

FE260

Function Expansion Unit FE260

Operating Manual and Installation Instructions

Operating Manual: 73017824
HW version: from V21 / V11
(AC / DC version)

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I Safety information

! Before mounting, installing or putting the FE260 into operation, this operating manual must be carefully read to avoid damage, hazards and problems.

Mounting and installation should only be carried out by specialist personnel.

! The "AC" versions of the Function Expansion Unit FE260 are supplied with mains voltage at 230 V. Avoid touching live parts, because this can be highly dangerous.

Switch off the mains voltage before starting installation or wire connection work and before opening the housing.

Only switch the mains voltage on again after all the work has been completed and the housing has been firmly closed.

! Also, follow all the safety instructions in Chapter 3.

II Items supplied and accessories

II-1 Included items

The items supplied with the FE260 include:

- a) Function Expansion Unit FE260
- b) Dispatch list
- c) Operating Manual

II-2 Ordering information and accessories

FE260	Order no.
• Function Expansion Unit FE260, complete (incl. accessories).....	83 480 540
Accessories	
• Operating manual, English.....	73 017 824
• Operating manual, German.....	73 017 464
Options	
• Standard modem 14,400 baud..... incl. telephone connection cable	73 016 757
• Ethernet interface (LAN connection) incl. network connection cable	73 017 688
• ISDN interface..... incl. telephone connection cable	73 017 117
• GSM/GPRS modem with application "WipSoft" (for operation with EK280)..... with application "ComTCPserv" (for operation with EK260) incl. GSM/GPRS antenna	73 019 577 73 020 642
• RS232 interface for connecting an external modem	73 016 941
• Cable with DSUB9 plug for connecting an external modem	73 016 923
• CL0 interface.....	73 017 709
• Cable LiYCY 4 X 2 X 0.5 mm ² for connecting FE260 and volume corrector (details of quantity and length required)	04 250 469



Only one modem or one modem connection can be fitted.

1 Brief description

The Function Expansion Unit FE260 is used for expanding the functions of a volume corrector in the LIS-200 range, such as for example the EK260 from software version 2.02.

In the current level of expansion it fulfils the following tasks:

- Intrinsically safe power supply for the volume corrector.
- Ex isolation for the digital outputs (pulse / signalling outputs).
- Ex isolation of the internal data interface.
- Remote data transmission on request, can also be retrofitted.
- Local data transmission on request (cannot be retrofitted)

For the "AC" versions the power supply is provided as 230 V or 115 V alternating voltage (mains voltage) and for the "DC" version it is provided as 10 to 30 V direct voltage.

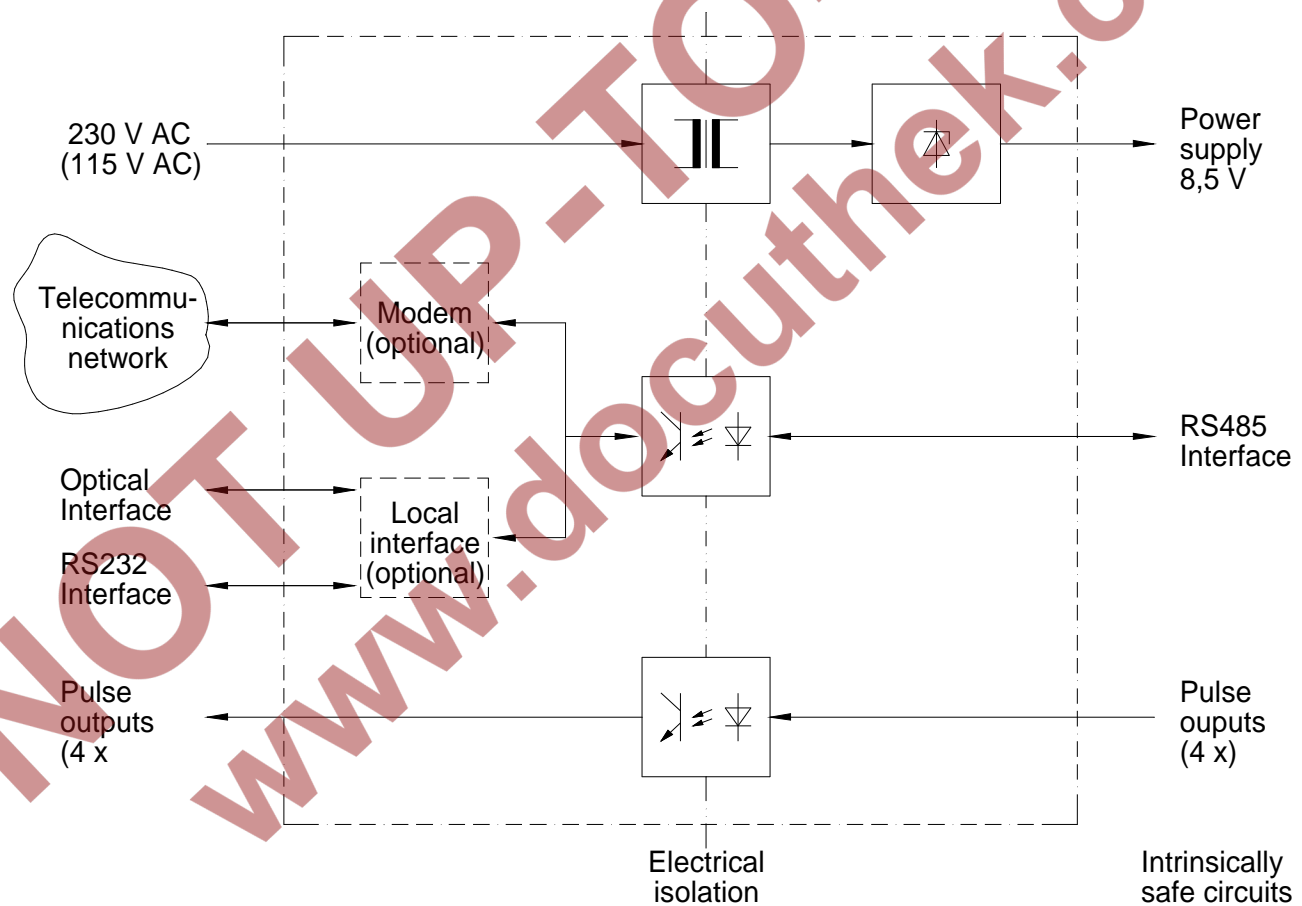


Fig. 1: Block diagram of the FE260,"AC" versions.

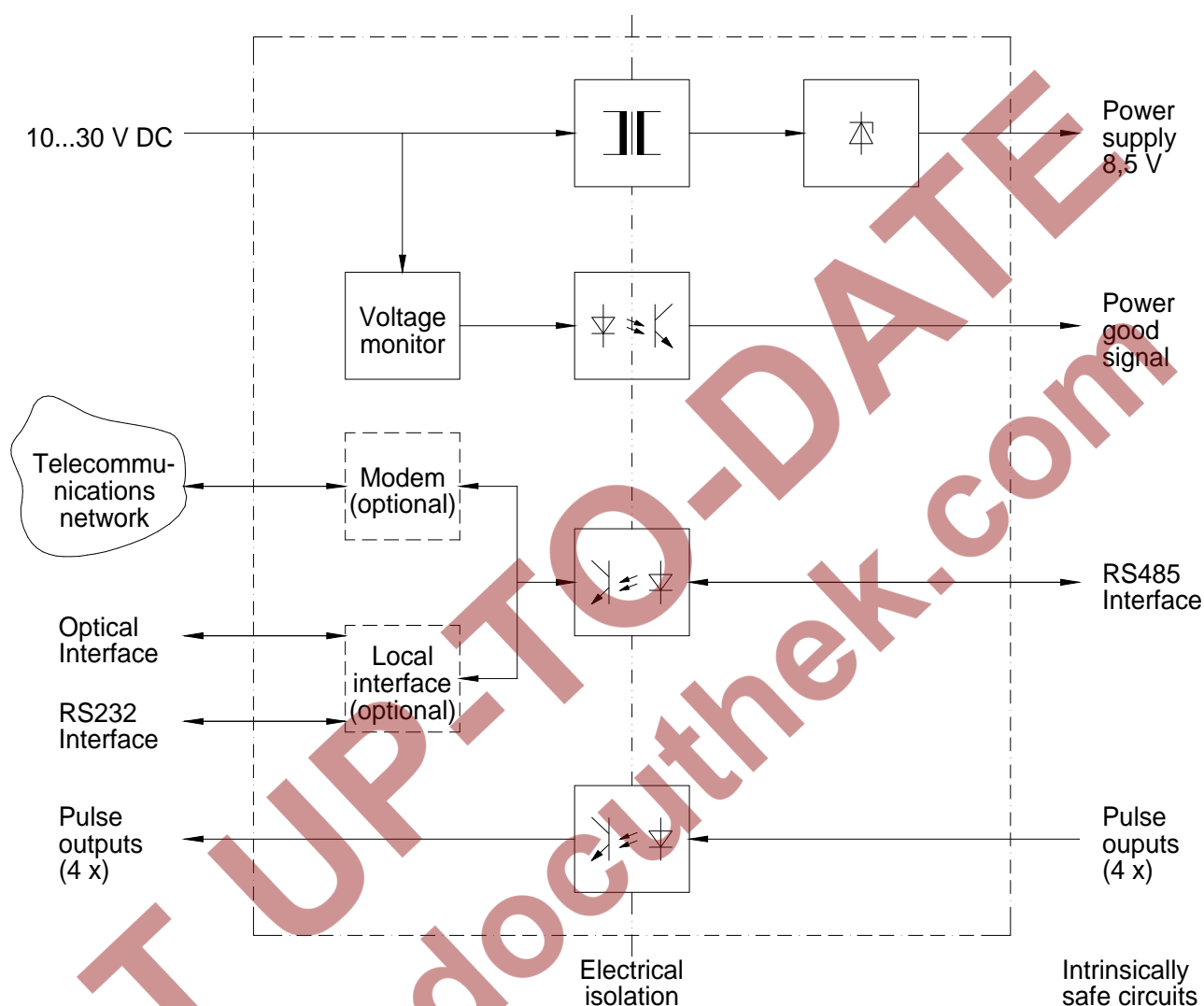


Fig. 2: Block diagram of FE260, "DC" version.

Two signalling lamps fitted to the cover indicate the following states:

- "Power": The device is ready for operation.
- "Online": Data transmission is running via the installed or connected modem. Data is being transmitted between the connected volume corrector and the readout station or control station over a telecommunications network.

At the start of a remote data transmission "Online" flashes with the ringing tones which the modem receives.

In case of a GSM/GPRS modem:

- slow flashing → modem is registered in GSM network
- fast flashing → data transmission in progress

2 Mounting

The holes for wall mounting become accessible after opening the housing cover of the FE260. The 4 screws for fastening the cover can be tightened by a flat head (blade 8 x 1,2 mm) or Phillips head screwdriver size 2.

The dimensions, drilling template and diameter of the mounting holes can be taken from Fig. 3 and Fig. 4.

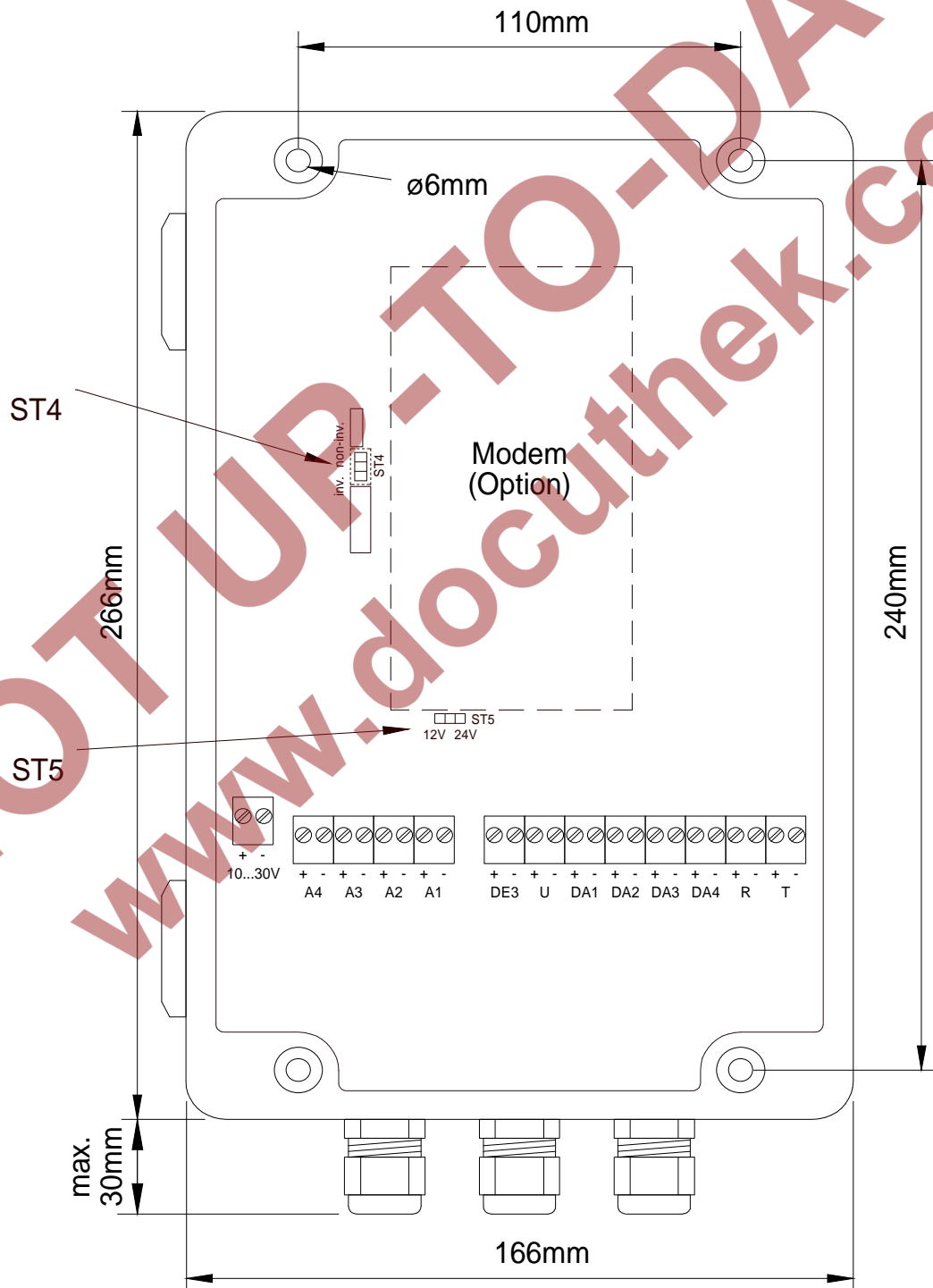


Fig. 3: View from above onto the opened device (here: the "DC" version).

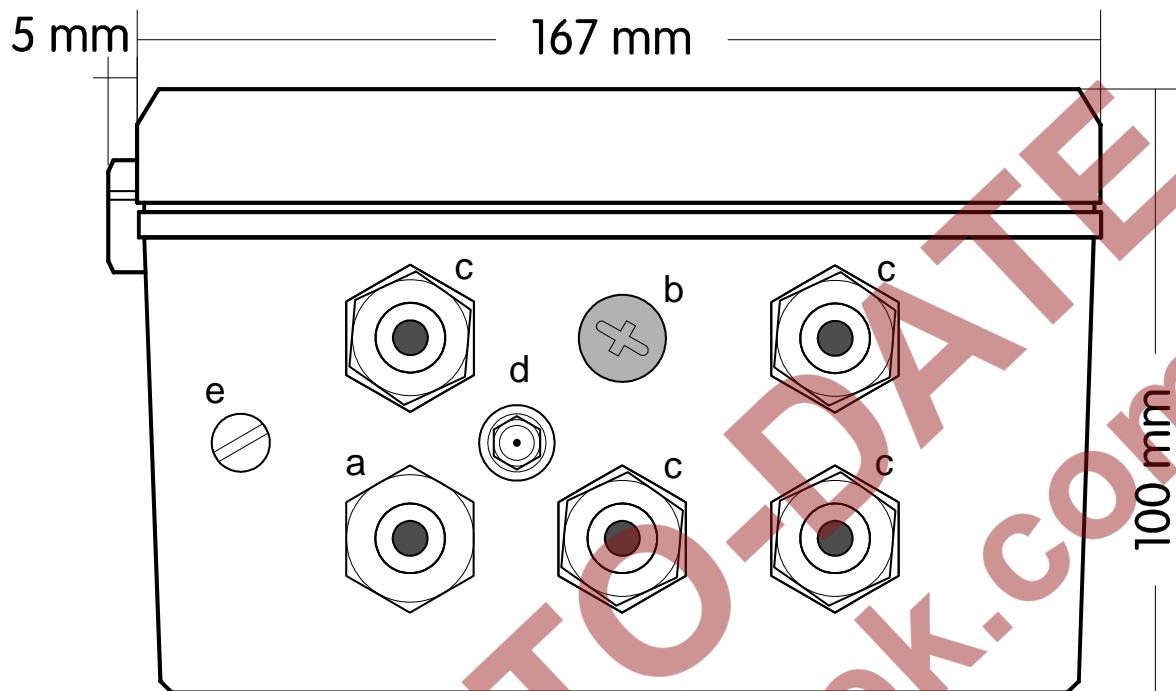


Fig. 4: View from the front onto the cable entries

- a = Plastic gland M16 for mains supply 230VAC
- b = Blind plug for M12 gland for telephone cable
- c = EMC metal glands M20 for data cables to EK2x0
- d = SMA antenna socket (for GSM/GPRS antenna)
- e = Earth connection

For versions of the FE260 without a GSM/GPRS modem, the hole on position "d" is sealed by a filler plug and on position "b" a plastic gland M12 is mounted.

! As "associated electrical equipment", the FE260 cannot be installed in Zone 1. (See [DIN] EN 60079-10 and [DIN] EN 60079-14.)

For versions of the FE260 with a GSM/GPRS modem, the supplied antenna must be mounted, e.g. on the wall. A mounting bracket is provided in the supplied items for this.

3 Installation

- !** *The terminals of the FE260 are freely accessible on opening the housing. To avoid damage to the device, it must be ensured that no electrostatic discharge (ESD) from persons via the FE260 can occur.*

To prevent this, the installer should discharge himself by touching an earthed metallic object directly before connecting a cable.

- !** *After installation replace all unused cable glands by the enclosed closed-sealing-inserts to ensure that the housing is sealed. If you don't use the M16 plastic gland, replace it by the also enclosed M16 blind plug. That's the only way to ensure the tightness of the housing!*

3.1 Power supply to the FE260

3.1.1 "AC" versions (for alternating voltage 230 V or 115 V)

- !** *The "AC" versions of the Function Expansion Unit FE260 are supplied with mains voltage at 230 V or 115 V. Avoid touching live parts, because this can be highly dangerous.*

Switch off the mains voltage before starting installation or wire connection work and before opening the housing.

Only switch the mains voltage on again after all the work has been completed and the housing has been firmly closed.

Mains alternating voltage should be connected to the terminal block labelled "230V" or "115V" and the earth conductor should be connected to "PE".

- !** *Depending on the version, the FE260 is suitable for power supply of 230 V or 115 V alternating voltage. In order to avoid damaging the device, only connect the voltage labelled on the terminals.*

3.1.2 "DC" version (for direct voltage of 10 to 30 V)

The "DC" version of the FE260 is suitable for a direct-voltage power supply in the range from 10 to 30 V. It can be operated, for example, with nominal voltages of 12 V or 24 V.

The "DC" version (not the "AC" versions) have the possibility of monitoring the supply voltage on the terminal "10...30V". In this respect, the terminal "DE3" must be connected to the terminal of the same name on the volume corrector. (→ 0

Terminal layout, page 14).

The monitoring can be set for nominal voltages of 12 V and 24 V. For further details: see Chapter 4.1.

3.2 Screening and earthing

The cables for connection to the intrinsically safe electrical circuits (blue terminal block) and to the outputs A1 to A4 have a screen which must be earthed at both ends to prevent interference due to high frequency electromagnetic fields.. The screen must be connected all round, complete and flat. The FE260, similar to the volume corrector (e.g. EK260 or EK280) to be connected, has special metallic EMC cable glands for this.

3.3 Intrinsically safe electrical circuits

The FE260 is approved according to DIN EN 50020 as “associated electrical equipment” in the Category “ia” (see Chapter A-2). The blue terminal block on the right-hand side includes three intrinsically safe circuits. If an intrinsically safe device is connected to them (e.g. an EK260 or EK280 volume corrector) which is located in the area subject to explosion hazards (Zone 1), then the appropriate regulations must be followed. The implications of this include:

- ! *Follow the stipulations in the relevant regulations and standards, in particular DIN EN 60079-14 (VDE 0165 Part 1) and DIN EN 50014.*
- ! *Make sure that the limits quoted in the certificate of conformance (Chapter A-2) do not exceed the limits quoted in the certificate of conformance for the intrinsically safe device to be connected.*
- ! *Only cable may be used for the intrinsically safe electrical circuits which fulfils the following requirements according to DIN EN 60079-14, Section 12.2.2.1:
Insulated cables with a proof voltage of at least 500 VAC between conductor-earth, conductor-screen and screen-earth.
If fine-stranded conductors are used, the conductor ends must be protected against splaying out, e.g. by the use of wire-end sleeves.
The diameter of individual conductors as well as single wires in fine-stranded conductors must not be less than 0.1 mm.*
- ! *Since the cable screens are connected at both ends, the volume corrector housing must be electrically connected to the earthed housing of the FE260 via a potential equalisation conductor. The potential equalisation conductor must have a cross-sectional area of at least 4 mm². (DIN EN 60079-14, Sect. 12.2.2.3).
The FE260 is earthed using terminal "e" in Fig. 4 (page 9).*

Furthermore all other relevant requirements in DIN EN 60079-14 must be fulfilled.

Screened cables must be used for reasons of electromagnetic compatibility (EMC). In this respect, labelling of the cables or a special sheath colour is not necessary according to DIN EN 60079-14, Sect. 12.2.2.6.

3.3.1 Cables and cable lengths

The cable length between the FE260 and the volume corrector (intrinsically safe circuits) may be up to 1000 m depending on the application. The following table provides an overview of the requirements, settings and limits depending on the cable length:

Cable length up to:	10 m	100 m	500 m	1,000 m	Rem.
Cable cross-sectional area for power supply (Terminal "U")	0.5 mm ²	0.5 mm ²	1.5 mm ²	1.5 mm ²	*1)
Max. transmission speed (Terminals "R" and "T")	19200 Bd	19200 Bd	19200 Bd	9600 Bd	*2)
Max. frequency on Outputs 1, 3, 4 (Terminals "DA1", "DA3", "DA4")	10 Hz	10 Hz	1 Hz	1 Hz	*3) *5)
Maximum frequency on Outputs 2, 3 (Terminal "DA2")	500 Hz	50 Hz	5 Hz	5 Hz	*4) *5)

*1) For cable lengths up to 100 m a total of two cables 4 x 2 x 0.5 mm² are sufficient for all intrinsically safe electrical circuits. With a cable length of more than 100 m a separate cable 2 x 1.5 mm² must be laid for the power supply to the volume corrector (Terminal "U"). The total diameter of each cable must not exceed 10 mm.

*2) The transmission speed is set on the volume corrector under "Bd.S2" (address 02:0708.0). With an FE260 with the option "Local interfaces" or "CL interface" the baud rate must be set to 9600 Bd irrespective of the cable length. With "CL interface" also lower baud rates are possible.

*3) With long cables (clearly noticeable from about 100 m) the pulse-space ratio is degraded by the cable capacity: The space (output transistor blocking) is shortened and the pulse (output transistor conducting) is lengthened correspondingly.

If this effect causes problems, the pulse duration and the period (and also therefore the space duration) can be altered for the volume corrector outputs with the aid of the "enSuite" parameterising program.

Example:

The standard setting is: Period 1000 ms, pulse duration 500 ms (giving a space also of 500 ms).

With a cable length of 1000 m the space is typically shortened by about 250 ms and the pulse is lengthened by about 250 ms. The space duration is therefore about 250 ms and the pulse duration about 750 ms.

If the (theoretical) pulse duration is set to 250 ms instead of 500 ms with the period unchanged, then actual pulse and space durations each of 500 ms are produced again including the degradations.

- *4) Output 2 ("DA2") can also be operated, as can all other outputs, as a low frequency pulse output with a frequency up to 10 Hz. Furthermore, some volume correctors in the LIS-200 range, such as the EK260¹ and EK280, offer the possibility of operating Output 2 as a high frequency output at up to 500 Hz. The connection "DA2" on the FE260 is specially rated for this. Consequently, the above mentioned degradation of the signal (see *3) is substantially less here.
- *5) In case of FE260 manufactured since January 2014, output 3 ("DA3") can be used for signals up to 500 Hz. The EK280 offers the ability to operate not only output 2 but also output 3 ("DA3") as a high frequency output under the same conditions as described for output 2 (refer to *4).

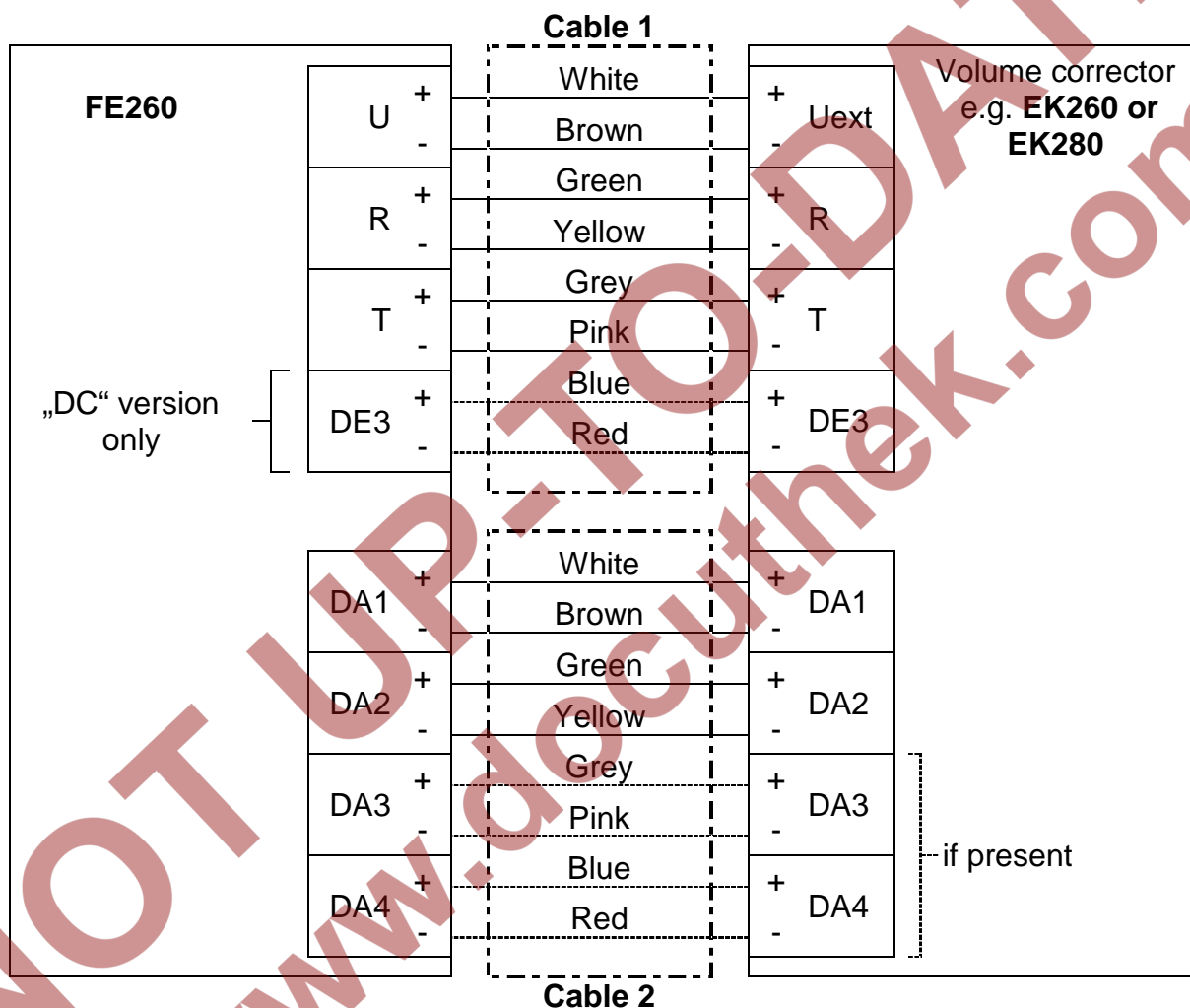
! *The cable cores must be stripped 11 mm. They must be inserted into the terminal over a length of 14 mm. Take care that only one core is inserted into each clamp!*

¹ Only EK260s with a date of manufacture from July 2004 onwards.

3.3.2 Terminal layout



With an EK260 or EK280 volume corrector, set "TypS2" = "2" before you connect it to the FE260 in order to avoid damage to the devices.



On the EK260 and EK280 the terminals "R+", "R-", "T+" and "T-" are also labelled with "CS", "RD", "RS" and "TD". When connecting the FE260, these designations have no significance. The terminals "Ri" and "Gnd" on the EK260 remain unconnected.

The cable designations (Cable 1 and Cable 2) and the suggested core colours are based on the use of two similar cables, LiYCY 4 x 2 x 0.5 mm², twin-twisted with colour code according to DIN 47100. Suitable cables can also be obtained from Elster-Instromet (see II-2, Options).

With "AC" versions (with 230V or 115V power supply) the blue and red wires of Cable 1 remained unused. They should then be cut off at both ends flush with the cable sheath or safely insulated to prevent hazardous short circuits from forming.

Of course, other cables can also be used provided they conform to the requirements quoted in 0. Similarly, a different designation of the core colours is possible.

3.4 Digital Outputs A1 to A4

The terminals “A1” to “A4” are individually electrically isolated digital outputs which pass on the incoming signals on “DA1” to “DA4” (pulse or message signals) from the volume corrector unmodified with respect to time. Due to the approved electrical isolation, any devices without Ex approval can be connected to A1 to A4, provided they do not exceed the limits quoted in the chapter “Technical Data”.

3.5 Modem

On request, the FE260 can be fitted with an integral modem or a connection for a separate modem in order to read out the data from the connected volume corrector by remote data transmission. Various modems are possible (refer to sections 3.5.1 to 3.5.4).

For data transfer via the FE260 the EK260 requires at least the software version 2.02.

3.5.1 Integral standard modem, ISDN or Ethernet interface

The standard modem is used for connection to the analogue telephone network (PSTN¹ subscriber socket, not ISDN²). With the FE260 with integral standard modem, the connection cable with a TAE subscriber plug is already mounted on the terminal clamps.

The ISDN interface is used for connection to the digital telephone network (ISDN).

The Ethernet interface is used for connection to a local area network (LAN).

With the FE260 with integral ISDN or Ethernet interface, the corresponding connection cable with a Western plug is already mounted on the terminal clamps.

The respective connection cable is passed through the smaller plastic gland at the top centre (→ position “b” in Fig. 4, page 9).

The connection is made according to the following configuration:

Wire colour		Terminal *	
Ethernet cabel	PSTN and ISDN cabel		
orange/white	white	LA RA	a RX-
green/white	brown	LB RB	b RX+
orange	pink	LA1 TA	a2 TX-
green	grey	LB1 TB	b2 TX+

* The terminal labelling can be implemented as in the left or right columns, depending on the version of the PCB³.

¹ Public Switched Telephone Network

² Integrated Services Digital Network

³ Printed Circuit Board

3.5.2 Integral GSM/GPRS modem

The GSM¹/GPRS² modem is used for data transmission via the GSM/GPRS network (radio network, "mobile phone network"). With the FE260 with an integral GSM/GPRS modem the antenna required for this is included in the supplied items.

Similarly, a mounting bracket for mounting the antenna (e.g. on the wall) is also included in the supplied items.

Once the antenna has been mounted, the antenna cable has to be connected to the SMA³ socket on the bottom side of the housing (→ Fig. 4, pos. "d", page 9).

To operate the modem you need a SIM⁴ card from your provider (e.g. D1 or D2 network). In case the data transmission should be originated by an analogue PSTN⁵ data modem, the CSD⁶ service must be enabled by the network provider. If in doubt, please contact your network provider.



Disconnect the FE260 from the power supply before you insert the SIM card into the SIM holder.

Then close the SIM holder carefully, close the housing and switch on the power supply again.



Disconnect the FE260 from the power supply before you mount or dismount the antenna!



Take care that the FE260 is in secure area (non Ex) before you mount or dismount the antenna!

¹ Global System for Mobile Communications

² General Packet Radio Service

³ Sub-Miniature-A, coaxial antenna socket

⁴ Subscriber Identity Module

⁵ Public Switched Telephone Network

⁶ Circuit Switched Data

3.5.3 Connection of a separate modem

For the connection of a CL modem: refer to Chapter 3.5.4, page 18.

If the FE260 is implemented with a connection for a separate modem, you can connect a commercially available modem to it to read out the volume corrector by remote data transmission. You can use a modem with or without automatic call acceptance.

A modem without automatic call acceptance must be parameterised such that it sends the text "Ring" over the data line to the volume corrector for each ringing tone (for each "ring"). This then causes the modem to accept the call ("lift receiver") after the set number of ringing tones ("Num.T", → 0 in Chapter 4.3).

Depending on the connected modem, "Md.S2" (MdxS2 respectively) should be set in the volume corrector according to the following table:

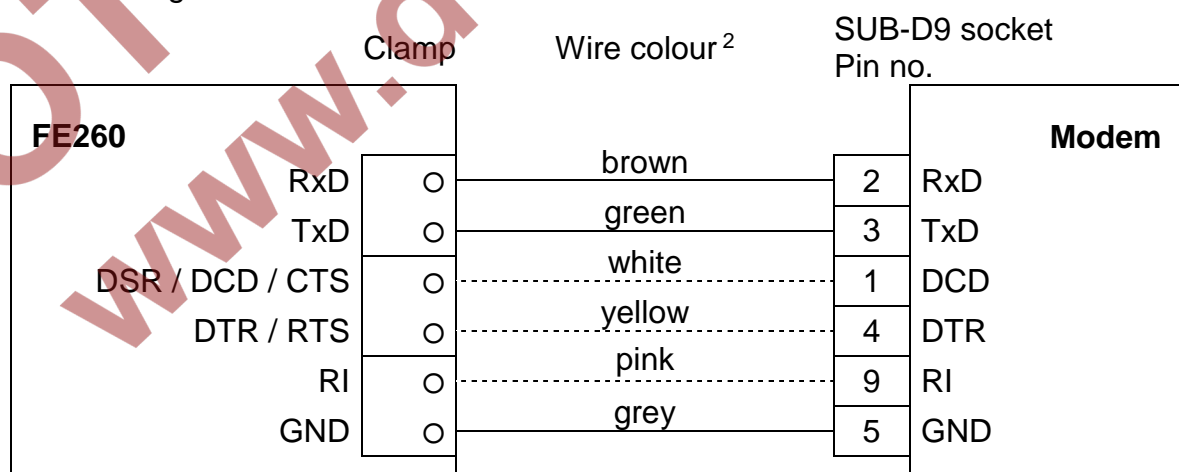
Automatic call acceptance in the modem	EK260 Md.S2 (Adr. 2:705)	EK280 MdxS2 (Adr. 2:706)
off (ATS0=0)	3	4 („Standard AT“)
on (ATS0>0) ¹	5	0 („Transparent“)

The modem connection in the FE260 can be configured as an RS-232 or RS-485 interface. To enable this, there is a jumper labelled "RS-232" and "RS-485" on the board with the terminals for the modem connection.



Before connecting a commercially available modem to the RS-232 interface, make sure that the jumper in the vicinity of the modem connection terminals is plugged on the side labelled "RS-232".

Connection diagram:



The modem signals "DCD", "DTR" and "RI" are not used by the FE260. These terminals may be connected or left unconnected. Connection of "RxD", "TxD" and "GND" is needed.

¹ e.g. when using option „Local Interfaces“, s. Kap. 4.4 on page 24

² The colours corresponds with the Elster modem cable with ID no. 73016923

3.5.4 Connection of a CL modem

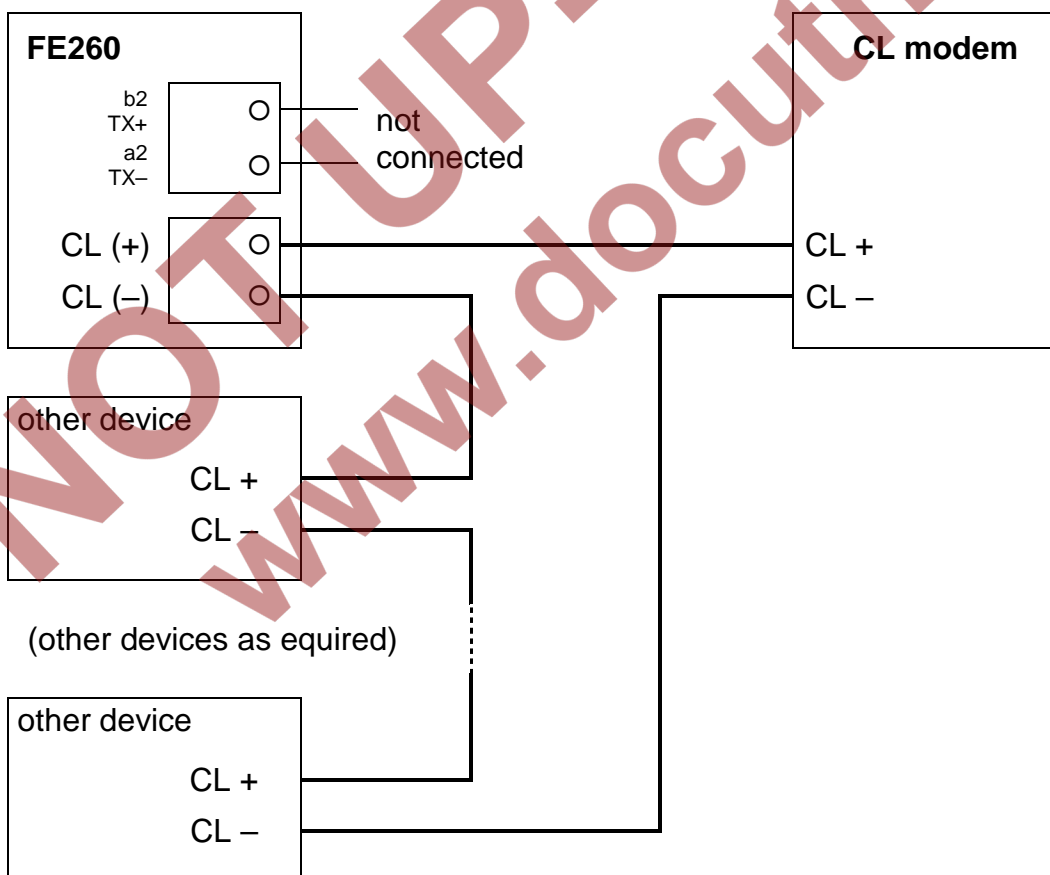
The following volume correctors can be connected to an FE260 with CL interface:

- EK260s with software version from 2.40 onwards as well as other volume correctors of the LIS-200 range from the year of manufacture 2006 onwards can be operated without restriction.
- EK260s with software version from 2.02 to 2.22 as well as other volume correctors of the LIS-200 range from year of manufacture 2005 onwards can be operated only with restrictions. Regarding this refer to Chapter 4.3.1, page 22.
- Older EK260s cannot be called via a CL modem.

Apart from the FE260, other devices ("bus devices") with the CL interface¹ can also be simultaneously connected to a CL modem². The number of devices that can be connected depends both on the CL modem and also on the connected devices:

The sum of the voltage (in volts) required by the connected devices must not be greater than the driver rating of the CL modem ("CL1 master interface"). The CL interface of the FE260 ("CL0 slave interface") requires 3 V.

Wiring diagram:



The sequence of the devices (incl. the FE260) connected to the CL modem is freely selectable.

¹ FE260 and other bus subscribers (slaves) with CL0 interface

² CL modem (master) with CL1 interface

4 Initial operation

For initial operation the following steps should be carried out:

4.1 Power supply

- Once all cables are connected and the housing firmly closed, switch on the FE260 power supply (mains voltage for the "AC" versions).
- Check the "Power" signal lamp on the cover of the FE260. A continuous green signal indicates that the FE260 power supply is functioning correctly.
- Check the power supply of the connected volume corrector by bringing the status messages into the volume corrector display. If the message "Batt. operat" (message "15" in status "St.SY") is not entered here, the volume corrector is being supplied from the FE260.

If the volume corrector displays the message "Batt. operat" (message "15" in "St.SY", the volume corrector is not being supplied from the FE260. In this case check that the intrinsically safe electrical circuits are connected correctly.

Only the "DC" version (not the "AC" versions) have the possibility of monitoring the supply voltage on the terminal "10...30V". When a voltage limit is undercut, the connected volume corrector receives a corresponding signal through the "DE3" terminal, setting the status message "8" in the status "St.3" of the volume corrector. Due to this status signal, the volume corrector can for example, with appropriate parameterisation, then activate an output or execute another event-controlled action.

If you would like to use the voltage monitoring of the "DC" version, carry out the following steps:

- Set the voltage limit with jumper "ST5" (→ Fig. 3, page 8) appropriate to your power supply:
 - to the position "12" for power supply with a nominal voltage of 12 V
(The limit for the warning is then approx. 11 V.)
 - to the position "24" for power supply with a nominal voltage of 24 V
(The limit for the warning is then approx. 20 V.)
- Make sure also that the terminal "DE3" is connected to the terminal of the same name on the volume corrector. (→ 3.3.2 Terminal diagram, page 13).
- On the volume corrector set the value "MdME3" (in the display column "Inp."¹) to "3".
- If the monitoring does not function, also check the following values in the display column "Inp." on the volume corrector:
 - SC.I3² = 0003:228_0 ("St.I3")
 - L1.I3 = 1
 - Spl3 = 0.08_03:1.1 ("I3 Warn.sig[↑]")

¹ on EK280 under "→ Inputs → Input 3"

² on EK280: "ScMI3"

4.2 Digital outputs

If you are using digital outputs, check whether the devices connected to terminals A1 to A4 are receiving the volume corrector signals.

If this is not the case, then check:

- the output settings of the volume corrector according to its operating manual and the details in Chapter 0.
- by how far the technical data for the outputs (Chapter B) match the connected device.
- whether all specifications regarding cables and cable lengths in Chapter 0 have been fulfilled.
- whether the signal inversion of the outputs may possibly be incorrectly set (see above).
- The transfer of an HF signal via output "DA2" functions with an EK260 with a date of manufacture from July 2004 onwards and furthermore with all EK280.
- The transfer of an HF signal via output "DA3" functions only with EK280 in conjunction with a FE260 with a date of manufacture from January 2014 onwards.

Signal inversion

With the aid of the jumper "ST4" (→ Fig. 3, page 8) you can set whether the output signals are inverted with respect to those supplied by the volume corrector.

- Position "non-inv." The signals are not inverted (standard setting).
- Position "inv." The signals are inverted.

"Inverted" signifies that the FE260 output is switched through (conducts) when the volume corrector output blocks and vice versa.

4.3 Modem

When using an integral or connected modem, the interface of the volume corrector (except EK280¹) must be parameterised as follows:

AD ²	Address	Designation	Setting	Meaning	Rem.
Md.S2	2:0705	Mode	3 or 5		*1)
DF.S2	2:0707	Data format	0	7 data bits, even parity, 1 stop bit ("7e1")	
Bd.S2	2:0708	Initial baud rate	19200 or 9600 baud		*2)
TypS2	2:070A	Type of interface	2	RS-485	*3)
Num.T	2:0720	Rings before call accept.			*4)
CW1.S	5:0150	Call Time Window 1 Start			*5)
CW1.E	5:0158	Call Time Window 1 End			
CW2.S	6:0150	Call Time Window 2 Start			
CW2.E	6:0158	Call Time Window 2 End			
	1:01FB	Activation with external power supply	1	Remains continuously active	*6)
	2:0709	"Identification baud rate"	19200 or 9600 baud		*2), *6)

*1) When using a modem without automatic call acceptance (standard case), Md.S2 = "3" must be set and MD.S2 = "5" for modems with automatic call acceptance (e.g. with an FE260 with the option "Local interfaces" or "CL interface").

*2) 19200 Bd is standard. With longer lengths of cable between the FE260 and the volume corrector (refer to Chapter 0, page 12) and when using the option "Local interfaces" or "CL interface", the baud rate may be set to a maximum of 9600 Bd.

When using an FE260, the starting baud rate "Bd.S2" and the "Identification baud rate" (address 2:0709) must always be set to the same value.

*3) The setting of the type of interface is only needed with those types of volume corrector where "TypS2" is present in the display (e.g. EK260).

*4) The adjustable number of ringing tones (rings) before call acceptance depends on the modem used. With a GSM modem it should be set to "1" and with other modems to a value between "2" and "9".

With a modem with automatic call acceptance, "Num.T" has no significance.

*5) Volume correctors in the LIS-200 range, such as the EK260 and EK280, offer at least two time windows within which calls can be accepted for data interrogation. Outside of these time windows calls are ignored, so that, for example, a person located in the station can be called via a telephone connected to the same telephone line.

*6) The values with the addresses 1:01FB and 2:0709 are not always available in the volume corrector display. They can be changed, for example, via the optical interface using the parameterisation software "enSuite". The standard setting is "1:01FB = 1" and "2:0709 = 19200".

¹ Please parameterize the EK280 according its Application Manual

² Abbreviation in the interface menu "Ser.IO" in the display of the volume corrector

4.3.1 CL modem

On connecting a CL modem, in principle all details for standard modems in Chapter 4.3 (from page 21 onwards) apply. Furthermore however, there are other points to be noted.

For setting the parameters in the volume corrector send the appropriate parameter file ("wpp" file) with a PC or laptop and the "enSuite" parameterisation software to the volume corrector via the optical interface. The parameter files are included with "enSuite".

The following restrictions apply depending on the connected volume corrector:

1. EK260 with software version from 2.40 and other volume correctors from year of manufacture 2006 onwards:

These volume correctors can be operated without restriction.

If other bus devices are connected to the CL modem as well as the FE260, you must assign an unambiguous bus address to the volume corrector. This address is used by the calling software to select a device.

You can set the bus address of the volume corrector with the "enSuite" parameterisation software. Interfaces > Modem > Connection formation > Device address

The address may consist of up to 32 characters (numbers or letters).

2. EK260 with software version from 2.02 to 2.22 and other volume correctors from year of manufacture 2005 onwards:

If other bus devices are connected to the CL modem as well as the FE260, you must suitably set the call acceptance time window of the volume corrector. A data call of the other bus devices is only possible outside of this time window.

3. EK260 with software version up to 2.01.

These volume correctors cannot be called via a CL modem.

4.3.2 Problems during data transfer and solutions

If, after connecting the cables and setting the parameters, the data transmission via the modem does not work, check the following points:

1. Does the signal "Power" light on the housing cover of the FE260?
→ If not, make sure that the FE260 power supply is connected correctly and switched on.
2. Does the volume corrector indicate the status message "Bat. operat.". (With older versions message "15" in the status "St.Sy")
→ Connect the terminals "U+/-" of the FE260 correctly to the terminals "Uext+/-" on the volume corrector.
In addition you can also measure the voltage on the terminals "U+/-" of the volume corrector with a multimeter. It should be approx. 8.5 V.
3. Does the FE260 have the option "CL interface"?
→ If so, follow all the instructions in Chapter 4.3.1, page 22.

4. Does the FE260 have the option "Local interface" (optical interface)?
→ If so, follow all the instructions in Chapter 4.4 from page 24 onwards.
5. Does the volume corrector display the status message "Call Win.1" or "Call Win.2"?¹
(Message "16" in the status "St.1" or "St.2")
→ Calls can only occur within one of the time windows. If none of the above messages are displayed, set the time window according to your requirements. You can set the time window with the values "CW1.S", "CW1.E", "CW2.S", "CW2.E" in the display column "Ser.IO" of the volume corrector.

6. Is the modem parameterization in the FE260 correct?

- The modem must be suitably parameterized in correspondence with the interface mode in the volume corrector:

Interface mode in EK2x0		Automatic call acceptance in the modem
EK260 Md.S2 (Adr. 2:705)	EK280 MdxS2 (Adr. 2:706)	
3	Standard AT	off (ATS0=0)
5	transparent	on (ATS0>0)

With "Md.S2 = 3" (respectively MdxS2 = "Standard AT") the modem may not pickup an incoming call automatically. A call is only accepted after the volume corrector has sent the corresponding pickup command "ATA" to the modem. This happens after the EK2x0 has received the number of RING messages, which is specified by the setting Num.T, address 2:720.

With "Md.S2 = 5" (respectively MdxS2 = "transparent") the modem has to accept incoming calls automatically after the number of ring signals, which is specified in register 0 by the command ATS0=x (where "x" is the number of ring signals).

If the FE260 is fitted with the option "Local interface" or "CL interface", the modem must accept the calls automatically.

- If a modem has been retrofitted, which was intended for a different device (e.g. DL240), the modem parameterization may need to be changed.

7. When "Md.S2" in the volume corrector is set to "3" (respectively "MdxS2 = "Standard AT"): Does the signal "online" on the housing cover of the FE260 illuminate or flash?
→ If not, check whether you have entered the correct telephone number for the call in your data recall software (e.g. "enSuite"). A telephone exchange may also require a leading zero.

Only when using a radio modem (GSM/GPRS modem):

If the FE260 "online" signal slowly flashes, the following possible faults are eliminated and do not need to be checked.

Otherwise, check the following points:

8. Is the antenna correctly connected to the modem?
→ Insert the antenna connection firmly into the modem.

¹ On EK280 the call acceptance windows 5 and 6 are used for the connections via FE260 (refer to the EK280 Application Manual)

9. Is a suitable SIM card inserted into the modem?
 - Possibly the CSD¹ service must be enabled by the network provider (please refer also to section 3.5.2).
10. If the PIN is activated on the SIM: Was the correct PIN entered in the EK2x0?
 - Possibly the PIN query has to be disabled on the SIM. This can be done by temporarily inserting the SIM in a mobile phone.
 - In case of an EK260 till V2.40 the PIN query may cause problems. If in doubt, please disable the PIN query!
11. Is the mobile radio network (GSM network) strong enough?
 - Check whether the data transmission functions correctly when you mount the FE260 at another point or connect an external antenna or locate the external antenna at another position.
12. Are there interference sources in the vicinity of the FE260 or the antenna?
 - Check whether the data transmission functions correctly when you mount the antenna at another point (this may need to be repeated).

4.4 Local interfaces (optical interface and RS-232)

The local interface board, included on request, has two connections:

- an "optical" interface (accessible externally) and
- a "RS-232 interface" (a DSUB-9 plug fitted in the housing).

The board is integrated into the housing cover. The optical interface is accessible externally; to use the RS-232 the housing must be opened.

Of the total of three interfaces of the FE260 for data transmission (modem, optical interface and RS-232) only one can be used at any point in time, not simultaneously with any other.

With the FE260 with the option "Local interfaces" the following special features should be noted:

- The volume corrector and the modem integrated into the FE260 must be parameterised such that the modem accepts calls automatically → No call acceptance by the volume corrector, setting Md.S2 = 5 (EK260), respectively MdxS2 = "transparent" (EK280).
- When using an FE260 with optical interface, operation occurs with a baud rate of 9600 Bd. On the volume corrector, apart from the displayed baud rate "Bd.S2", the so-called "Identification baud rate" (address 2:709) must also be set to 9600 Bd. To do this, send an appropriate file to the volume corrector using a PC or laptop and the parameterising program "enSuite".²

¹ Circuit Switched Data

² With the FE260 with integral analogue modem and the EK260 with software version 2.53, e.g. the file "EK260_2v5.. - FE260-OPTO & int. Analog-Modem, 9600Bd_*.WPP".

The following operating modes can be set with the switches S1 and S2 on the local interface board:

Switch		Operating mode
S1	S2	
normal	normal	Reading out and parameterising the volume corrector
Test	normal	Test mode
normal	Modem par.	Parameterisation of the mode integrated into the FE260
Test	Modem par.	No defined function

4.4.1 Reading out and parameterising the volume corrector

This is the standard operating mode for the local interface in which a volume corrector connected to the FE260 can be read out and parameterised.

In this respect the switches S1 and S2 on the local interface board must be set to "normal".

In contrast to the optical interface on the volume corrector itself, the FE260 local interfaces can only be used under the following conditions:

- For reading out or parameterisation with a PC or laptop the "enSuite" parameterisation program must operate without baud rate changeover. In this respect the so-called "Serial RS232" connection must be used. (→ menu „Actions“ → "Search device..." (F3) → "Serial RS232" with baudrate 9600).

4.4.2 Parameterisation of the modem integrated into the FE260

When the switch S2 is set to "Modem par.", the modem integrated into the FE260 can be parameterised with the aid of a PC or laptop. The serial interface of the PC or laptop is in this respect connected to the optical interface or to the DSUB-9 connector. The modem parameterisation can then be carried out, for example, with the aid of the program "Modemini".



The modem parameterisation should only be carried out by experienced specialist personnel. In cases of doubt obtain the help of a service technician from Elster-Instromet.

4.4.3 Test mode

Switch S1 in the "Test" position activates the test mode: The data sent by the modem and the volume corrector is output simultaneously on the transmitted data line of the optical interface and the RS-232 (DSUB-9 connector).

In this operating mode the communication between the integral modem and the connected volume corrector can be observed with the aid of a so-called "terminal program". This function can be used by experienced specialist personnel for putting the FE260 into operation.

The test mode is signalled by a red indicating light (LED) on the interface board.

A Approvals

A-1 EC Declaration of Conformance



Declaration of Conformity Konformitätserklärung



Product
Produkt

Function Expansion Unit FE260
Funktions-Erweiterungs-Einheit FE260

Type, Model
Typ, Ausführung

FE260

Product marking
Produkt-Kennzeichnung

ATEX	ATEX	EMV / EMC
II (2) G [Ex ia] IIB TÜV 01 ATEX 1791	II 3 (3) G Ex nA IIB T4 Gc EE0283	
94/9/EC 94/9/EG	94/9/EC 94/9/EG	2004/108/EC 2004/108/EG
EN 60079-0: 2012 EN 60079-11: 2012	EN 60079-0: 2012 EN 60079-15: 2010	EN 61326-1: 2013 EN 61000-6-1...4: 2002
Notified Body 0044 TÜV Nord Cert GmbH Am TÜV 1 D-30519 Hannover	Elster GmbH Steinern Straße 19- 21 D-55252 Mainz-Kastel	Mectronic Prüflabor GmbH Max Planck Straße 7 D-64331 Weiterstadt
Notified Body 0044 TÜV Nord Cert GmbH D-30519 Hannover 94/9/EC Annex IV+VII 94/9/EG Anhang IV+VII	Not applicable Entfällt	Not applicable Entfällt

We declare as manufacturer:

Products labelled accordingly meet the requirements of the listed directives and standards. They correspond to the tested type samples. The production is subject to the stated surveillance procedure. If alterations are made to the product or it is modified, this declaration becomes void with immediate effect.

Wir erklären als Hersteller:

Die entsprechend gekennzeichneten Produkte erfüllen die Anforderungen der aufgeführten Richtlinien und Normen. Sie stimmen mit dem geprüften Baumuster überein. Die Herstellung unterliegt den genannten Überwachungsverfahren.

Bei Umbau des Produkts oder Änderungen am Produkt verliert diese Erklärung mit sofortiger Wirkung ihre Gültigkeit.

12.08.2015

Dr. Harald Dietrich
Managing Director

Elster GmbH, Postfach 1880, D – 55252 Mainz-Kastel; Steinern Straße 19-21

A-2 Approval as associated operating equipment



Translation

(1) **EC TYPE-EXAMINATION CERTIFICATE**(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

(3) EC-Type Examination Certificate Number

TÜV 01 ATEX 1791

(4) Equipment: Circuit board type FE260-SVB

(5) Manufacturer: Elster GmbH

(6) Address: Steinernstraße 19-21
D – 55252 Mainz-Kastel

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV Hannover/Sachsen-Anhalt e.V., TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 02 YEX 137103.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014: 1997**EN 50 020: 1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design and construction of the specified equipment or protective system according to Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and placing on the market of this equipment or protective system.

(12) The marking of the equipment or protective system must include the following:

II (2) G [EEx ia] IIB

TÜV Hannover/Sachsen-Anhalt e.V.
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover

Hanover, 2002-01-14

Head of the
Certification Body



TÜV CERT A4 07.01 10.000 L8

This certificate may only be reproduced without any change, schedule included.
Excerpts or changes shall be allowed by the TÜV Hannover/Sachsen-Anhalt e.V.

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(13)

SCHEDULE(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 01 ATEX 1791**

(15) Description of equipment

The circuit board type FE260-SVB is an associated apparatus. It is intended for the galvanically separated supply and for the galvanical separation and amplification of signals preferably from electronic volume correctors e.g. type EK260.

The device meets the requirements of category 2.

Electrical data

Supply FE260
(terminals 230V, PE)

$U = 230 \text{ V}, +10\% / -15\%, 50\ldots 60 \text{ Hz}; \text{max. } 1,5 \text{ W}$

$U_m = 253 \text{ V}$

Impulse outputs
(terminals A1...A4)

$U \leq 30 \text{ V DC}, I \leq 50 \text{ mA}$

$U_m = 253 \text{ V}$

Intrinsically safe supply
(terminals U+, U-)

in type of protection "Intrinsic Safety" EEx ia IIB
resp. EEx ib IIB

Maximum values:

$U_o = 9,6 \text{ V}$

$P_o = 473 \text{ mW}$

Characteristic line: trapezoidal

max. permissible external inductance $L_o = 1 \text{ mH}$

max. permissible external capacitance $C_o = 1,1 \text{ } \mu\text{F}$

The other maximum values see below.

Interface circuit
(terminals R+, R-, T+, Ti)

in type of protection "Intrinsic Safety" EEx ia IIB
resp. EEx ib IIB

Maximum values:

$U_o = 6,5 \text{ V}$

$P_o = 423 \text{ mW}$

Characteristic line: trapezoidal

max. permissible external inductance $L_o = 1 \text{ mH}$

max. permissible external capacitance $C_o = 6,1 \text{ } \mu\text{F}$

The other maximum values see below.

Interface- and
supply circuit

Common maximum values for the trapezoidal circuits:

$I_o = 99 \text{ mA}$

$P_o = 473 \text{ mW}$ (max. sum output power of both circuits)

$R_i = 193 \text{ } \Omega$



Schedule EC-Type Examination Certificate N° TÜV 01 ATEX 1791

Intrinsically safe impulse outputs
(terminals DA1+, DA-;
...;DA4+,DA4-)

in type of protection "Intrinsic Safety" EEx ia IIB
resp. EEx ib IIB

Maximum values

$U_o = 6,5 \text{ V}$

$I_o = 1 \text{ mA}$

$P_o = 1,4 \text{ mW}$

Characteristic line: linear

max. permissible external inductance $L_o = 1 \text{ H}$

max. permissible external capacitance $C_o = 570 \text{ }\mu\text{F}$

The intrinsically safe circuits are safely galvanically separated from all other circuits up to a peak value of the nominal voltage of 375 V.

(16) Test documents are listed in the test report No.: 02 YEX 137103.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones



Translation

1. SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 01 ATEX 1791

of the company: Elster GmbH
Steinernstraße 19-21
D-55252 Mainz-Kastel

In the future, the circuit boards type FE260-SVB may also be manufactured and operated according to the test documents listed in the test report.

The modifications of type FE260-SVB, version with mains supply, concern the internal design of the board. The electrical data and all further data apply unchanged for this type. The ident number of this board reads as follows: 73017231.

Furthermore the circuit boards have been extended by a type of direct voltage supply. The type designation of this type reads as follows: FE260-SVB-DC. Due to the kind of electrical supply and one additional intrinsically safe digital input, some electrical data and the permissible ambient temperature range have been changed.

The permissible ambient temperature range for the type FE260-SVB-DC is -20°C to 60°C.

Electrical data for FE260-SVB-DC

Supply FE 260-SVB-DC
(terminals +, -)

$U = 10 \text{ V} \dots 30 \text{ V DC}$
 $U_m = 253 \text{ V}$

Digital input
(terminals DE3 +, DE3-)

in type of protection Intrinsic Safety EEx ia IIB
EEx ib IIB

passive switching output
only for the connection of certified intrinsically
safe circuits with the following maximum value:
 $U_i = 10 \text{ V}$
The effective internal inductance and
capacitance are negligibly small.

All further data apply unchanged for this supplement.

The circuit boards types FE260-SVB and FE260-SVB-DC XYZ according to EC-Type Examination Certificate TÜV 01 ATEX 1791. incl. of this 1.supplement also meets the requirements of EN 50 014:1997+A1+A2 EN 50 020:2002.

Test documents are listed in the test report N° 04 YEX 551450.

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2004-06-25


Head of the
Certification Body

B Technical data

B-1 General data (mechanical and ambient conditions)

Housing/structure	Wall-mounted housing, Aluminium cast alloy G Al SI 12 / DIN 1775
Dimensions (W x H x T)	approx. 290 x 175 x 102 mm with cable entry glands and hinges
Cable union glands	Suitable for cables with overall diameter 6...10 mm
Weight	approx. 3 kg
Protection	IP 65 according to EN60529
Ambient temperature	„AC“ versions: 0°C ... +40 °C „DC“ version: -10°C ... +60 °C
Climatic conditions	Relative humidity max. 93%, non-condensing

B-2 Power supply

Designation	„230V“ („AC“ version 230 V) „115V“ („AC“ version 115 V) „10...30V“ („DC“ version)
Cable connection	Screw terminals, green, for
Cable cross-sectional area ..	solid wires 0.14...2.5 mm ² flexible stranded wire 0.14...1.5 mm ² Fit wire-end sleeves to flexible stranded wires
Screening	No cable screen required
Voltage	230 V AC +10% / -15% („AC“ version 230 V) 115 V AC +10% / -15% („AC“ version 115 V) 10 V DC to 30 V DC („DC“ version)
Power consumption	3 W max. (with modem)

B-3 Connection cables and cable glands

In order to ensure the IP protection class 65 according to EN60529 even when all connection cables are mounted, the values in the following table must be taken into account:

Cable gland	Valid cable diameter range	Torque for tightening the gland	Metric wrench size of open-end wrench
Plastic cable gland M16 (page 9, fig. 4. pos. „a“)	7 ... 8 mm	2,5 Nm	22 mm
Plastic cable gland M12 (page 9, fig. 4. pos. „b“)	5 ... 6 mm	1,5 Nm	15 mm
Metal cable gland M20 (page 9, fig. 4. pos. „c“)	7 ... 8 mm	10 Nm	20 mm

Take care that only one core is inserted into each clamp!

The cable cores must be stripped 11 mm. They must be inserted into the terminal over a length of 14 mm!

B-4 Intrinsically safe power supply for the volume corrector

Also suitable for supplying the EK260 volume corrector.

Designation	“U”
Cable connection	Screw terminals, blue
Cable cross-sectional area ...	0.5...1.5 mm ² Fit wire-end sleeves to flexible stranded wires
Cable length for cable of cross- sectional area:	
1.5 mm ²	1,000 m max.
0.5 mm ²	100 m max.
Screening	Connect cable screen to the cable gland <u>over the full area</u>
Voltage	8.5 V ± 5 %
Current	40 mA max.
Safety limits	(see Declaration of Conformance A-2)

B-5 Connections for volume corrector digital outputs

Suitable for pulse or message outputs.

Connection “DA2” is also suitable for higher frequencies, e.g. for the transmission of a frequency proportional to the flow.

Designation	“DA1”, “DA2”, “DA3”, “DA4”
Cable connection	Screw terminals, blue
Cable cross-sectional area ...	0.5...1.5 mm ² Fit wire-end sleeves to flexible stranded wires
Cable length	1000 m max. depending on frequency (see below)
Screening	Connect cable screen to the cable gland <u>over the full area</u>
Open-circuit voltage	5 V ± 10 %
Short-circuit current	
DA1, DA3, DA4	5 µA max.
DA2	30 µA max.
Frequency	
DA1, DA3, DA4	
for cable length	
up to 100 m	10 Hz max.
up to 1,000 m	1 Hz max.
DA2	
for cable length	
up to 10 m	500 Hz max.
up to 100 m	50 Hz max.
up to 1,000 m	5 Hz max.
Safety limits	(see Declaration of Conformance A-2)

B-6 Serial data interface to the volume corrector

Intrinsically safe RS-485 interface for four-wire operation

Designation	"R" (received data), "T" (sent data)
Cable connection	Screw terminals, blue
Cable cross-sectional area ..	0.5...1.5 mm ² Fit wire-end sleeves to flexible stranded wires
Cable length	1000 m max. depending on transmission speed (see below)
Screening	Connect cable screen to the cable gland <u>over the full area</u>
Transmission speed for cable length	
up to 500 m.....	19200 Bd max.
up to 1,000 m.....	9600 Bd max.
Safety limits	(see Declaration of Conformance A-2)

B-7 Digital outputs

Individually electrically isolated transistor outputs (open collector)

Designation	"A1", "A2", "A3", "A4"
Cable connection	Screw terminals, green, for - solid wires 0.14...2.5 mm ² - flexible wires 0.14...1.5 mm ² Fit wire-end sleeves to flexible stranded wires
Screening	Connect cable screen to the cable gland <u>over the full area</u>
Switching voltage	30 V max.
Switching current	50 mA max.
Voltage drop	1.5 V max.
Residual current	0.01 mA max.
Frequency	
A1, A3, A4	10 Hz max. for cable length up to 10 m *
A2	500 Hz max. for cable length up to 10 m * and 40 to 50 mA switching current **

* With a cable length of more than 10 m between the FE260 and the volume corrector (intrinsically safe electrical circuit) the maximum frequency cannot be guaranteed. (See B-5 and Chapter 0).

** With a smaller load (lower switching current) the frequency which can be transmitted is reduced.

In this case a resistance can be wired in parallel to the load so that in total a switching current of approx. 40 to 50 mA (no more) is produced. The resistance should have a rating of 2 watts or higher.

Note that the switching current at frequencies above approx. 1 Hz cannot be measured with a commercially available ammeter (multimeter). You can connect an ammeter to the input of the device which is to be later connected to the FE260 to determine the switching current.