EDGE_LP3=FALL | RISE             ;Active edge LP3
ACTIVE_TIME_LP1=10...150                ;Minimum pulse duration LP1 (10 ... 150 [msec])
ACTIVE_TIME_LP2=10...150                ;Minimum pulse duration LP2 (10 ... 150 [msec])
ACTIVE_TIME_LP3=10...150                ;Minimum pulse duration LP3 (10 ... 150 [msec])
EDIS_KZ_LP1=edis_index_no._channel1     ;EDIS index no. channel 1 (LP1) (e.g.: '1.5', max. 7
                                        ;characters)
EDIS_KZ_LP2=edis_index_no._channel2     ;EDIS index no. channel 2 (LP2) (e.g.: '1.5', max. 7
                                        ;characters)
EDIS_KZ_LP3=edis_index_no._channel3     ;EDIS index no. channel 3 (LP3) (e.g.: '1.5', max. 7
                                        ;characters)
EDIS_MWE_LP1=edis_measuring_unit1       ;Measuring unit channel1 (e.g.: 'kW', max. 7 characters)
EDIS_MWE_LP2=edis_measuring_unit2       ;Measuring unit channel2 (e.g.: 'kW', max. 7 characters)
EDIS_MWE_LP3=edis_measuring _unit3      ;Measuring unit channel 3 (e.g.: 'kW', max. 7 characters)
LP3_FUNCTION=IMPULS | SYNC              ;LP3 can be used as a pulse input (def.) or as a
                                        ;synchronisation input (MP termination)
MEDIUM_LP1=medium channel 1             ;Medium for channel (e.g.: '1-', max. 4 characters)
MEDIUM_LP2=medium channel 2             ;Medium for channel (e.g.: '1-', max. 4 characters)
MEDIUM_LP3=medium channel 3             ;Medium for channel (e.g.: '1-', max. 4 characters)


[IP_CONFIG]
IP=server_ip_address                    ;IP address or hostname of the server
DESTPORT=server_port_address            ;TCP-destination port
SOURCEPORT=zdue_lan_port_address        ;Port address of the ZDUE-LAN-PLUS-IV (source)
IP2=server2_ip_address                  ;IP address or hostname of the 2nd server
DESTPORT2=server2_port_address          ;TCP-destination port address of 2nd server
SOURCEPORT2=zdue_lan_port_address       ;Port address of the ZDUE-LAN-PLUS-IV (source)
CONNECT_ATTEMPTS=1...99                 ;No. of connection attempts (DNS/socket/TSC) made
                                        ;directly in succession before the ZDUE-LAN-PLUS-IV waits
                                        ;the delay time
RANDOM_DELAY=YES|NO                     ;Activate random delay before starting the socket IF
DELAY_TIME=T1,T2,T3,....T10             ;Time ZDUE-LAN-PLUS-IV waits after
                                        ;CONNECT_ATTEMPS tries before starting another
                                        ;connection attempt

[SERVER]
MODE=TSC | CPS                          ;TSC -> CS-Mode, CPS -> LL-Mode
USER=Username_for_Server_Login          ;User name for server login (def.: MAC address)
PASSWORD= Password_for_Server_Login     ;Password for server login
USER2=Username_for_Server2_Login        ;Username for login to 2nd server
PASSWORD2= Password_for_Server2_Login   ;Password for login to 2nd server

[LAN]                                   ;LAN = Local Area Network
PPPOE_ENABLE=YES | NO                   ;activate/deactivate PPPoE (necessary when connected to a
                                        ;DSL modem)
DHCP=YES | NO                           ;YES=the parameters LOCALIP, SUBNET, GATEWAY,
                                        ;DNS1 and DNS2 are automatically retrieved from a DHCP
                                        ;server. In this case the parameters are NOT stored in the
                                        ;para.ini file!
                                        ;No= the parameters have to be set by the configuration
                                        ;software
LOCALIP=IP_Address_of_zdue              ;IP address of the ZDUE_LAN
SUBNET=Subnet_Mask                      ;subnet mask for the sub network in which the ZDUE-LAN is
                                        ;operated
GATEWAY=Gateway_Address                 ;IP address of the gateway that allows the crossover to
                                        ;other (sub)networks
DNS1=IP_Address_of_DomainNameServer1    ;IP address of one DomainNameServer
DNS2=IP_Address_of_DomainNameServer2    ;IP address of one DomainNameServer
DHCP_TIME=dhcp_time                     ;Time (in seconds) the ZDUE-LAN waits before sending a
                                        ;new DHCP query to the DHCP server
DATAFORMAT=1 | 2                        ;Data format during connection ZDUE-LAN <-> control
                                        ;centre
```

```
COLLECT_TO=000 ... 999          ;Timeout [10 msec]: The application sends meter data to the
                                ;control centre when no further meter data was ;received
                                ;during the stipulated data collect timeout.
                                ;(def. '20' = 200 msec)
PPPOE_USER=Username_for_PPPoE   ;User name for PPPoE (def.: MAC address)
PPPOE_PASSWORD= Password_for_PPPoE ;Password for PPPoE
PPPOE_MODE=STD                  ;STD -> Standard (acc. to RFC2516)

Parameter set internally:
ETH0_MAC=MAC_Address            ;MAC (Media Access Control) address of the
                                ;ZDUE-LAN-PLUS-IV

[GSMLOG_CONFIG]
KENNZIFFER=50 .. 98             ;Index no. of LAN logbook in IEC communication
ENABLED=YES | NO                ;Record in the LAN logbook active/inactive
TIMEOUT=02 .. 15                ;Timeout to generate cyclical GSM logbook entries [min.]
                                ;(def.: 10 min.)

[GENERAL]                       ;general parameters that must not be changed
PAR_STATUS=DEFAULT | USER       ;System works with default configuration / user
                                ;parameterisation (may only be changed by the system)
PAR_VERSION=002                 ;parameter version no.
PLATFORM=DM700 / ZDUE-LAN-PLUS IV ;System-dependent parameter
PRODUCT_CODE=DNT8140            ;System-dependent parameter
REBOOT_TIME=xxx                 ;Delay time [secs] between the occurrence of an event
                                ;causing a reboot and the actual rebooting (0 = Reboot
                                ;disabled)
LOG_UART_FILTER=1 2 3 4 5       ;DEBUG: Filter for output on the service interface
LOG_FILE_FILTER=0 1 2 3 4 5     ;DEBUG: Filter for entries in the master logbook

SAISON=WINTER | SOMMER          ;Winter/summer time active
```

3.3.6 Parameters and classes, class numbers of the ZDUE-LAN-PLUS-IV

The following table shows the section, i.e. classes contained in the parameter file *para.ini* of the ZDUE-LAN-PLUS-IV. Numbers are assigned to these classes and must be included in the parameter commands.

Section in 'para.ini'	Class	Permitted access types (R=Read/W=Write)
[LS]	52	R/W
[DEVICE_CONFIG]	53	R/W
[CLOCK_CONFIG]	54	R/W
[RS232D]	55	R/W
[CL1]	56	R/W
[RS485_MBUS]	57	R/W
[LPRF]	58	R/W
[GENERAL]		R
[IP_CONFIG] [SERVER]	75	R/W
[IP_CONFIG] [SERVER]	76	Reserved for future applications
[LAN] [GSMLOG_CONFIG]	77	R/W
[LAN] [IP_CONFIG]	78	R/W

Classes 52 and 53:
For information on these classes in regard to the ZDUE-LAN-PLUS-IV, please see the following sections. (Some parameters and/or parameter values within these classes deviate from those of the ZDUE-GSM-PLUS-IV.)

Classes 54 to 58:
For information on these classes, please see the description for ZDUE-GSM-PLUS-IV.

Classes 75, 77 and 78:
These specific ZDUE-LAN-PLUS-IV classes, are explained more closely in the sections below.

3.3.6.1 Parameter class 52 [LS]

Length of the Class 52 data record in the RAM: 39 bytes (**0x0027**)
Length of the Class 52 data record during communication: 41 bytes

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
PROTECTION	0x00	1	1	**'0'** '1'	**No access protection** Password
TRANSFER_TO	0x01	1	2	'10' .. '99'	Transfer-Timeout (Def.: **20 sec**)
String length PASSWORD	0x02	1	2	'00' .. '16'	String length password (Def.: **'00'**)
PASSWORD	0x03	16	16	Max. 16 characters	Password (Def.: **empty**)
Reserved for additional parameters	0x13	20	20	TBD	TBD

➲ If the parameter PROTECTION is set to ‘1‘ a PASSWORD must previously have been determined or have been set in the same W1 command (string length != 0). Otherwise the W1 command is acknowledged with ERROR.

3.3.6.2 Parameter class 53 [DEVICE_CONFIG]

Length of the Class 53 data record in the RAM: 74 Bytes (**0x004A**)
Length of the Class 53 data record during communication: 79 Bytes

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
String length DEVICE ADDRESS	0x00	1	2	‘01‘ .. ‘16‘	Length of IEC address default: **‘08‘**
Device address (ZDUE-LAN-PLUS IV) (IEC_ADR)	0x01	16	16	Max. 16 characters (‘0‘ .. ‘9‘, ‘a‘ .. ‘z‘, ‘A‘ .. ‘Z‘)	IEC address of .ZDUE-LAN-PLUS-IV default: **‘99999999‘**
String length COMMUNICATIONS-ID	0x11	1	2	‘01‘ .. ‘16‘	default: **‘15‘**
COMMUNICATIONS-ID (IEC_IDENT)	0x12	16	16	Max. 16 characters [‘ ‘ .. ‘~‘ (20h .. 7Eh)]	Default: **‘1KGL923370R<u>0002</u>‘** The last four digits are codes for the interface variants: **0002**: (Standard) (CL1-, RS232-, RS485-IF) **1002**: (CL1-, RS232-, M-Bus-IF) **2002**: reserved **3002**: (CL1, RS232-IF) + Auxiliary voltage source **0012**: reserved **0000**: HW-Detection-Error
String length SET-PASSWORD	0x22	1	2	‘00‘ .. ‘16‘	Default: **‘08‘**
SETZ-PASSWORT (IEC_SET_PW)	0x23	16	16	Max. 16 characters [‘ ‘ .. ‘~‘ (20h .. 7Eh) without ‘(‘ , ‘)‘]	Default: **‘00000000‘**
IEC_TA	0x33	1	2	‘02‘ .. ‘20‘	Timeout Ta in acc. with EN 62056-21, Default: **‘15‘**
IEC_TR	0x34	1	2	‘02‘ .. ‘20‘	Timeout Tr in acc. with EN 62056-21, Default: **‘15‘**
External COM interface	0x35	1	1	**‘0‘** ‘1‘ ‘2‘ ‘3‘	**Current-Loop (CL1)** RS232 RS485 M-Bus
String length EVU_IDENT	0x36	1	2	‘00‘ .. ‘16‘	Default: **‘08‘**
EVU_IDENT	0x37	16	16	16 characters [‘ ‘ .. ‘~‘ (20h .. 7Eh)]	Default: ‘**00000000‘** Property number of the ZDUE-LAN-PLUS IV in the invoicing data record.
Reserved for additional parameters	0x47	2	2	TBD	TBD

➲ If, when writing this class, the control centre selects an external COM interface which is not physically present in the device (e.g. M-Bus) the write command (W1 C5300000000) is acknowledged with ‘ERROR13‘.

➲ When setting the COMMUNICATIONS-ID (IEC_ IDENT) the firmware of the ZDUE-LAN-PLUS-IV always sets the last four digits (referring to the string length of the IEC_ IDENT) to the values specified by the hardware identification.

3.3.6.3 Parameter class 75 [IP_CONFIG], [SERVER_CONFIG]

Length of the Class 75 data record in the RAM: 168 Bytes (**0x00A8**)
Length of the Class 75 data record during communication: 178 Bytes (0x00B2)

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
String length IP IP address / Hostname of the server * [IP_CONFIG] -> IP	0x00 0x01	1 64	2 64	‘00‘ .. ‘64‘ (0x20 .. 0x7E)	**Def: ‘00‘** IP or host name of the TSC / TMS e.g.: ‘172.068.255.003’ or ‘test.dyndns.org’ **Def: ‘empty‘**
Destination port [IP_CONFIG] -> DESTPORT	0x41	2	5	(‘0‘ .. ‘9’)	**Def: ‘26862’**
Source port [IP_CONFIG] -> SOURCEPORT	0x43	2	5	(‘0‘ .. ‘9’)	**Def: ‘00000’ (=RANDOM)**
Server mode [SERVER] -> MODE	0x45	1	1	‘0‘ | ‘1‘	**Def: ‘0‘ = TSC(TAINYSwitch.Center)** ‘1‘ = CPS(ComPortServer) CS-Modus -> TSC LL-Modus -> CPS
String length user name for server login User name for server login [SERVER] -> USER	0x46 0x47	1 32	2 32	‘01‘ .. ‘32‘ (0x20 .. 0x7E)	**Def: ‘12‘** **Def: ‘<MAC-address>’** The 12-digit MAC address of the Ethernet controller is used as default (e.g.: 00604CC71004)
String length password for server login Password for server login [SERVER] -> PASSWORD	0x67 0x68	1 32	2 32	‘01‘ .. ‘32‘ (0x20 .. 0x7E)	**Def**: **‘03‘** **Def: ‘PW0’**
No. of connection attempts (DNS/socket/TSC) made directly in succession before the ZDUE-LAN-PLUS-IV waits the delay time [IP_CONFIG] -> CONNECT_ATTEMPTS	0x88	1	2	‘01‘ .. ‘99‘	**Def**: **‘03‘**
Activate random delay before starting the socket IF [IP_CONFIG] -> RANDOM_DELAY	0x89	1	1	‘0‘ | ‘1‘	Activate random delay before starting the socket IF to avoid problems due to simultaneous starting-up of many devices. **Def**: **‘1‘ = activated**
Reserved for additional parameters	0x8A	30	30	TBD	TBD

➲ *: If the IP destination address is parameterised as a ‘blank string’ or ‘000.000.000.000’, a connection to the server cannot be established.

3.3.6.4 Parameter class 76 [IP_CONFIG], [SERVER_CONFIG]

For future applications and/or functions some parameters have already been defined, e.g. *IP2, PASSWORD2*, etc. However, these parameters are not yet supported.
Please do not set these parameters and/or do not change the default settings.

3.3.6.5 Parameter class 77 [LAN], [GSMLOG_CONFIG]

Length of Class 77 data record in the RAM: 244 Bytes (**0x00F4**)
Length of Class 77 data record during communication: 249 Bytes (0x00F9)

Parameter	Offset (hex.)	RAM	COM	Values (ASCII)	Description
PPPoE-Enable [LAN] -> PPPOE_ENABLED 1)	0x00	1	1	'0' | '1'	**Def: '0' = Disabled** '1' = Enabled
DynamicHostConfiguration-Protocol [LAN] -> DHCP 2)	0x01	1	1	'0' | '1'	**Def: '1' = Enabled** '0' = Disabled
Local IP for the ZDUE_LAN if DHCP is disabled [LAN] -> LOCALIP 3)	0x02	15	15	'0' .. '9' und '.'	**Def.: '000000000000000'** e.g. 123.456.678.003
Subnet mask [LAN] -> SUBNET 3)	0x11	15	15	'0' .. '9' und '.'	**Def.: '000000000000000'** e.g. 192.186.001.003
Gateway [LAN] -> GATEWAY 3)	0x20	15	15	'0' .. '9' und '.'	**Def.: '000000000000000'** e.g. 123.456.678.003
DomainNameServer 1 [LAN] -> DNS1 3)	0x2F	15	15	'0' .. '9' und '.'	**Def.: '000000000000000'** e.g. 123.456.678.003
DomainNameServer 2 [LAN] -> DNS2 3)	0x3E	15	15	'0' .. '9' und '.'	**Def.: '000000000000000'** e.g. 123.456.678.003
EDIS index of LAN logbook [GSMLOG_CONFIG] -> KENNZIFFER	0x4D	1	2	'50' .. '98'	Index no. of LAN logbook in IEC communication **Def.: '98'**
Record in the LAN logbook active/inactive [GSMLOG_CONFIG] -> ENABLED	0x4E	1	1	'0' or '1'	'0' : Disabled **'1' : Enabled** Refers to generation of new entries. Readout is always possible.
LAN logbook Timeout [GSMLOG_CONFIG] -> TIMEOUT	0x4F	1	2	'02' to '15'	Timeout to generate cyclical GSM logbook entries [min.] **Def.: '10'**
Data format LAN interface [LAN] -> DATAFORMAT	0x50	1	1	'1' '2'	8N1 **7E1 (Software emulation)** Data format during logical connection ZDUE-LAN <-> Control centre
Data-collect timeout [LAN] -> COLLECT_TO	0x51	2	3	'000'..'999'	Data-collect timeout [10msec]: The application sends meter data to the control centre when 1024 bytes have been received or after a data-collect timeout. **Def.: '020'** = 200msec
String length user name for PPPoE PPPoE user name [LAN] -> PPPOE_USER	0x53 0x54	1 64	2 64	'00' .. '64' (0x20 .. 0x7E)	**Def: '12'** **Def: '<MAC-address>'** The 12-digit MAC address of the Ethernet controller is used as default (e.g.: 00604CC71004)
String length password for PPPoE PPPoE password [LAN] -> PPPOE_PASSWORD	0x94 0x95	1 64	2 64	'00' .. '64' (0x20 .. 0x7E)	**Def: '03'** **Def: 'PW0'**
PPPoE mode [LAN] -> PPPOE_MODE	0xD5	1	1	'0' or '1'	**Def: '0' = RFC2516** '1' : reserved for additional modes
Reserved for additional parameters	0xD6	30	30	TBD	TBD

1) With PPPoE (PPP over Ethernet) activated, the parameters DHCP, SUBNET, GATEWAY are without function.

2) When the DHC Protocol (value = '1') is activated the ZDUE-LAN-PLUS-IV will automatically try to retrieve the parameters LOCALIP, SUBNET, GATEWAY, DNS1 and DNS2 from the DHCP server. Since they are dynamic, these parameters will NOT be stored in the parameter file 'para.ini'!
If DHCP is not activated, the ZDUE-LAN-PLUS-IV has to be programmed with a fixed IP address ([LAN]->LOCALIP) as well as the subnet mask, Gateway IP address and one or both DNS servers. If the LOCALIP and SUBNET are not entered although the DCHP is deactivated, ZDUE-LAN-PLUS-IV will use the following values for LOCAL and SUBNET: LOCALIP=192.168.001.100, SUBNET=255.255.255.0 (in this case the values are NOT stored in the parameter file 'para.ini' !)

3) If the IP destination address is parameterised as a 'blank string' or '000.000.000.000', the parameter value in the file 'para.ini' will be deleted (value = empty string).

3.3.6.6 Parameter class 78 [LAN], [IP_CONFIG]

Length of Class 78 data record in the RAM: 90 Bytes (**0x005A**)
Length of the Class 78 data record during communication: 150 Bytes (0x0096)

Parameter	Offset (hex.)	RAM	COM	Value (ASCII)	Description
Time the ZDUE-LAN waits before sending a new DHCP query to the DHCP server [LAN] -> DHCP_TIME [1)]	0x00	20	40	10 values, each between '0000' and '9999'	10 four-digit values [minutes] **Def: '000300000000000000000000000000000000000000'**
Time ZDUE-LAN-PLUS-IV waits after CONNECT_ATTEMPS tries before starting another connection attempt [IP_CONFIG] -> DELAY_TIME [1)]	0x14	20	40	10 values, each between '0000' and '9999'	10 four-digit values [minutes] **Def: '000300000000000000000000000000000000000000'**
DELAY_TIME2 (Reserve)	0x28	20	40	10 values, each between '0000' and '9999'	Unused
Reserved for additional parameters	0x3C	30	30	TBD	TBD

1) The parameter DELAY-TIME consists of 10 four-digit values with a range for each single value of 0000 <= T <= 9999 minutes. If the 2nd to 10th value are equally set to '0000' attempts to reconnect will follow a static time pattern according to the first value entered. If different entries are made for the 2nd to 10th value, the reconnecting attempts will follow a dynamical pattern, i.e. the reconnect time is increased dynamically, provided every subsequent value is greater than its predecessor.

Example:
DELAY_TIME=000100020005001000300060000000000000000000

6 values have been entered: 1 minute, 2 minutes, 5 minutes, 10 minutes, 30 minutes and 60 minutes. If the first connect attempt is not successful (after CONNECT_ATTEMPTS tries -> class 75), the socket interface waits for 1 minute before starting a further connect attempt „session". If this also fails, the device will wait for 2 minutes, after that for 5 minutes etc. If the 6th „session" also fails, the device will then switch to a static pattern and will try every 60 minutes to connect to the server.

3.3.7 Service commands

For basic information on these commands, please see the instructions for the ZDUE-GSM-PLUS-IV.
On account of the different network interface of the ZDUE-LAN-PLUS-IV, the following commands differ from those of the ZDUE-GSM-PLUS-IV:

4. Read chip ID and type of the Ethernet controller:

Command format: <SOH>**R3**<STX>**S64( )**<ETX><BCC>

Response: <STX>S64(0x630E)(CS8900A)<ETX><BCC>

5. Read the MAC address of the Ethernet controller:

Command format: <SOH>**R3**<STX>**S65( )**<ETX><BCC>

Using this command, the MAC address of the Ethernet controller is requested:

Response: <STX>S65(00604CC7100B)<ETX><BCC>

This command can also be sent via the LAN-Interface.

3.3.8 The LAN log

Purpose and benefits

In the LAN log the ZDUE-LAN-PLUS-IV records key events and status changes that occur in

- communication with the server (TAINY SwitchingCenter, TAINY ModemServer, TAINY ComPortServer)
- local meter communication
- special events..

The LAN log is structured according to the GSM log. The readout is performed identical to that of the GSM log, see chapter *The GSM* log, page 49 and following).

Parameter settings for the LAN log are described in chapter *Parameter class 77 [LAN]*.

Information elements of each entry

Each entry in the LAN log contains the following information elements:

- Date / time
- Cause of the entry
- Registration status (GSM)
- Network operator (alphanumerical, GSM)
- Location area ID (GSM)
- Cell ID (GSM)
- Field strength (GSM)

In order to achieve an identical structure in the log books of the different ZDUE devices, the GSM-specific elements are also included in the LAN log. The contents of these GSM-specific elements are represented in the LAN log as follows:

- Registration status (GSM) => ZDUE-LAN-PLUS-IV: (0)
- Network-Operator (alphanumerical, GSM) => ZDUE-LAN-PLUS-IV: ()
- Location Area ID (GSM) => ZDUE-LAN-PLUS-IV: (????)
- Cell-ID (GSM) => ZDUE-LAN-PLUS-IV: (????)
- Field strength (GSM) => ZDUE-LAN-PLUS-IV: (-113dBm).

3.3.8.1 Causes for an entry in the LAN log

The following events or condition changes result in a log entry:

Cause	Description
LAN operating parameters	
106	Socket-CONNECT
107	Socket-DISCONNECT
108	TSC-CONNECT
109	TSC-DISCONNECT
111	PPP-CONNECT (PPPoE only)
112	PPP-DISCONNECT (PPPoE only)
113	RING from TSC
114	CONNECT Control centre <-> ZDUE-LAN-PLUS-IV via TSC/TMS/CPS
115	DISCONNECT Control centre <-> ZDUE-LAN-PLUS-IV via TSC/TMS/CPS
154	Parameter ScrambleMode, ConnectAttempts, Dest-Port, IP address/Hostname, User / Password not available or wrong
159	Link not available (LAN)
160	Error on network layer (DHCP/DNS not available)
Local communication	

201	Meter communication: billing data readout successful.
202	Meter communication: data readout in programming mode without using P1 command.
203	Meter communication: data readout in manufacturer mode without using P1 command.
204	Meter communication: communication closed after acknowledgement telegram (data readout).
205	Meter communication: communication closed after acknowledgement telegram (programming mode).
206	Meter communication: communication closed after acknowledgement telegram (manufacturer-specific)
207	Meter communication: communication closed after identification telegram of meter
208	Meter communication: communication closed after request telegram from control centre
Parameterisation / firmware updates	
301	Device parameterised (ZDUE: execution of parameter transfer command).
302	Firmware update carried out successfully.
303	Operating status word of ZDUE reset by control centre.
Time / date	
401	Automatic entry due to timeout (by default every 10 minutes if no other event occurs).
402	Time reset in device (RTC).
403	Date reset in device (RTC).

Although events 201 to 208 are registered in the online phase the log entry does not take place until the connection is established. If there are several communication cycles during the online (transparent) phase the CAUSE therefore describes only the sequence of the last cycle.

3.3.9 Updating the firmware of the ZDUE-LAN-PLUS-IV

Firmware update by control centre (remote) or local

The latest firmware can be transferred to the ZDUE-LAN-PLUS-IV

- from a computer that is connected direct to the RS-232 interface of the ZDUE-LAN-PLUS-IV
  AND
- from the control centre via the TAINY SwitchingCenter, TAINY ModemServer, TAINY ComPortServer

The same conditions apply as for configuration: See chapter *Configuring the device,* page 89, and chapter *Configuration by parameterisation,* page 25.

Procedure

The procedure is basically identical to that described for ZDUE-GSM-PLUS-IV, *Updating the firmware*, page 55.

4 Technical Data ZDUE-*GSM*-PLUS-IV / ZDUE-*GPRS*-PLUS-IV

Power supply:	
Voltage	100 VAC -24% up to 230 VAC +10%, 50/60Hz 60 VDC –10% up to 100 VDC +10% (protected against polarity reversal)
Power consumption	Approx. 10 VA active, approx 6 VA passive
GSM interface:	
Standard	GSM Rec. 7.02 asynchronous, non-transparent, 9.6 kbps, modem type V.32, RLP in acc. with GSM Rec. 4.22, ISDN type V.110 small SIM card (3V)
Spectrum	GSM-900 MHz (2W) and GSM-1800 MHz (1W) PCS-1900 MHz (1W) optional
Antenna connection	FME, approx. 50 Ohm
Meter interfaces:	
Current loop interface	CL1 (20mA) in acc. with DIN EN 62056-21, Mode A/C, up to 19,2 kbps
RS-232	Full duplex Signals: Rx, Tx, DTR, GND Interface speed: up to 57.600 Baud (max. length of cable < 3m) Cable length: up to 15m
RS-485	Signals: RT+, RT- Transceiver: up to 32 Interface speed: up to 19.200 Baud Cable length: up to 1000m
RS-485 (4-wire)	4-wire, 19,2kBit/s, cable length up to 1000m (special variant)
M-Bus (optional instead of RS-485)	Max. 25 M-Bus standard loads Interface speed: max. 9.600 bit/s (in the case of optimal bus topology);
Pulse inputs	3 S0 input acc. to EN 62053-31-B (potential-free)
Configuration	DIN EN 62056-21
Communication with meter	Transparent DIN EN 62056-21: Mode C, Mode A (corresponds to transparent)
Load profile memory:	
Statistical load profile	Flash memory (power failure-proof)
Internal real-time clock	Power reserve > 48 hours
Galvanic isolation:	
Test voltage	Power supply L1,N against all communication interfaces: 3kVAC, 50Hz, 1 min. Between the communication interfaces: 500VAC, 50 Hz, 1min.
Ambient conditions:	
Temperature	Operating: -20 ... +50 °C Storage: -25°C up to +85°C
Humidity	0 - 95 % relative, non-condensing
Housing:	
Enclosure	Standard enclosure for terminal block cover mounting, 3-point mounting acc. to DIN 43857-7
Material	Synthetic material, flammability acc. to UL94-V0
Protection type	IP 51
Dimensions	H=180mm, W=105mm, D=70mm
Weight	Approx. 900g
Approvals:	
CE marking	Yes
GSM module	GCF compatible; R&TTE
Interference resistance	EN 55024; EN 61000-6-2; EN 61036
Emitted interference	EN 55022 B
Electrical safety	EN 60950, protection class 2
System requirements ZDUE-GPRS-PLUS-IV	TAINY SwitchingCenter, TAINY ModemServer or TAINY ComPortServer (CPS) or TAINY Connect compatible switching service

5 Technical Data ZDUE-*LAN*-PLUS-IV

LAN interface	Standard	10 BASE-T Ethernet IEEE 802.3; Socket: RJ45
	Speed	10Mbit/s
Meter interfaces	Current loop interface	CL1 (20mA) in acc. with DIN EN 62056-21, Mode A/C, up to 19,2 kbps
	RS232 interface	Full duplex Signals: Rx, Tx, DTR, GND Interface speed: up to 57.600 Baud (max. length of cable < 3m) Cable length: up to 15m
	RS485 interface	Signals: RT+, RT- Transceiver: up to 32 Interface speed: up to 19.200 Baud Cable length: up to 1000m
	Pulse inputs	3 S0 input acc. to EN 62053-31-B (potential-free)
	Configuration	DIN EN 62056-21
	Communication with meter	Transparent DIN EN 62056-21: Mode C, Mode A (corresponds to transparent)
Load profile memory	Statistical load profile	Flash memory (power failure-proof)
	Internal real-time clock	Power reserve 48 hours
Power supply	Input voltage	100 VAC -24% up to 230 VAC +10%, 50/60Hz 60 VDC –10% up to 100 VDC +10% (protected against polarity reversal)
	Input current	$I_{typ.}$ 26mA@230Vac, $I_{typ.}$ 27mA@253Vac, $I_{typ.}$ 49mA@76Vac
Galvanic isolation	Test voltage	Power supply L1,N against all communication interfaces: 3kVAC, 50Hz, 1 min. Between the communication interfaces: 500VAC, 50 Hz, 1min.
Ambient conditions	Temperature range	Operating: –20°C up to +70°C (>55°C derating) Storage: –25°C up to +85°C
	Humidity	0 - 95 % relative, non-condensing
Mechanics	Enclosure	Standard enclosure for terminal block cover mounting, 3-point mounting acc. to DIN 43857-7
	Material	Synthetic material, flammability acc. to UL94-V0
	Protection type	IP51
	Dimensions	180 mm x 105 mm x 70 mm (H x W x D)
	Weight	Approx. 900g
Approvals	CE marking	Yes
	EMC directive	89/336/EWG
	EMC / ESD	EN 55022, EN 61000-6-2,
	Electrical safety	EN 60950, protection class 2
System requirements	TAINY SwitchingCenter, TAINY ModemServer or TAINY ComPortServer (CPS) or TAINY Connect compatible switching service	

Deviating from above mentioned data:

M-Bus version

Meter interfaces	Current loop interface	CL1 (20mA) in acc. with DIN EN 62056-21, Mode A/C, up to 19,2 kbps
	RS232 interface	Full duplex Signals: Rx, Tx, DTR, GND Interface speed: up to 57.600 Baud (max. length of cable < 3m) Cable length: up to 15m
	M-Bus	Max. 25 M-Bus standard loads Interface speed: max. 9.600 bit/s (in the case of optimal bus topology)
	Pulse inputs	3 S0 input acc. to EN 62053-31-B (potential-free)
Power supply	Input current	$I_{typ.}$ 46mA@230Vac, $I_{typ.}$ 44mA@253Vac, $I_{typ.}$ 100mA@76Vac

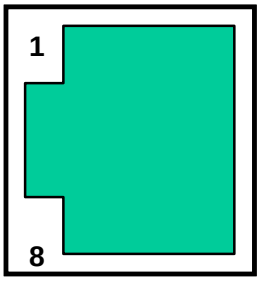
Version with auxiliary power source

Meter interfaces	Current loop interface	CL1 (20mA) in acc. with DIN EN 62056-21, Mode A/C, up to 19,2 kbps
	RS232 interface	Full duplex Signals: Rx, Tx, DTR, GND Interface speed: up to 57.600 Baud (max. length of cable < 3m) Cable length: up to 15m
	Pulse inputs	3 S0 input acc. to EN 62053-31-B (potential-free)
Auxiliary power source	Output voltages	Optionally 5 VDC, 9 VDC, 12 VDC or 24 VDC
	Output power	Max. 1,2W; $I_{max.}$ 240mA@5V, 133mA@9V, 100mA@12V, <50mA@24V,

LAN interface (RJ45) of the ZDUE-LAN-PLUS-IV

➲ Use Shielded Twisted Pair (STP) cable for connecting.

RJ45 (shielded)



Ethernet connection 10-BaseT

Pin1	TD+
Pin2	TD-
Pin3	RD+
Pin4	nc
Pin5	nc
Pin6	RD-
Pin7	nc
Pin8	nc