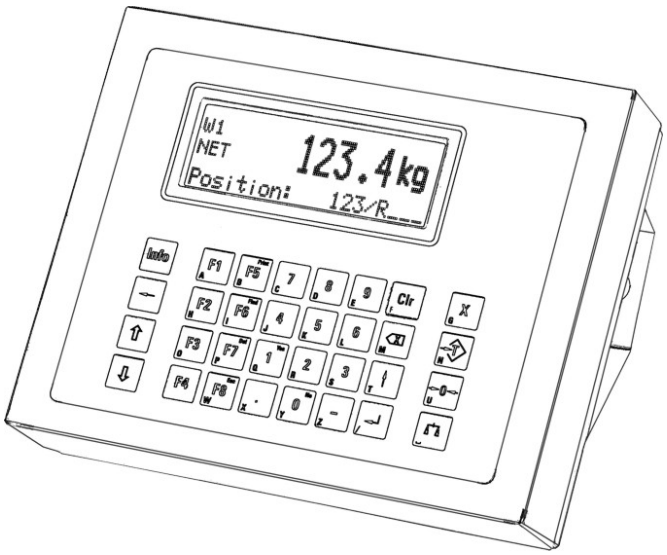
SysTec Systemtechnik und Industrieautomation GmbH

Technical Manual

IT8000Ex

E8SYS0xx



II 2G (2GD) Ex e mb [ib] IIB/IIC T4

II 2D Ex tD A21 [ibD] IP65 T60°C

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Technical Manual IT8000Ex

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Please Note:

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

Contents

1 Introduction

1.1 About This Manual

This manual contains information and Technical Data for the use, the installation and the operation of the weighing terminal IT8000Ex-****** (article-No. E8SYS0xx).

Units with article-No. E8SYS0x1 have the factory assembled external power supply unit VG230EX installed at the rear of the housing (see further down below). The power supply unit has a separate ATEX approval. The Technical Manual of the power supply unit ST.2309.1455 must be observed.

The weighing terminal must only be operated by trained personnel.

In addition to this manual further information is provided in the following documentation:

- Technical Manual power supply VG230Ex, No. ST.2309.1455
- Calibration Manual **IT8000 ADM and ADC**, Order-No.: ST.2309.0688.

1.2 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:

W A R N I N G
Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

Ex
W A R N I N G
Failure to observe this precaution could result in serious injuries or fatal accidents due to ignition of an explosive atmosphere. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

Note:

- This indicates an advice for the intended use of the equipment and/or additional information to avoid inappropriate handling.

1.3 Safety Advice

Ex
W A R N I N G
Disconnect all power to this instrument before opening the housing! Risk of explosion!

Ex
W A R N I N G
Make absolutely sure before servicing that no potentially explosive atmosphere can be present at any time!

W A R N I N G
Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.

Ex
W A R N I N G
This weighing terminal must <u>not</u> be used in Ex-Zone 0 and Zone 20.
It is the sole responsibility of the employer / operating company to classify the area of installation (zone, group, temperature class). To that effect, the assistance of the Technical Supervisory Service or any other technical authority may be utilized!

W A R N I N G
When this unit is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved.

W A R N I N G
For installation, service and operation of the unit, the ATEX directive as well as all locally applicable regulations for safety and the prevention of accidents must be observed!

W A R N I N G
Input voltage of the instrument must comply with local mains supply! The input voltage must not exceed at any time the permissible maximum voltage of the weighing terminal Um.

W A R N I N G
This module and its associated equipment must only be installed, adjusted and maintained by qualified personnel authorized by SysTec GmbH!

W A R N I N G
If a permanently connected power supply cable is used, an easily accessible separator must be included in the supply circuit!

W A R N I N G
Operation of the weighing terminal type IT8000Ex-**** in areas requiring equipment of category 2D is only permitted when the occurence of intensive electrostatic charging caused by operating or working process can be excluded.**

Notes:

- Only permit qualified personnel to operate this instrument!
  Disconnect all power to this instrument before cleaning and servicing!
- All switch gear connected to the unit and/or installed close to it, such as relays and contactors, must be fitted with appropriate components (RC-modules, diodes) to suppress interference.
- In order to avoid static discharge, all metallic parts of a system must be thoroughly grounded.
- Keep this manual for future reference!

1.4 Declaration Of Conformity

SysTec Systemtechnik und Industrieautomation GmbH
Ludwig-Erhard-Str. 6
D-50129 Bergheim-Glessen

CE EC Declaration of Conformity

Manufacturer:	**SysTec GmbH**
Type/model:	**IT8000Ex-********
No. of the EC type approval certificate (NAWI):	**D02-09-021**
No. of the EC type approval certificate (ATEX):	**BVS 06 ATEX E 034**

The device corresponds to:

the production model described in the type approval certificate No. D02-09-021 issued by the PTB Braunschweig as Notified Body and to the requirements of the:

EC Directive **2009/23/EC (non-automatic weighing instruments)**

in conformity with the following standards:

EN 45501:2004 **OIML R51-1:2006** **OIML R76-1:2006**

With respect to the EC Directive 90/384EC this declaration is only valid with a certificate of conformity of a Notified Body;

and:

the production model described in the EC type approval certificate No. BVS 06 ATEX E 034 issued by DEKRA EXAM GmbH and the requirements of the:

EC Directive **94/9/EC (ATEX)**

in conformity with the following standards:

EN 1127:2007 **EN 60079-0:2006** **EN 60079-11:2007**
EN 60079-7:2007 **EN 61241-0:2006** **EN 61241-1:2004**
EN 60079-18:2004 **EN 61241-11:2006**

Notified Body for the supervision of the ATEX requirements: DEKRA EXAM GmbH, No. 0158;

and:

the requirements of the:

EC Directive **2004/108/EC (electromagnetic compatibility)**

in conformity with the following standards:

EN 61000-6-2:2005 **EN 61000-6-4:2001** **EN 55011**

In addition the device conforms to the following standards:

NAMUR NE21:05.2006

Date: October 01, 2009

Dipl.-Ing. Rainer Junglas, General Manager

2 Marking

Manufacturer	Systec Systemtechnik und Industrieautomation GmbH	
	Ludwig-Erhard-Straße 6	
	50129 Bergheim-Glessen	
Designation	IT8000Ex-******	
Year of construction	yyyy	
Serial-No.	Ex yy xxxx	
Ex classification		II 2G Ex e mb [ib] IIB/IIC T4
		II 2D Ex tD A21 [ibD] IP65 T60°C
CE marking	CE 0158	
Type examination certificate	BVS 06 ATEX E 034	
Service	Only by qualified service personnel authorized by SysTec GmbH, addresses on request.	

3 System Description

3.1 General Description

IT8000Ex is a universal weighing terminal for use in a variety of applications such as data logging, data capturing and set point control, suitable for installation in Ex zones 1, 2, 21 and 22. It consists of the following Ex modules:

- Housing with type of protection 'Increased safety'
- Internal 12-30VDC power supply with intrinsically safe outputs, type of protection 'Encapsulation'
- Mainboard, keyboard and display intrinsically safe
- Plu-on modules selectable, intrinsically safe or with type of protection 'Increased Safety' (in preparation).

In addition to 4 intrinsically safe inputs, the mainboard has sockets for the extensions listed below:

- One socket for a plug-on module ADM8000-Exi, suitable to connect one analog scale base with intrinsically safe strain gauge loadcells with an overall impedance between 43 and 4500 Ω.
- Two sockets for plug-on modules that can be fited with:
  type RS485-Exi to connect an intrinsically safe serial interface RS485 or
  type S10mA-Exi to connect an intrinsically safe serial 10mA interface.
- One socket for a plug-on module OUT4-Exi with 4 intrinsically safe digital 5V outputs or a plug-on module REL4-Exi with 4 intrinsically safe relays with potential-free relay outputs.
- The supply voltage of the weighing terminal is 12 – 30 VDC (Ex-e).
- The short-circuit current of the power supply unit must be limited to 100 A.

The supply voltage of the weighing terminal is 12 – 30 VDC (Ex-e). The short circuit current of the power supply must be limited to 100A or 1500A, respectively.

Units with article-No. E8SYS0x1 have the factory assembled external power supply unit VG230EX installed at the rear of the housing which is connected at its secondary side to the weighing terminal IT8000Ex. The connection at the primary side of the power supply is to 100 – 230 VAC (see further down below).

All external connections are made at screw terminals. Weight and additional information are shown on a back-lit 4-line LCD. Operation and data entry is made via a sealed membrane keyboard with numeric peypad and function keys.

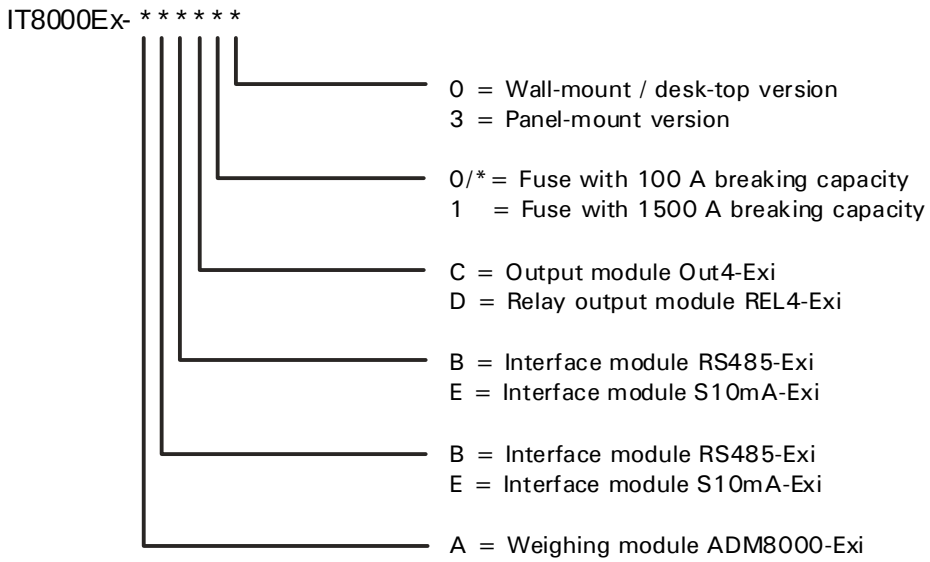
Operation, sequence and printout of the IT8000Ex can be adapted to a specific application. Standard programs are available for typical applications such as batching, filling, checkweighing, data capturing, etc.

IT8000Ex is available in eight basic configurations:

Article-No. E8SYS001	Basic desk-top / wall-mount unit with external power supply unit VG230Ex with 2.5m cable and free ends to connect to 100-230VAC.
Article-No. E8SYS005	Basic desk-top / wall-mount unit with 2.5m cable and free ends to connect to external power supply unit.
Article-No. E8SYS006	Basic desk-top / wall-mount unit with 2m cable with Ex-de plug type miniCLIX to connect to external battery box E3AKK001.
Article-No. E8SYS007	Basic desk-top / wall-mount unit with 2m cable with Ex-de plug type DXN1 to connect to external battery box E3AKK002.
Article-No. E8SYS011	Basic panel-mount unit with external power supply unit VG230Ex with 2.5m cable and free ends to connect to 100-230VAC.
Article-No. E8SYS015	Basic panel-mount unit with 2.5m cable and free ends to connect to external power supply unit.
Article-No. E8SYS016	Basic panel-mount unit with 2m cable with Ex-de plug type miniCLIX to connect to external battery box E3AKK001.
Article-No. E8SYS017	Basic panel-mount unit with 2m cable with Ex-de plug type DXN1 to connect to external battery box E3AKK002.

3.2 Product Key

The mainboard of the IT8000Ex features 4 sockets that can be fitted with different plug-on boards. The configuration at the time of delivery is shown on the name plate using the following code:



Designation	Description	Article-No.
Weighing terminal IT8000Ex-******	Basic unit with 4 slots for plug-on modules	E8SYS001 E8SYS005 E8SYS006 E8SYS007 E8SYS011 E8SYS015 E8SYS016 E8SYS017
Plug-on module ADM8000-Exi	Weighing module for connection of intrinsically safe loadcells	E8OPT100-x
Plug-on module S10mA-Exi	Serial interface module with intrinsically safe 10mA interface	E8OPT221-x
Plug-on module RS485-Exi	Serial interface module with intrinsically safe RS485 interface	E8OPT222-x
Plug-on module OUT4-Exi	Digital output module with 4 intrinsically safe transistor outputs	E8OPT310
Plug-on module REL4-Exi	Digital output module with 4 intrinsically safe relay outputs	E8OPT311

3.3 Definition Of Electrical Values

3.3.1 Ex-e Circuits

3.3.1.1 Supply Circuit Input Power Supply Unit (Ex-e)

Connecting terminal	KL1702	(+) and (—)
Rated voltage	U_n	9 – 36 V DC
Rated current	I_n	0.3 A
Max. voltage	U_m	60 VDC

Max. short circuit current of supply

Type IT8000Ex-****0*	I_k	100 A
Type IT8000Ex-****1*	I_k	1500 A

3.3.2 Intrinsically Safe Circuits CPU8000Ex

3.3.2.1 Input Circuits CPU8000ex (Galvanically Connected Inputs IN0 - IN3)

Connecting terminal	KL200.1 and .2	IN0 (+) and (Gnd)
Connecting terminal	KL201.1 and .2	IN1 (+) and (Gnd)
Connecting terminal	KL202.1 and .2	IN2 (+) and (Gnd)
Connecting terminal	KL203.1 and .2	IN3 (+) and (Gnd)

Value per circuit:

Voltage	U_0	5.3 V
Current	I_0	22 mA
Internal resistance	R_i	248 Ohm

Characteristic curve linear

External inductance and capacitance
as per table below:

Lo[mH]	0	0,01	0.2	70
Co[μF]	50	14	4.7	0

Internal inductance	L_i	negligible
Internal capacitance	C_i	negligible

3.3.3 Intrinsically Safe Circuits Plug-On Modules

3.3.3.1 Output Circuits Weighing Module ADM8000-Exi

Connecting terminal	KL1.1	+ Excitation
Connecting terminal	KL1.2	– Excitation
Connecting terminal	KL1.3	+ Sense
Connecting terminal	KL1.4	– Sense
Connecting terminal	KL1.5	+ Signal
Connecting terminal	KL1.6	– Signal

Voltage	U_o	5.3 V
Current	I_o	220 mA
Power	P_o	1.116 W

External inductance and capacitance as per table below:

	IIB				IIC			
Lo[mH]	0	0.05	1	2.5	0	0.01	0.1	0.15
Co[μF]	1000	43	7	0	67	10	1	0

3.3.3.2 Interface module RS485-Exi

Connecting terminal	KL1400.1 and KL1400.2	Tx+/A and Tx–/B
Connecting terminal	KL1401.1 and KL1401.2	Rx+ and Rx–

Values per circuit

Voltage	U_o	5.3 V
Current	I_o	9 mA
Linear output curve		
Internal resistance	R_i	588 Ohm

External inductance and capacitance as per table below:

	IIB				IIC			
Lo[mH]	0	0.05	50	100	0	0.05	0.2	100
Co[μF]	1000	50	9.4	0	71	7.6	5	0

Max. voltage	U_i	6.5 V
Internal inductance	L_i	negligible
Internal capacitance	C_i	negligible

Values for two outputs connected in parallel:

Voltage	U_o	5.3 V
Current	I_o	18 mA
Linear output curve		
Internal resistance	R_i	294 Ohm

External inductance and capacitance:

	IIB				IIC		
Lo[mH]	0	1	5	100	0	5	100
Co[μF]	1000	19	13	0	71	2.5	0

Max. voltage U_i 6.5 V

Internal inductance L_i negligible

Internal capacitance C_i negligible

Values for one output with connection to GND:

Voltage U_o 5.3 V

Current I_o 36 mA

Linear output curve

Internal resistance R_i 147 Ohm

Linear output curve

Internal resistance R_i 147 Ohm

External inductance and capacitance:

	IIB				IIC			
Lo[mH]	0	1	5	100	0	1	5	38
Co[μF]	1000	19	13	0	71	3.3	2.3	0

Max. voltage U_i 6.5 V

Internal inductance L_i negligible

Internal capacitance C_i negligible

Values for two outputs with connection to GND connected in parallel:

Voltage U_o 5.3 V

Current I_o 72 mA

Linear output curve

Internal resistance R_i 73.5 Ohm

External inductance and capacitance:

	IIB				IIC			
Lo[mH]	0	1	5	41	0	1	5	9.8
Co[μF]	1000	18	12	0	71	3.1	1.8	0

Max. voltage U_i 6.5 V

Internal inductance L_i negligible

Internal capacitance C_i negligible

3.3.3.3 Interface Module S10mA-Exi

Connecting terminal	KL1500.1	TxIn
Connecting terminal	KL1500.2	TxOut
Connecting terminal	KL1500.3	GND
Connecting terminal	KL1500.4	RxOut

Voltage	U_o	5.3 V
Current	I_o	32.5 mA
Internal resistance	R_i	163.5 Ohm

External inductance and capacitance as per table below:

	IIB				IIC			
Lo[mH]	0	5	20	100	0	1	2	47
Co[μF]	1000	13	9.6	0	71	3.3	2.8	0

3.3.3.4 Relay module REL4-Exi

Connecting terminal	KL1100.1 and KL1100.2	Relais 1 Out
Connecting terminal	KL1101.1 and KL1101.2	Relais 2 Out
Connecting terminal	KL1102.1 and KL1102.2	Relais 3 Out
Connecting terminal	KL1103.1 and KL1103.2	Relais 4 Out

Potential free contacts to connect one intrinsically safe circuit each:

Switching voltage	U_i	60 V
Switching current	I_i	3 A
Internal inductance	L_i	negligible
Internal capacitance	C_i	negligible

3.3.3.5 Output module OUT4-Exi

Connecting terminal	KL1000.1 and KL1000.2	0ut0 + and GND
Connecting terminal	KL1001.1 and KL1001.2	0ut1 + and GND
Connecting terminal	KL1002.1 and KL1002.2	0ut2 + and GND
Connecting terminal	KL1003.1 and KL1003.2	0ut3 + and GND

Values per circuit:

Voltage	U_o	5,3 V
Current	I_o	108 mA
Power	R_i	49 Ohm

External inductance and capacitance as per table below:

	IIB				IIC			
Lo[mH]	0	0,5	5	19	0	0.01	0.2	4.5
Co[μF]	1000	22	11	0	71	14	4.7	0

3.4 Housing

IT8000Ex is available in two housing versions, for desk-top / wall-mount (E8SYS00x) or panel-mount (E8SYS01x) installation. The stainless steel housings are protected to IP65 and have 5 cable glands for the connection of external components.

See section 'Dimensions' for details.

Ex **The housing must be included in the equipotential bonding of the installation with the bonding conductor connected at the PA stud at the outside of the housing.**

3.5 Description Of Components

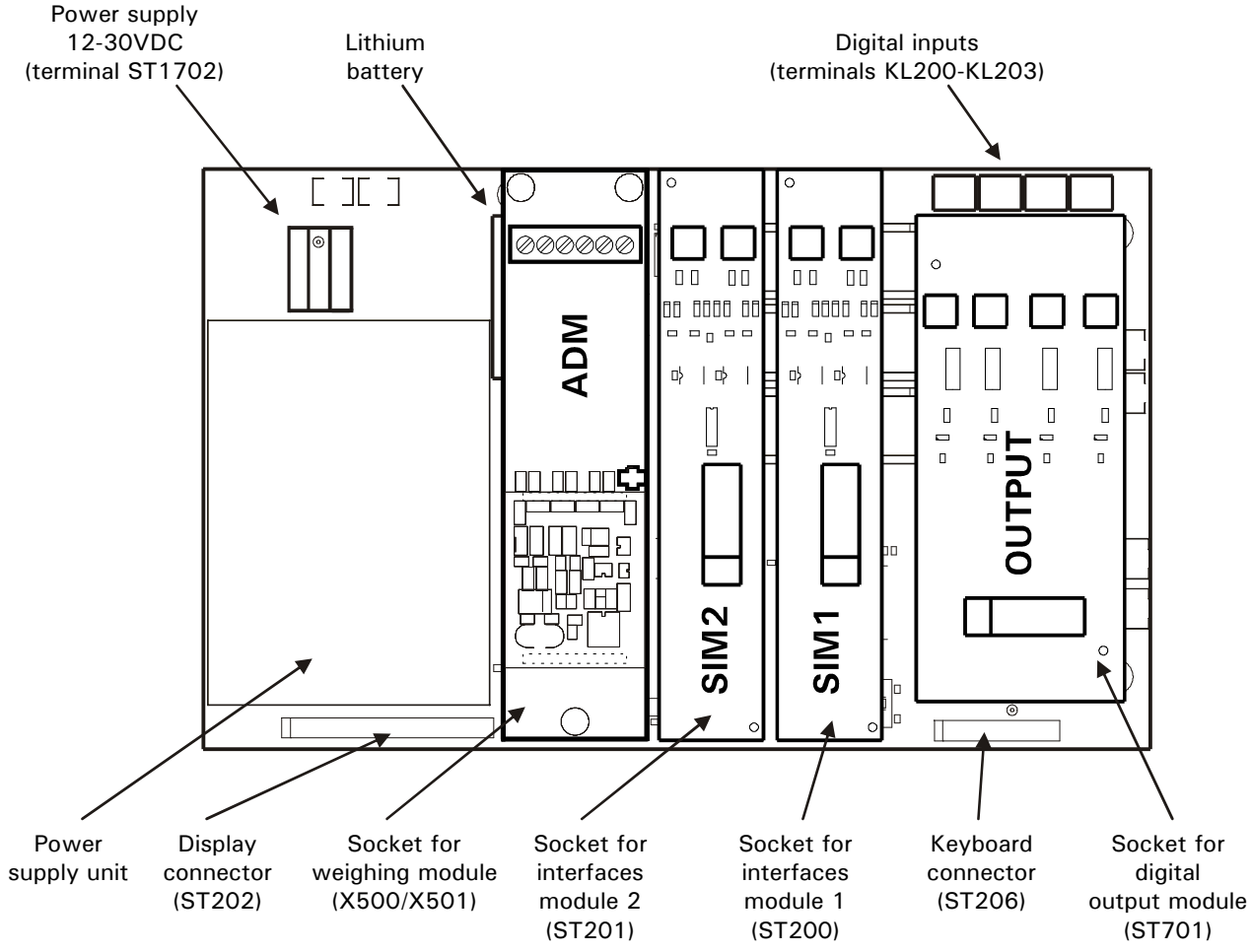
3.5.1 Main Module CPU8000Ex

The CPU8000Ex is the core of the weighing terminal. It contains the processor system with the program memory and battery-backed data memory and realtime clock.

In addition to 4 intrinsically safe inputs (KL200-KL203), sockets are provided for 1 weighing module (ADM), 2 interface modules (SIM1 and SIM2) plus 1 output module (OUTPUT).

Also installed on the mainboard is an encapsulated power supply unit, type of protection Ex'mb', with pertaining Ex'e' input terminals (ST1702). They are suitable for the connection of a non-intrinsically safe supply voltage of 12-30 VDC (Ex-e). The output of the power supply unit provides the intrinsically safe supply circuits for the CPU8000Ex and the plug-on modules.

Layout of components on CPU8000Ex main module:



3.5.2 Display

An intrinsically safe dot matrix display is used to indicate weights, texts and operator prompts. It has a resolution of 120 x 32 pixels. Weight and additional information is shown in two lines. Height of characters for weights: 19mm, for additional information: 9 mm. Depending on the application program, the display can divided into 4 lines max.

The LCD module has backlighting, which can be switched off when not in use. The display is connected to the CPU8000Ex with a ribbon cable.

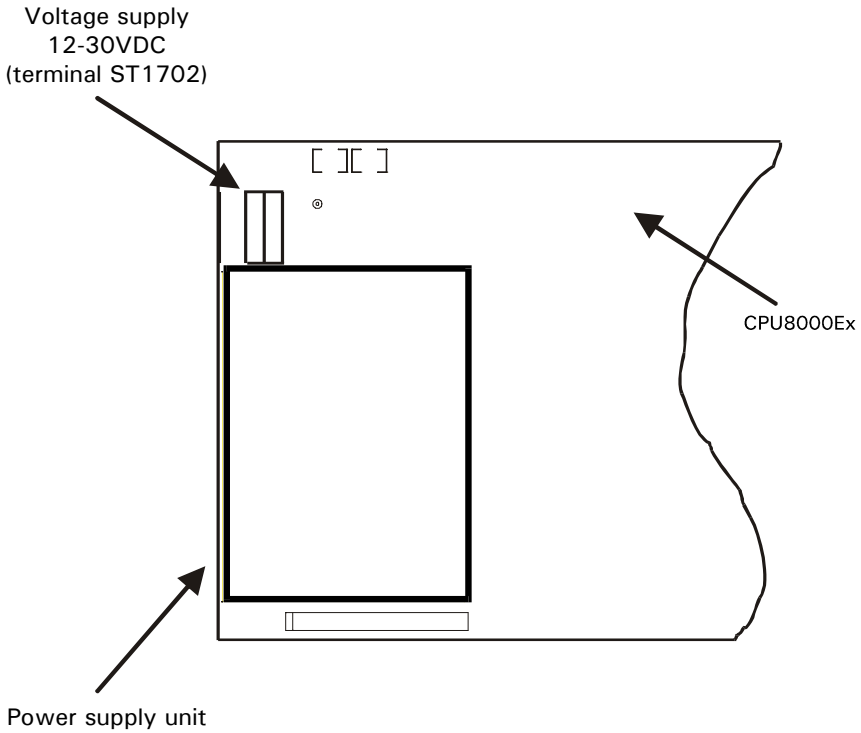
3.5.3 Keyboard

The intrinsically safe keyboard permits the entry of numerals, letters and special characters. By means of a shift-key, upper and lower case letters can be entered. The keyboard also features keys for scale functions and 8 additional function keys. The keyboard is connected to the intrinsically circuits of the CPU8000Ex with a ribbon cable.

3.5.4 Power Supply Unit GMEX3062NA

The power supply unit GMEX3062NA is designed with type of protection 'mb'. The power supply itself and the pertaining Ex'e' input terminals are soldered to the mainboard CPU8000Ex. The input terminals are suitable for the connection of a non-intrinsically safe supply voltage of 12-30 VDC (+10% / –15%). The intrinsically safe output voltages of the power supply are used to supply the components of the weighing terminal.

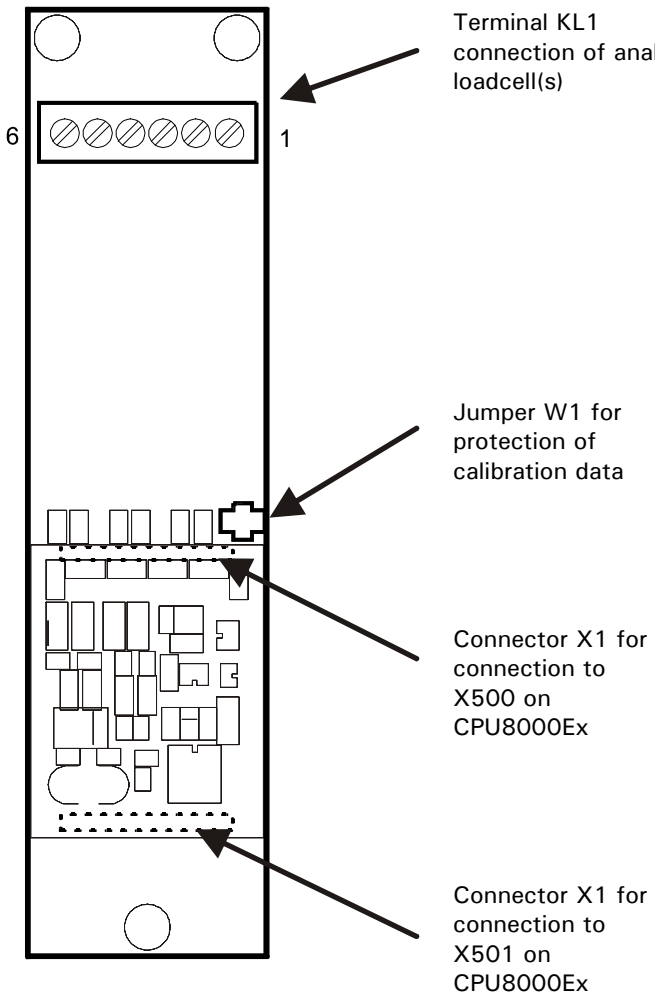
Ex 'mb' power supply unit GMEX3062NA with Ex'e' input terminals for 12-30 VDC



3.5.5 Weighing Module ADM8000-Exi

The **A**nalog **D**igital **M**odule **ADM8000-Exi** provides connection of an analog scale base with intrinsically safe loadcells in 6- or 4-wire mode. The ADM8000-Exi board plugs into the socket (X1 / X2) on the main module CPU8000Ex. Calibration data are stored in an EEPROM and secured with the jumper W1.

Terminal assignment on ADM8000-Exi module



Specification for the connection of weighing platforms and loadcells:

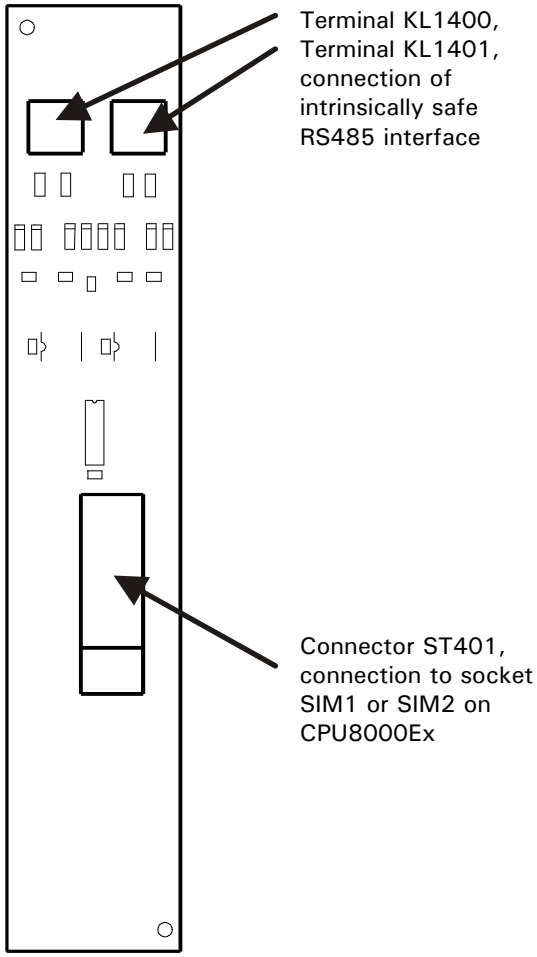
- Max. 8 intrinsically safe strain gauge loadcells with a min. impedance of 350 Ω each
- Impedance of loadcells 43 Ω ... 4500 Ω
- W&M approved resolution of 6000d at a max. preload of 80%, internal resolution 524,000d
- Smallest permissible input signal for approved applications: 0.33 μV / e
- Update rate 50 updates / second
- Loadcell excitation: 5 V ±5% (gated power supply).

3.5.6 Interface Module RS485-Exi

The interface module **RS485-Exi** is a driver for one intrinsically safe RS485 4-wire or 2-wire interface. The module is plugged into one of the two **SIM** sockets on the **CPU8000Ex**. In combination with a suitable separation module, communication is possible between hazardous and safe area.

For connection and terminal assignment see chapter 'Connection Of Interfaces'.

Terminal assignment on interface module RS485-Exi module

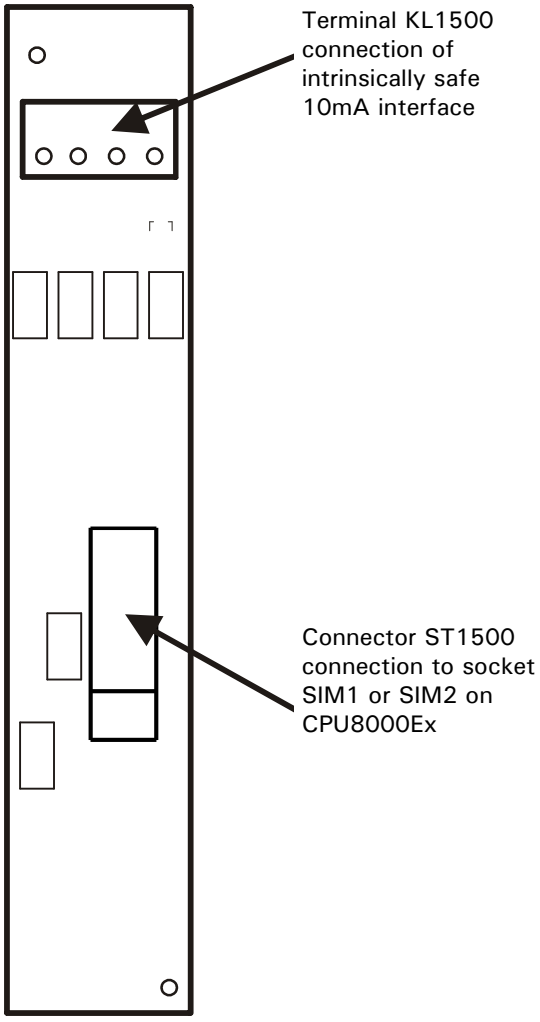


3.5.7 Interface Module S10mA-Exi

The interface module **SIM-10mA-Exi** is a driver for one intrinsically safe 10mA interface. The module is plugged into one of the two **SIM** sockets on the **CPU8000Ex**. In combination with the SysTec interface separation module TS3000, communication is possible between hazardous and safe area.

For connection and terminal assignment see chapter 'Connection Of Interfaces'.

Terminal assignment on the S10mA-Exi module

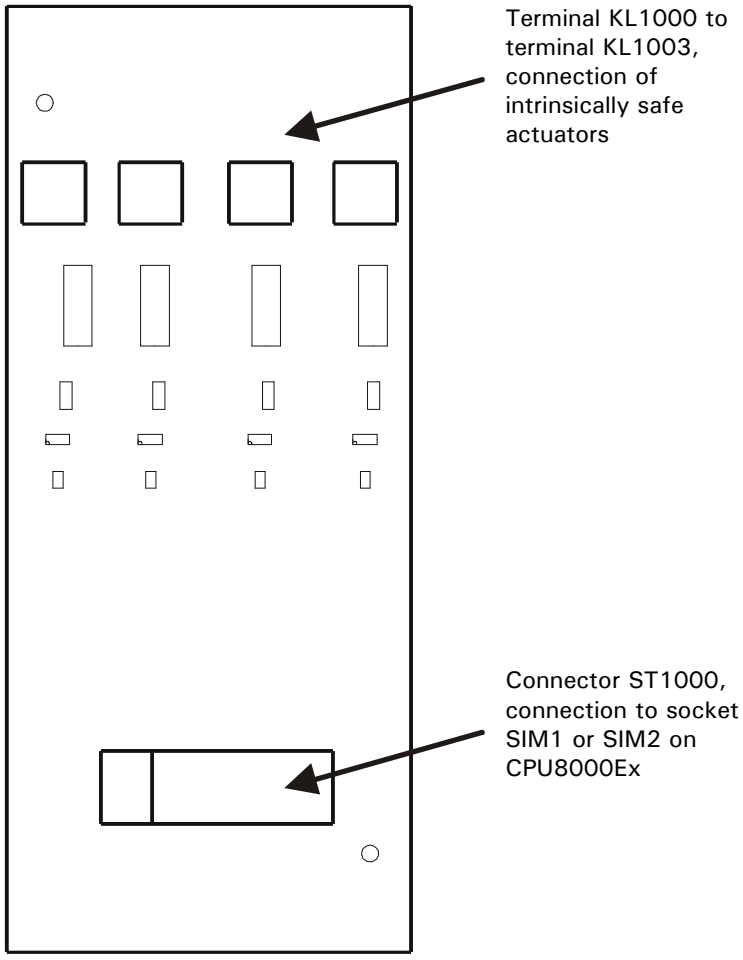


3.5.8 Transistor Output Module OUT4-Exi

The transistor output module **OUT4-Exi** is a plug-on module with 4 intrinsically safe 5V outputs. The module can be plugged into the socket **OUTPUT** on the **CPU8000Ex**.

For connection and terminal assignment see chapter 'Connection Of Interfaces'.

Terminal assignment on OUT4-Exi module

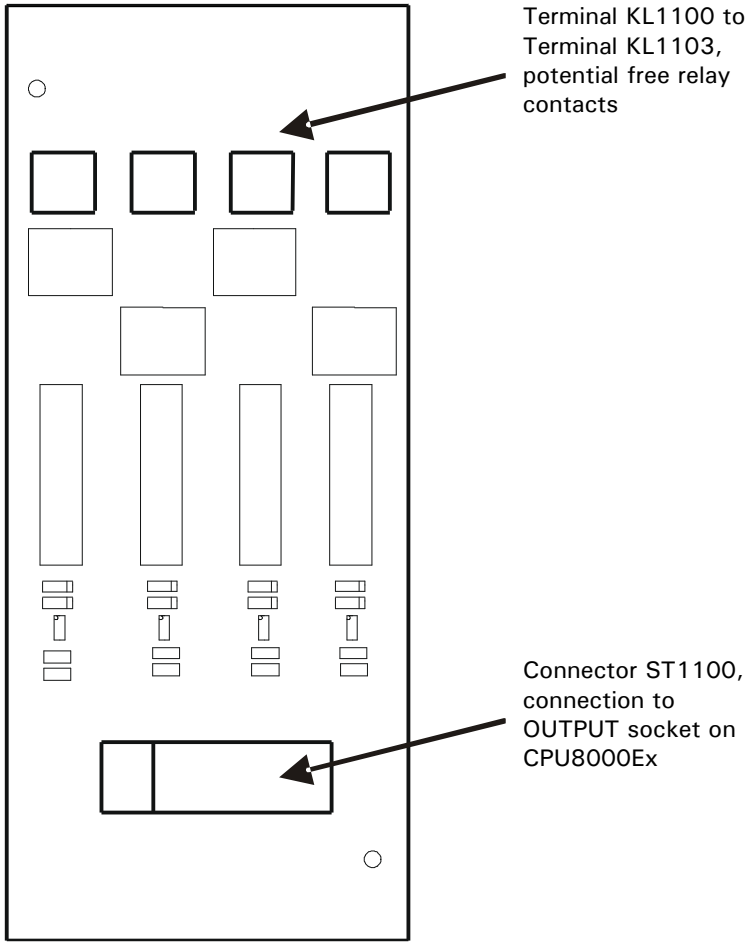


3.5.9 Relay Output Module REL4-Exi

The relay output module **REL4-Exi** is a plug-on module with 4 intrinsically safe relay outputs. It can be plugged onto the socket **OUTPUT** on the **CPU8000Ex.**

For connection and terminal assignment see chapter 'Connection Of Interfaces'.

Terminal assignment on REL4-Exi module



4 Intended Use

Ex	Any other but the intended use of the equipment, modifications and extensions must not be made without the explicit approval of the manufacturer and is deemed not to be intended. Part of the intended use is observance of this Technical Manual and the adherence to inspection and maintenance instructions and intervals. The manufacturer does not assume any liability whatsoever for damages resulting from non-intended use. Any risk resulting from non-intended use is solely borne by the user.
	In compliance with RL 94/9/EG (ATEX 95) appendix I, the weighing terminal IT8000Ex is an apparatus of group II category 2G, that following RL 99/92/EG (ATEX 137), can be used in zones 1 and 2, as well as in gas groups IIA, IIB and IIC, which are at risk of explosion through combustible substances of temperature classes T1 to T4.
	In compliance with RL 94/9/EG (ATEX 95) appendix I, the weighing terminal IT8000Ex is also an apparatus of group II category 2D, that following RL 99/92/EG (ATEX 137), can be used in zones 21 and 22 (dust). The maximum housing temperature is 60°C. Operation of the weighing terminal type IT8000Ex-****** in areas requiring equipment of category 2D is only permitted when the occurence of intensive electrostatic charging caused by operating or working process can be excluded.

Ex	The Ex-e supply voltage of the weighing terminal is connected at terminal KL1702 of the CPU8000Ex. The rated supply voltage is 12-30VDC. The max. voltage in compliance with EN60079-11 section 3.16 is Um = 60 VDC. The max. short-circuit current of the power source is 100A for IT8000Ex-****0* or 1500A for IT8000Ex-****1*. This must be ensured by operator. For the use of external power supply modules refer to section 'Connection of external supply voltage to IT8000Ex'.
	Only intrinsically safe, potential-free pushbuttons or switches may be connected to the intrinsically safe inputs IN0 - IN3 of the CPU8000Ex. Recorded evidence of intrinsic safety in compliance with EN 60079-14 is required.
	Only intrinsically safe strain gauge loadcells may be connected to the plug-on module ADM8000-Exi. The overall impedance of connected loadcells must be between 43 Ω and 4500 Ω. Recorded evidence of intrinsic safety in compliance with EN 60079-14 is required.
	Only suitable intrinsically safe components, e.g. piezoelectric valves type Hoerbiger P8 385RF-NG-SPT67, may be connected to the plug-on module OUT4-Exi with 4 intrinsically safe transistor outputs. Recorded evidence of intrinsic safety in compliance with EN 60079-14 is required.
	Only suitable intrinsically safe components, e.g. isolated switch amplifier type Pepperl&Fuchs KFA6-SR2-Ex2.W, may be connected to the plug-on module REL4-Exi with 4 intrinsically safe potential-free contacts. Recorded evidence of intrinsic safety in compliance with EN 60079-14 is required.
	Only a suitable intrinsically safe serial interface may be connected to the plug-on module S10mA-Exi. For communication to non-hazardous (safe) area the following equipment is available: 1) Interface separation module TS3000 for installation in safe area Article-No. E3OPT600 -xxx or E3OPT605-xxx 2) ExtensionBox for installation in safe area Article-No. E3SYS140-xxx or E3SYS145-x Recorded evidence of intrinsic safety in compliance with EN 60079-14 is required.

Ex	By means of the PA bolt, the metal housing of the IT8000Ex terminal must be connected to the equipotential bonding system of the installation.
	For installation and operation the regulations as per EN 60079-14 and/or EN61241-14 must be adhered to.
	In compliance with EN 60079-14 and/or EN61241-14 the weighing terminal and all connected components must be integrated into the equipotential bonding system of the installation.
	The permissible temperature range is –10°C to +40°C. When IT8000Ex is installed in a switch cabinet (panel-mount version) this temperature range must also be adhered to inside the switch cabinet.
	Dust covers or any other parts covering the housing must not be used.
	The housing must be protected against permanent UV radiation.

5 Assembly

Ex	**During assembly of the terminal it must be made absolutely sure that no potentially explosive atmosphere (gas or dust) is present at any time!** **Operation of the weighing terminal type IT8000Ex-****** in areas requiring equipment of category 2D is only permitted when the occurence of intensive electrostatic charging caused by operating or working process can be excluded.**

Assembly must be made in strict compliance with applicable DIN/VDE regulations. Also, all country-specific regulations and the rules for the prevention of accidents must be observed, this particularly applies to all work carried out on electrical installations.

The weighing terminal is suitable for installation in Ex zones 1, 2, 21 or 22. The unit must be undamaged and the place of installation must be clean. The desk-top/wall-mount version of the IT8000Ex has mounting brackets for installation. It must be firmly installed by means of suitable mounting accessories that are not part of the delivery. All srews must be securely tightened.

The panel-mount version of the IT8000Ex is supplied with screw clamps to fix the terminal in the cut-out of the switch cabinet.

The housing must be included in the equipotential bonding of the installation with the bonding conductor connected at the M5 stud at the rear plate or the bottom of the IT8000Ex housing.

6 Installation

6.1 General

Ex	This apparatus may only be installed by qualified personnel who are familiar with all regulations applicable to the different types of protection and the methods of installation, as well as the general principles for the classification of zones. This level of competence must correspond to the work that is to be carried out and appropriate training should be provided on a regular basis.
	Installation of the IT8000Ex weighing terminal in Ex zones 1 or 2 must only be made in strict compliance with the requirements of EN 60079-14.
	Installation of the IT8000Ex weighing terminal in Ex zones 21 or 22 must only be made in strict compliance with the requirements of EN61241-14:2004. Operation of the weighing terminal type IT8000Ex-******* in areas requiring equipment of category 2D is only permitted when the occurence of intensive electrostatic charging caused by operating or working process can be excluded.
	During installation of the terminal it must be made absolutely sure that no potentially explosive atmosphere (gas or dust) is present at any time!
	Installation must be carried out in compliance with applicable DIN/VDE regulations. Also, all country-specific regulations must be observed. Connection of supply volatage must be made in compliance with VDE 0100 and VDE 0160.
	An easily accessible separator must be included in the supply circuit! Mains supply to the device must be equipped with a circuit breaker 10 A char. C, breaking capacity 1500A min.
	IT8000Ex is protected to IP65 and should be protected against undue exposure to dust and moisture. It must only be put into operation when installation with appropriate ingress protection is complete.
	Any other but the intended use of the IT8000Ex is not permitted.
	The connection to any other electrical equipment must be reviewed by qualified personnel who are familiar with all applicable regulations.
	Connection at the EEx-e terminals must only be made when the unit is disconnected from all power sources.
	Electrical connection is made at screw terminals inside the housing.
	All cables outside the housing must be firmly installed. Connectors must be protected as instructed by manufacturer.
	Only certified cable glands (EEx e) may be used.
	Disconnect all power to the apparatus before carrying out any installation work. Make sure that power cannot be switched on again. Installation work may only be carried out with all power sources disconnected.
	All cables are led into the housing through Ex cable glands. Strip cable jacket only as long as required for the wires to reach the screw terminals. Use wire end ferrules on stranded cable and avoid protruding wires. When assembling the cable glands make sure that shield of cable is connected inside the cable gland (see also section 'Installation Of Cables').
	When installation is completed close lid and tighten securely with all hexagonal screws provided.

6.2 Equipotential Bonding

Ex	In compliance with EN 60079-14 and/or EN 61241-14 the apparatus must be integrated into the equipotential bonding system of the installation. The bonding conductor must have a cross section of min. 4mm². To connect the bonding conductor, an M5 stud is provided at the rear or bottom of the housing.

6.3 Shielding

Ex	Use only shielded connection cables. The shield must be connected at both sides in the cable glands. It is mandatory to additionally install equipotential bonding as per EN60079-14 paragraph 12.2.2.3 exception b). The bonding conductor must have a cross section of min. 4mm².

6.4 Connection Of Supply Voltage To IT8000Ex

Connection of supply voltage for the weighing terminal is designed according to 'Ex-e'. The 24VDC supply voltage is connected at terminal KL1702.

Nominal voltage	Un: 24 VDC +10% / –15%
Max. voltage for safety	Um: 60V
Type of protection	Ex-e
Cross section (rigid wire):	1.0 – 2.5 mm²
Cross section (stranded wire with wire end ferrule)	1.0 – 1.5 mm²
Length of stripped insulation	9 mm
Torque	0.4 – 0.5 Nm

Terminal assignment KL1702	
PA	Potential equalization
+	Supply voltage (+)
—	Supply voltage (—)

Ex	Observe sequence for connection of supply voltage as shown below:
	1) Unscrew Ex-e terminal cover
	2) Lead supply wires in a loop through ferrite ring and connect at Ex-e terminals, max. cross section of wires CU 2.5mm².
	3) Check internal PA connection from PA terminal to internal PA stud.
	4) Fasten cover over Ex-e terminal.

Ex	Connection of voltage supply is designed according to "Ex-e". For the connection of the connection cable an appropriate method must be chosen in compliance with hazardous area requirements as per EN60079-0 (e.g. "Ex-e" or "Ex-d").
	Mains supply to the device must be equipped with a circuit breaker 10 A char. C, breaking capacity 1500A min.

With respect to the connection of the supply voltage, the weighing terminal is available in four basic versions:

1. Article-No. E8SYS0x1: weighing terminal IT8000Ex with factory assembled external power supply unit VG230EX installed at the rear of the housing and firmly connected 2.5m cable with free ends to connect to 110-230 VAC.
2. Article-No. E8SYS0x5: weighing terminal IT8000Ex with firmly connected 2.5m cable with free ends to connect to external power supply.
3. Article-No. E8SYS0x6: weighing terminal IT8000Ex with firmly connected 2m cable with Ex-de connector type miniCLIX to connect to external battery box E3AKK001.
4. Article-No. E8SYS0x7: weighing terminal IT8000Ex with firmly connected 2m cable with Ex-de connector type DXN1 to connect to external battery box E3AKK002.

6.4.1 External Power Supply

An external power supply unit for the IT8000Ex weighingterminal must comply with the following specification:

1. Power supply unit VG230Ex, installed at the rear of the weighing terminal, for use in Ex zone 1, 2, 21, 22 SysTec article-No. E8PWS002

2. Power supply unit 230VAC/24VDC for use in Ex zone 1, 2, 21 and 22
   SysTec Article-No. E3OPT903

3. Power supply unit 230VAC/24VDC for use in safe area
   SysTec Article-No. E3OPT901 or E3OPT902-EU

4. Equivalent power supply unit complying with the following specification:
   - SELV according to EN60950
   - Output voltage 12 - 30 VDC
   - Max. voltage for safety as per EN60079-11:2007 section 3.16: Um = 60 VDC
   - Output current limited to 10A max.
   - Power supply unit incorporated in metal housing (observe equipotential bonding, see chapter 'Equipotential Bonding')
   - If the power supply is used in hazardous area, the type of protection must correspond to the place of installation.
   - Connecting cables from power supply to weighing terminal must be shielded. The shield must be grounded on both sides. Use only suitable cable in compliance with EN60079-14:2003 section 9.

The technical manual of the chosen power supply module must be observed.

Ex	The max. voltage for safety of the weighing terminal is **Um = 60 VDC**. This must be guaranteed by using an external SELV power supply module as per EN 60950 (SELV). The max. voltage for safety on the input side of the external power supply unit must correspond to the max. permissible input voltage of the external SELV power supply.

6.4.2 Connection To Power Supply VG230Ex E8PWS002 (Power Supply Unit In Hazardous Area)

The weighing terminal IT8000Ex (article-No. E8SYS0x1) is supplied ex factory with the following power supply unit:

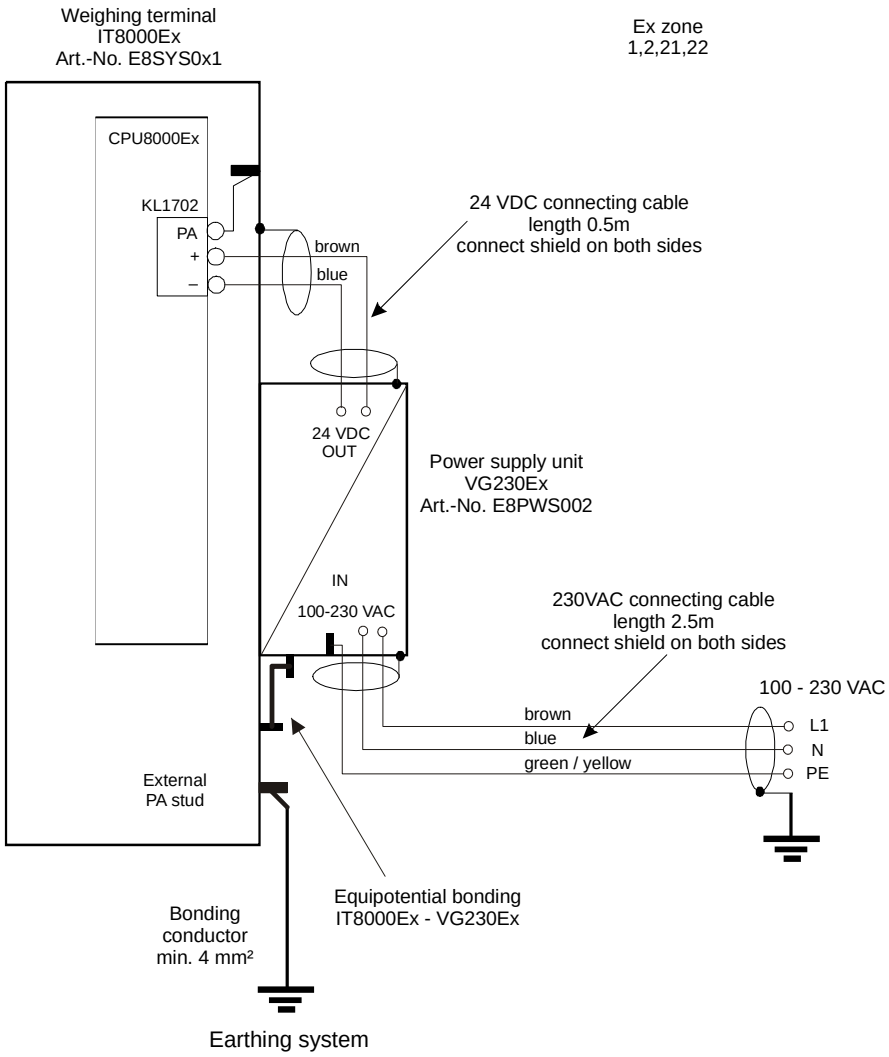
Art.-No. E8PWS002: power supply unit VG230Ex

The power supply unit VG230Ex is installed at the rear of the weighing terminal with two M4 bolts. It has two firmly connected cables with free ends. The first one with a length of 0.5m conducts the output voltage (OUT = 24VDC) and is directly lead through a cable gland into the housing of the weighing terminal where it is connected at terminal KL1702 of the CPU8000Ex.

The second cable with a length of 2.5m conducts the input voltage (IN = 100-230VAC) and is connected on site to the supply voltage 100-230VAC. The connection must be made in a junction box with Ex-e terminals and appropriate Ex protection. The weighing terminal and the power supply unit VG230Ex are suitable for installation in Ex zone 1, 2, 21 and 22. The bolt for potential equalization of the power supply unit is connected with a bonding conductor to the rear plate of the weighing terminal. The Technical Manual of the power supply unit VG230Ex (ST.2309.xxxx) must be observed!

Ex	**Power supply unit and weighing terminal must be installed in compliance with EN 60079-14 or EN61241-14 and must be integrated into the equipotential bonding system of the installation.**

Rear view of the weighing terminal IT8000Ex (E8SYS001) with assembled power supply unit VG230Ex (E8PWS002).



Connecting diagram IT8000Ex (E8SYS0x1) to power supply unit VG230Ex (E8PWS002)

6.4.3 Connection To Power Supply Unit 230VAC/24VDC E3OPT901/902 (Power Supply Unit In Safe Area)

If 24VDC power to the weighing terminal IT8000Ex (art.-No. E8SYS0x5) is to be supplied from the safe area, one of the following power supply units can be used:

1) Art.-No. E3OPT901: Power supply unit 230VAC/24VDC for installation on DIN rail

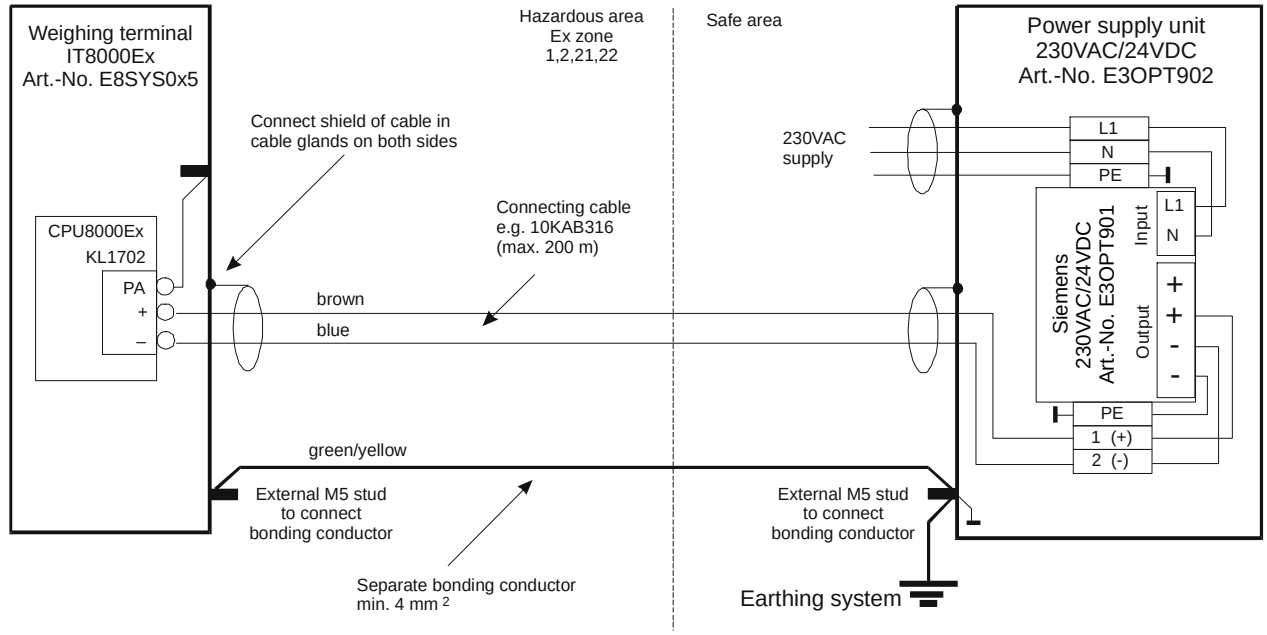
This powers upply unit (Siemens make) must be installed on DIN rail and incorporated into a metal housing, protected to IP54 or better (by others). It has screw terminals for the connection of input voltage (230VAC) and output voltage (24VDC). The metal housing (by others) and the minus connection of the output voltage must be grounded. The power supply unit must be installed in safe area. The instructions in the technical manual must be observed.

2) Art.-Nr. E3OPT902: Power supply unit 230VAC/24VDC in stainless steel housing

This is a power supply unit of Siemens make, incorporated in a stainless steel housing and pre-wired. It has a line cord of 2.5m length with grounded safety plug for the connection of the input voltage (230VAC) and screw terminals for the connection of the output voltage (24VDC). The power supply unit must be installed in safe area. The instructions in the technical manual must be observed.

For the connection of the power supply unit (E3OPT901 or E3OPT902) to the weighing terminal IT8000Ex only suitable shielded connecting cable, e.g. type SysTec art.-No. 10KAB316 may be used. The shield must be connected at both sides. The max. permissible length of cable is 200 m.

Ex	**Power supply unit and weighing terminal must be installed in compliance with EN 60079-14 or EN61241-14 and must be integrated into the equipotential bonding system of the installation.**



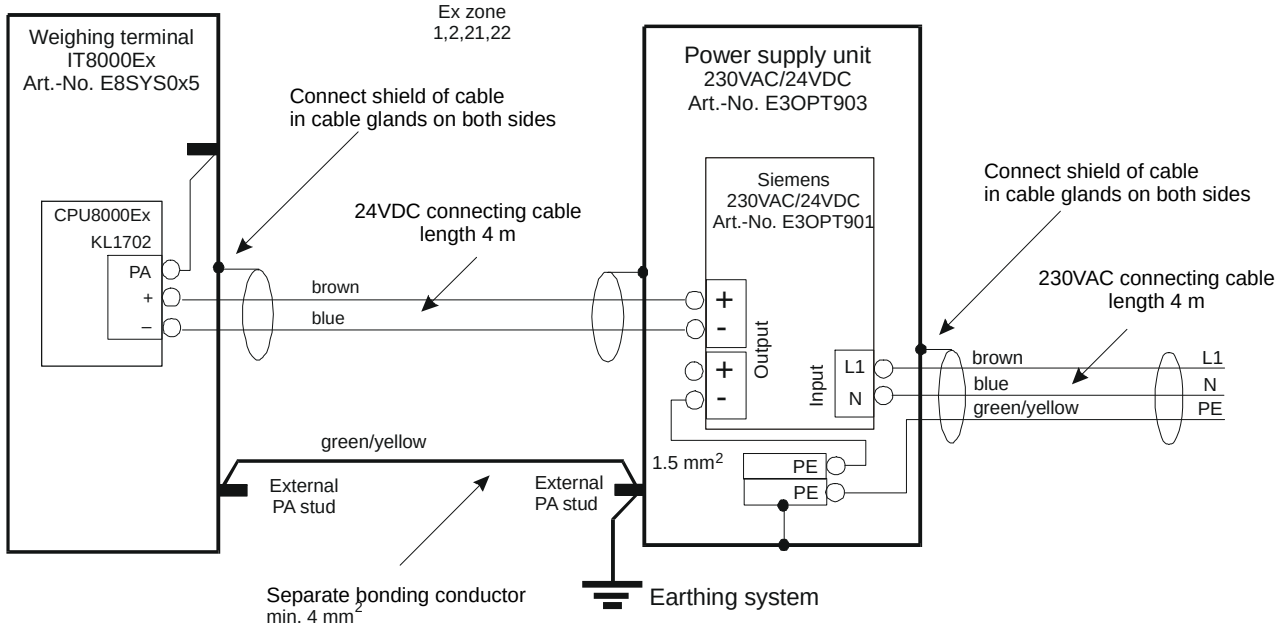
6.4.4 Connection To Power Supply Unit 230VAC/24VDC E8OPT903 (Power Supply Unit In Hazardous Area)

If 24VDC power supply of the IT8000Ex weighing terminal (article-No. E8SYS0x5) is to be made from a power supply unit installes in hazardous area, the following power supply unit can be used:

Art.-No. E3OPT903: Power supply unit 230VAC/24VDC for installation in hazardous area

This is a power supply unit of Siemens make which is incorporated in a metallic Ex-d housing and pre-wired. It has a line cord of 4m length with free ends for the connection of the mains supply (230VAC) and an output cable of 4m length for the connection of the output voltage (24VDC). The power supply unit may be installed in Ex zones 1, 2, 21 or 22. The 230V input voltage must be connected in a junction box with Ex-e terminals and suitable type of protection. The 24VDC output voltage can be connected directly at the Ex-e terminals of the weighing terminal. The instructions in the technical manual must be observed.

Ex	**Power supply unit and weighing terminal must be installed in compliance with EN 60079-14 or EN61241-14 and must be integrated into the equipotential bonding system of the installation.**



6.4.5 External Rechargeable Battery

A rechargeable battery intended as external power supply of the IT8000Ex weighing terminal (E8SYS0x6 / E8SYS0x7) must comply with one of the specifications below:

1. AkkuBox Ex; 12VDC with miniCLIX connector, for use in Ex zone 1 and 2, 21 and 22
   SysTec Article-No. E3AKK001
2. AkkuBox Ex; 12VDC, with DXN1 connector, for use in Ex zone 1 and 2, 21 and 22
   SysTec Article-No. E3AKK002
3. Equivalent battery complying with the following specification:
   - Nominal voltage Un = 12 - 30 VDC
   - Max. voltage for safety as per EN60079-11:2007 section 3.16: Um = 60 VDC
   - Output current limited to 10A
   - Rechargeable battery incorporated in metal housing (observe equipotential bonding, see chapter 'Equipotential Bonding')
   - If the rechargeable battery is to be used in hazardous area, it must comply with a suitable type of protection.
   - Connecting cable from battery to weighing terminal must be shielded. The shield must be connected on both sides.
     Use only suitable cable in compliance with EN60079-14:2003 section 9.

Observe the instructions in the technical manual of the rechargeable battery.

⚠ Ex	**The max. voltage for safety of the weighing terminal as per EN60079-11:2007 section 3.16 is Um = 60 VDC. This must be guaranteed by the external battery.**

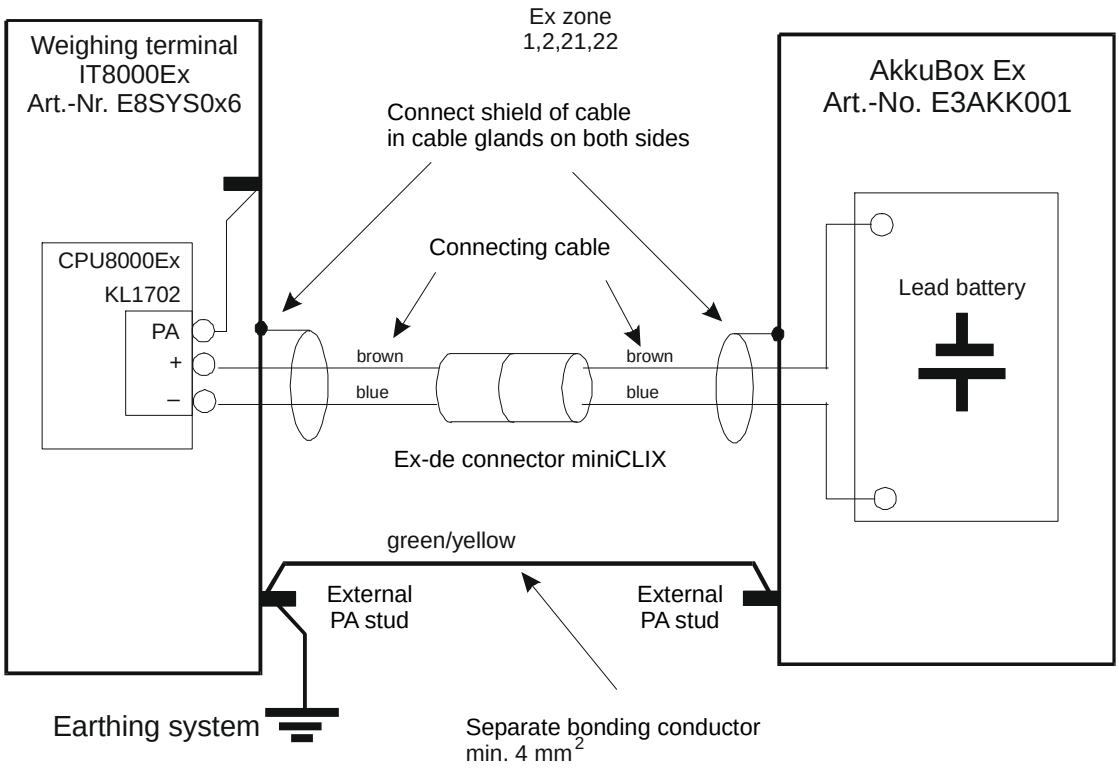
6.4.6 Connection To External AkkuBox Ex With miniCLIX Connector E3AKK001 (AkkuBox In Hazardous Area)

For the supply of the IT8000Ex weighing terminal (article-No. E8SYS0x6) in hazardous area, a 12V rechargeable SysTec battery is available:

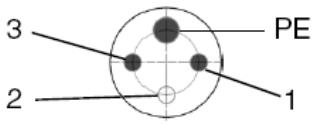
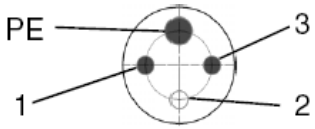
Art.-No. E3AKK001: AkkuBox Ex rechargeable battery with miniCLIX connector for use in hazardous area

This is a rechargeable lead battery, incorporated in a metallic Ex-e housing. It is prewired with a short connecting cable and Ex-de connectors (Stahl make, miniCLIX series). The AkkuBox can be used in Ex-zone 1, 2, 21 or 22. The Technical Manual of the AkkuBox Ex and the operating instructions 'Ex connectors mini Clix series 8591' must be observed.

⚠ Ex	AkkuBox and weighing terminal must be installed in compliance with EN 60079-14 or EN61241-14 and must be integrated in the equipotential bonding system of the installation.



Pin assignment of miniCLIX connector:

No. of pins	Coding	Female connector / socket e.g. AkkuBox Ex	Male connector IT8000Ex
2 + PE	12 h		

Assignment

Pin	Voltage
1	12VDC
2	not used
3	GND
PE	Shield

Instructions for connecting and separating connectors:

- Before plugging in check connectors for any damages.

- Align male/female connectors along groove (1).
- Push components together up to stop position (2).

- Twist right approx. 30° up to stop (3).
- Push connectors together completely (4).
- Fasten coupling ring tightly (5). This procedure provides for mechanical connection, electrical contact and IP protection.
- Disconnect in reverse order.

Ex	Absolutely adhere to the operating instructions 'Ex connectors mini Clix series 8591'.
	Components must have identical coding, or damages to connector / socket cannot be ruled out.
	The connector cable must be firmly installed in a suitable way to protect it against mechanical damage. An appropriate type of cable must be chosen that complies with the thermal and mechanical requirements at the place of installation.
	If connectors are not connected correctly, protection against risk of explosion is no longer ensured. Strictly follow the instructions!
	Immediately after disconnecting, cover voltage-conducting components with protective cap!

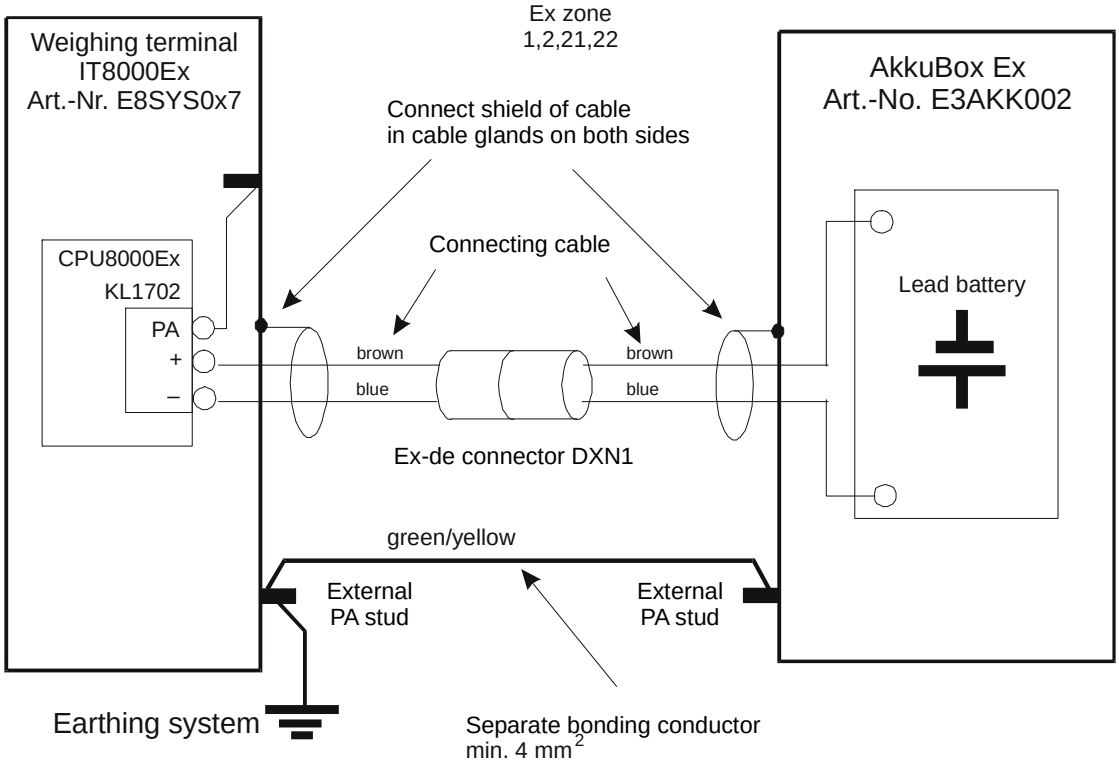
6.4.7 Connection To External AkkuBox Ex With DXN1 Connector E8AKK002 (AkkuBox In Hazardous Area)

For the supply of the IT8000Ex weighing terminal (article-No. E8SYS0x7) in hazardous area, a 12V rechargeable SysTec battery is available:

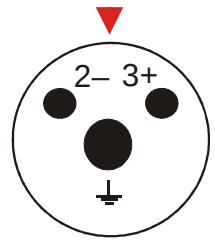
Art.-N. E3AKK002: AkkuBox rechargeable battery with DXN1 connector for use in hazardous area

This is a rechargeable lead battery, incorporated in a metallic Ex-e housing. It is prewired with a short connecting cable and Ex-de connectors (Marechal make, type DXN1). The AkkuBox can be used in Ex-zone 1, 2, 21 or 22. The Technical Manual of the AkkuBox Ex and the operating instructions 'Ex connectors DXN1' must be observed.

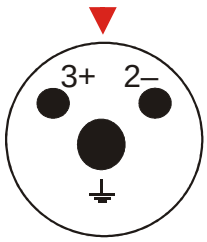
Ex	**AkkuBox and weighing terminal must be installed in compliance with EN 60079-14 or EN61241-14 and must be integrated in the equipotential bonding system of the installation.**



Assignment DXN1 connector:



Top view socket



Top view connector

DXN1 Pin	Assignment
1	not used
2–	GND
3+	+12 VDC
PE	Shield
N	not used

Instructions for connecting and separating connectors:

1. Open protective caps before plugging and check connector/socket for damages.
2. Align male/female connectors along red arrows and insert into groove.

1)  2) 

3. Turn connector/socket right by approx. 45° to stop.
4. Plug in connector/socket until they click into place and are held by the blue hook.

3)  4) 

Disconnect in reverse order.

Ex	Absolutely adhere to the operating instructions 'DXN' provided by Marechal
	Components must have identical coding, or damages to connector / socket cannot be ruled out.
	The connector cable must be firmly installed in a suitable way to protect it against mechanical damage. An appropriate type of cable must be chosen that complies with the thermal and mechanical requirements at the place of installation.
	If connectors are not connected correctly, protection against risk of explosion is no longer ensured. Strictly follow the instructions!
	Immediately after disconnecting, cover voltage-conducting components with protective cap!

6.5 Connection Of Scale

6.5.1 Connection Of Loadcells

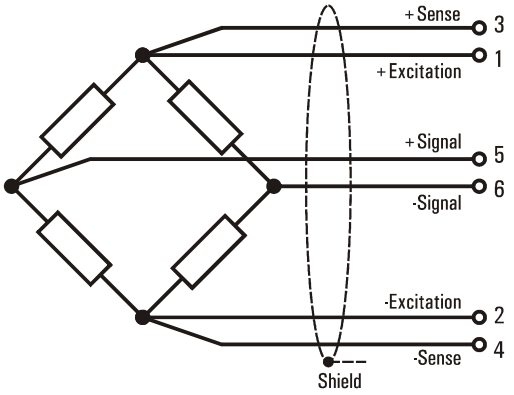
The scale interface module ADM8000-Exi is plugged into the ADM socket on the CPU8000Ex and must be fastened with the screws that are part of the delivery.

The **A**nalog **D**igital **M**odul ADM8000-Exi provides connection of one analog Ex scale base as specified below:

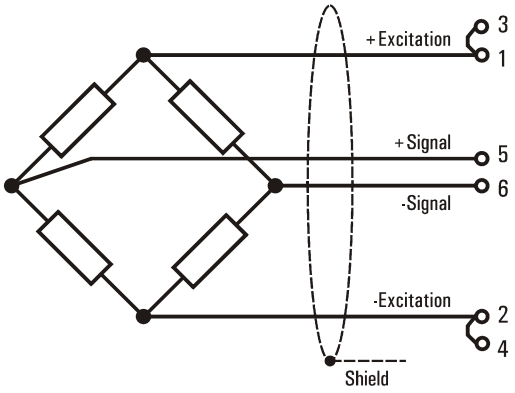
- Intrinsically safe strain gauge loadcells with an overall impedance from 43 Ω to 4500 Ω
- Connection in 4- or 6-wire mode

Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**

Principal schematics of 6-wire and 4-wire Ex strain gauge loadcell

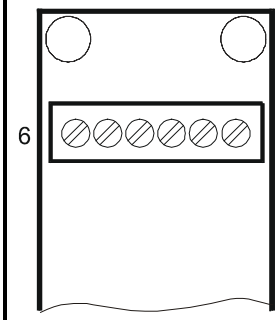


6-wire loadcell



4-wire loadcell

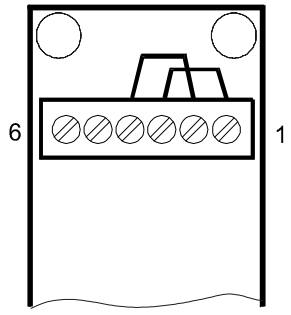
Connection of 6-wire Ex loadcell to ADM8000-Exi module:



Module: ADM8000-Exi **Terminal: KL1** **Terminal assignment**	
1	+ Excitation
2	– Excitation
3	+ Sense
4	– Sense
5	+ Signal
6	– Signal

Connection of 4-wire Ex loadcell to ADM8000-Exi module:

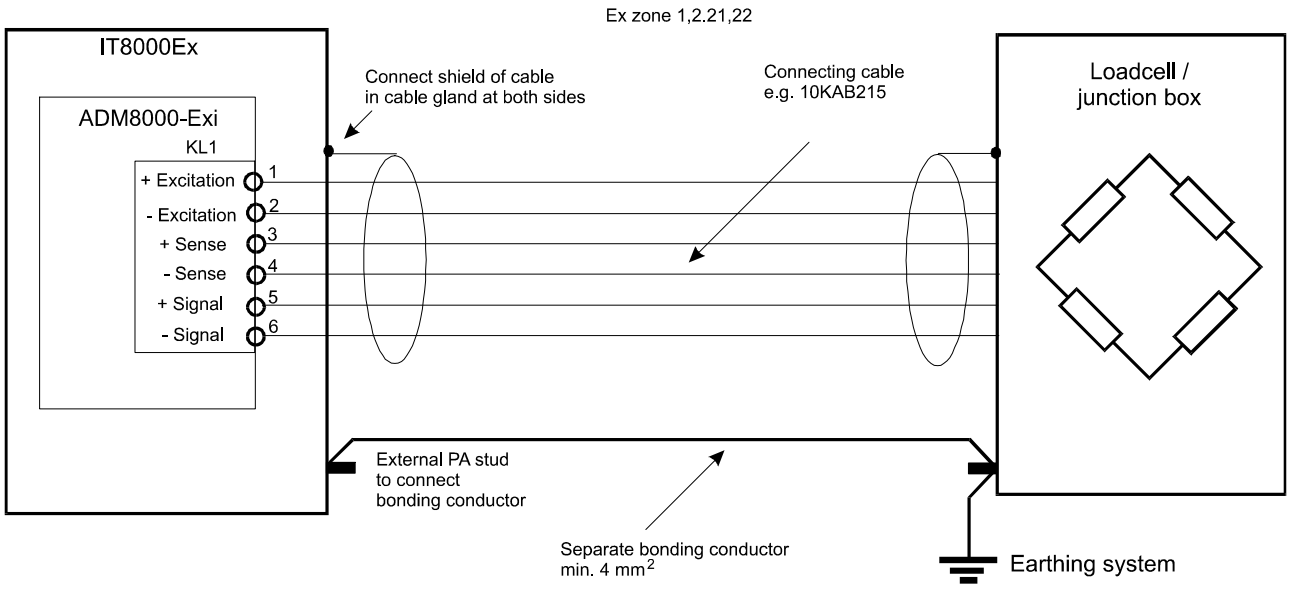
To connect loadcells without sense lines (4-wire connection), two jump leads must be connected at terminal row KL1 between terminal 1 and 3, and between terminal 2 and 4.



Module: ADM8000-Exi **Terminal: KL1** **Terminal assignment**	
1	+ Excitation
2	– Excitation
3	+ Excitation
4	– Excitation
5	+ Signal
6	– Signal

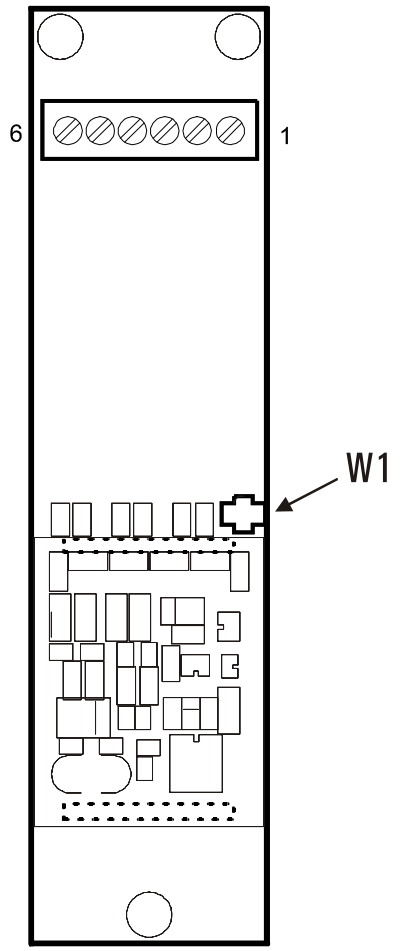
Use only suitable shielded cable, e.g. SysTec article-No. 10KAB215. Connect shield on both sides.

Principal schematics for connection of ADM8000-Exi to 6-wire loadcell / junction box



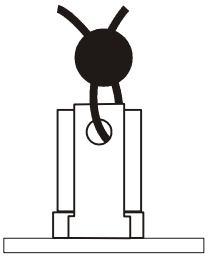
6.5.2 Securing Scale Parameters (W&M Approved Applications)

The scale parameters are stored in EEPROM and secured with the jumper W1:



Calibration data secured

W&M approved applications require that the calibration parameters be protected against unauthorized modifications. To that effect the jumper can be sealed with thread and lead seal.



For a description of the scale calibration refer to the following manual:
IT8000/IT8000Ex/IT9000E Calibration Instructions in English, No. ST.2309.0688.

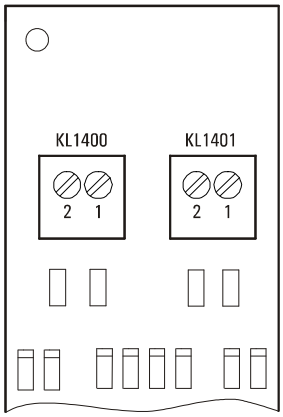
6.6 Connection Of Interfaces

6.6.1 Plug-on Module RS485-Exi

The interface module RS485-Exi is plugged into the SIM1 or SIM2 socket provided on the CPU8000Ex and must be fastened with the screws that are part of the delivery.

The RS485-Exi interface module permits the connection of a suitable interface coupler, e.g. 'Stahl 9185' (SysTec article-No. E8OPT600).

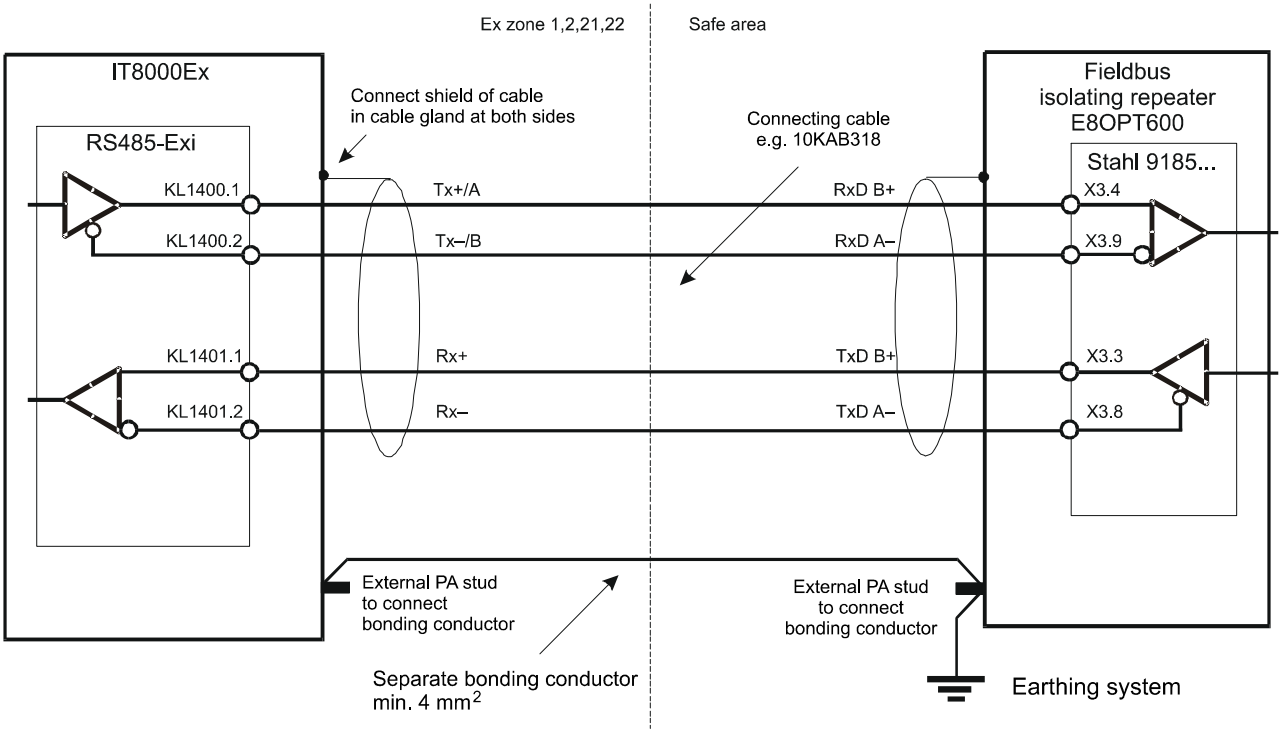
Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**



Module: RS485-Exi **Terminal: KL1400-KL1401** **Terminal assignment**	
1400.1	Tx + /A
1400.2	Tx — /B
1401.1	Rx +
1401.2	Rx —

The interface coupler must be installed in safe area. The weighing terminal and the interface coupler must be integrated into the equipotential bonding of the installation. Only suitable shielded cable e.g. SysTec article-No. 10KAB318 may be used. The shield must be connected on both sides.

Principal schematics for connection of RS485-Exi interface to fieldbus isolating repeater Stahl 9185

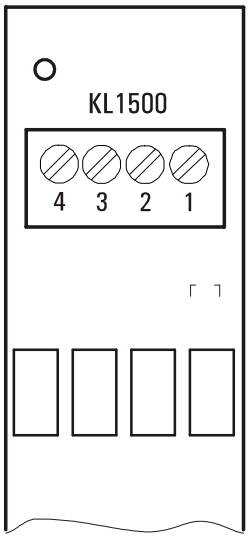


6.6.2 Plug-On Module S10mA-Exi

The interface module S10mA-Exi is plugged into the SIM1 or SIM2 socket provided on the CPU8000Ex and must be fastened with the screws that are part of the delivery.

The S10mA-Exi interface module permits the connection of the separation module TS3000 or the ExtensionBox via an intrinsically safe serial interface.

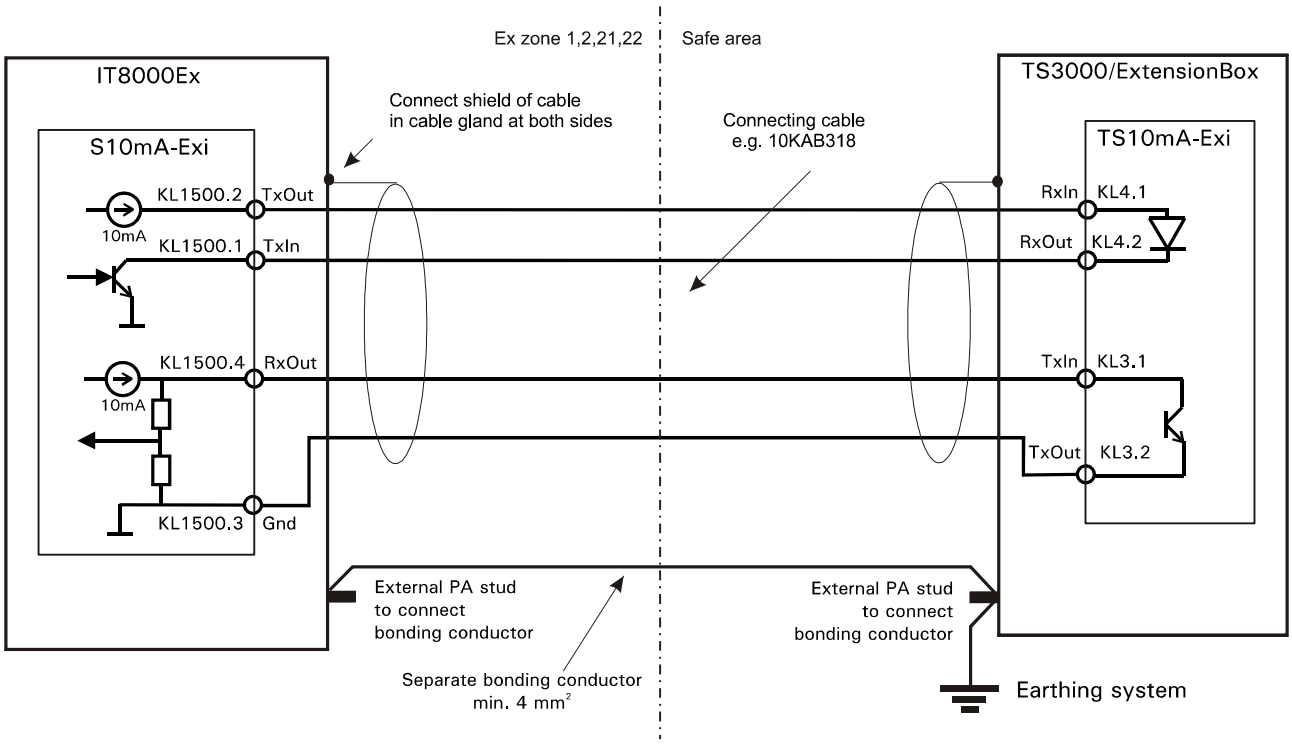
Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**



Module: S10mA-Exi Terminal: KL1500 Terminal assignment	
1500.1	TxIn
1500.2	TxOut
1500.3	GND
1500.4	RxOUT

The interface coupler TS3000 or the ExtensionBox must be installed in safe area. The weighing terminal and the interface coupler or the ExtensionBox must be integrated into the equipotential bonding of the installation. Only suitable shielded cable e.g. SysTec article-No. 10KAB318 may be used. The shield must be connected on both sides.

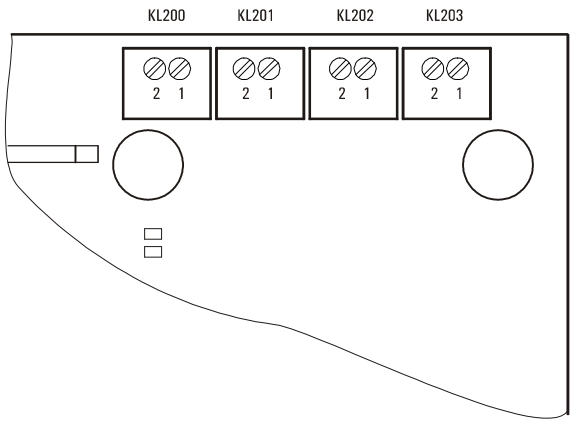
Principal schematics for the connection of the S10mA-Exi interface to the TS3000 ExtensionBox



6.6.3 Digital Inputs IN0 - IN3 On CPU8000Ex

The intrinsically safe digital inputs IN0 - IN3 can be connected at terminals KL200 - KL203. Up to 4 potential free contacts can be connected.

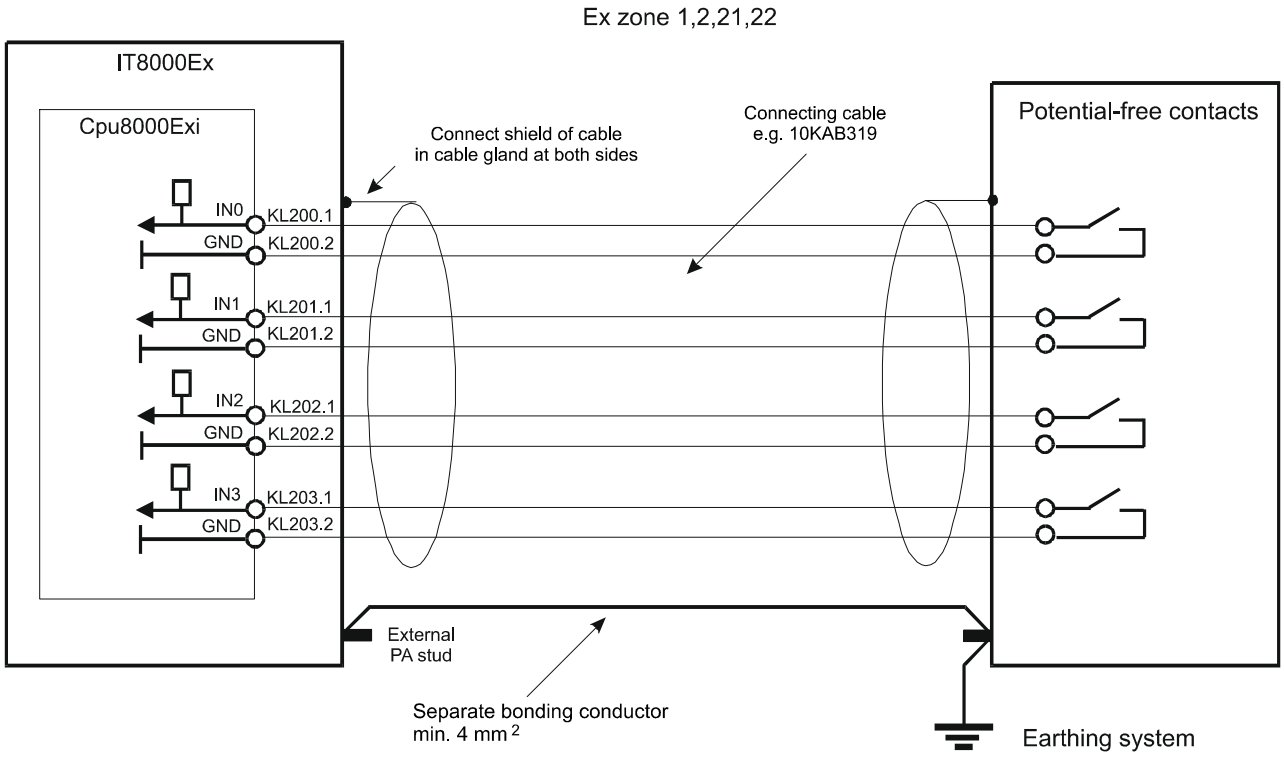
Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**



Module: CPU8000Exi Terminal: KL200-203 Terminal assignment	
KL200.1	IN0
KL200.2	GND
KL201.1	IN1
KL201.2	GND
KL202.1	IN2
KL202.2	GND
KL203.1	IN3
KL203.2	GND

Only suitable shielded cable e.g. SysTec article-No. 10KAB319 may be used. The shield must be connected on both sides.

Principal schematics for the connection of the digital inputs

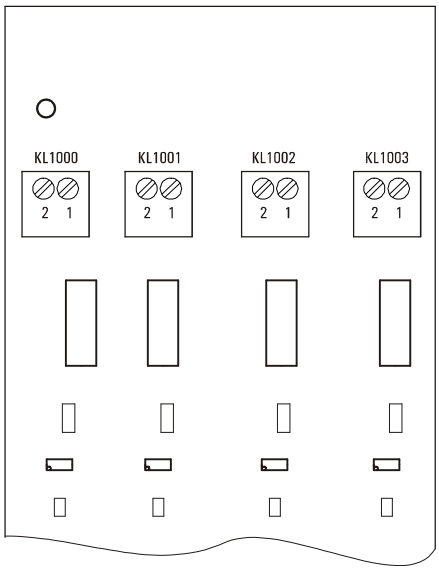


6.6.4 Transistor Output Module OUT4-Exi

There are 4 intrinsically safe digital transistor outputs on the plug-on board OUT4-Exi. They can be used to connect 4 intrinsically safe piezoelectric valves.

The nominal values of each of the outputs are 2mA @ 5VDC.

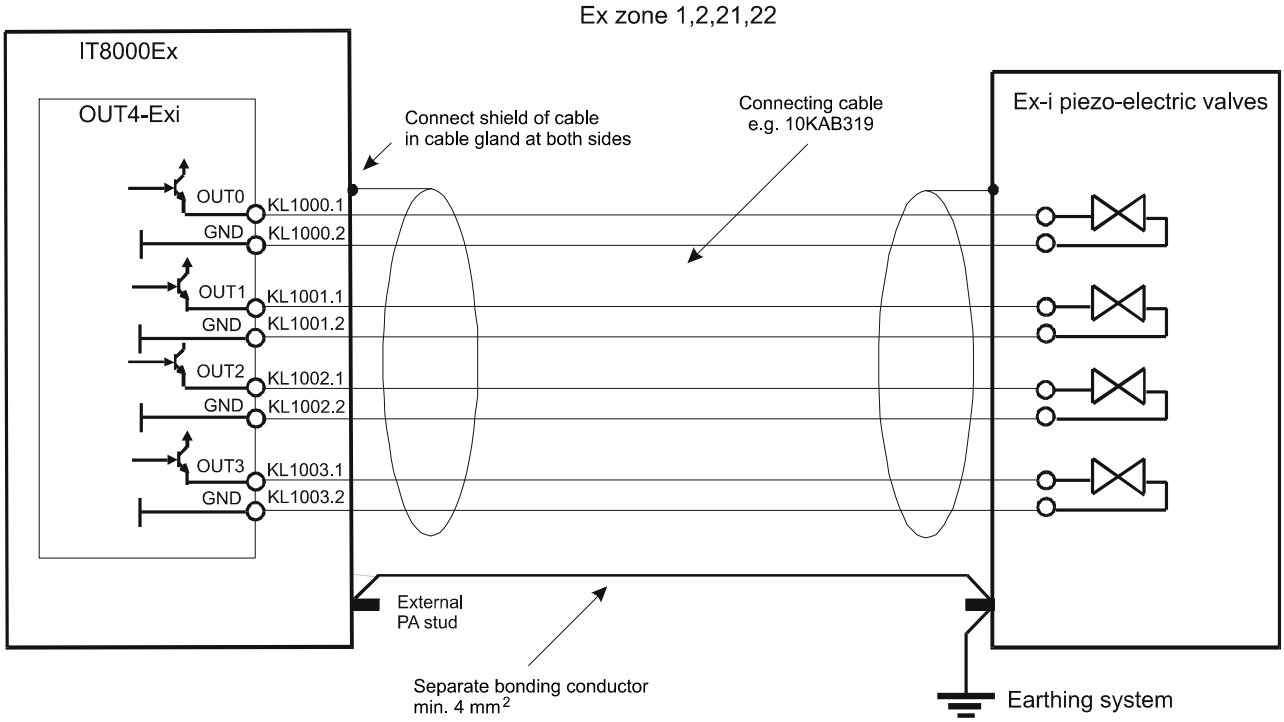
Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**



Module: OUT4-Exi Terminal: KL1000-1003 Terminal assignment	
KL1000.1	OUT0
KL1000.2	GND
KL1001.1	OUT1
KL1001.2	GND
KL1002.1	OUT2
KL1002.2	GND
KL1003.1	OUT3
KL1003.2	GND

Only suitable shielded cable e.g. SysTec article-No. 10KAB319 may be used. The shield must be connected on both sides.

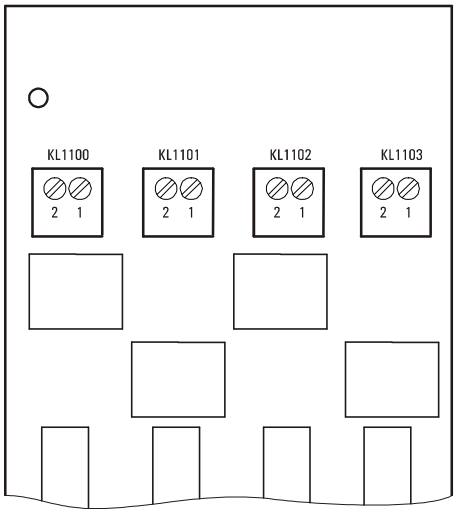
Principal schematics for the connection of the digital transistor outputs on the OUT4-Exi plug-on module



6.6.5 Relay Output Module REL4-Exi

Four intrinsically safe, potential-free relay outputs are available on the REL4-Exi plug-on module. There suitable intrinsically safe components, e.g. the isolated switch amplifier Pepperl & Fuchs KFA6-SR2-Ex2.W can be connected.

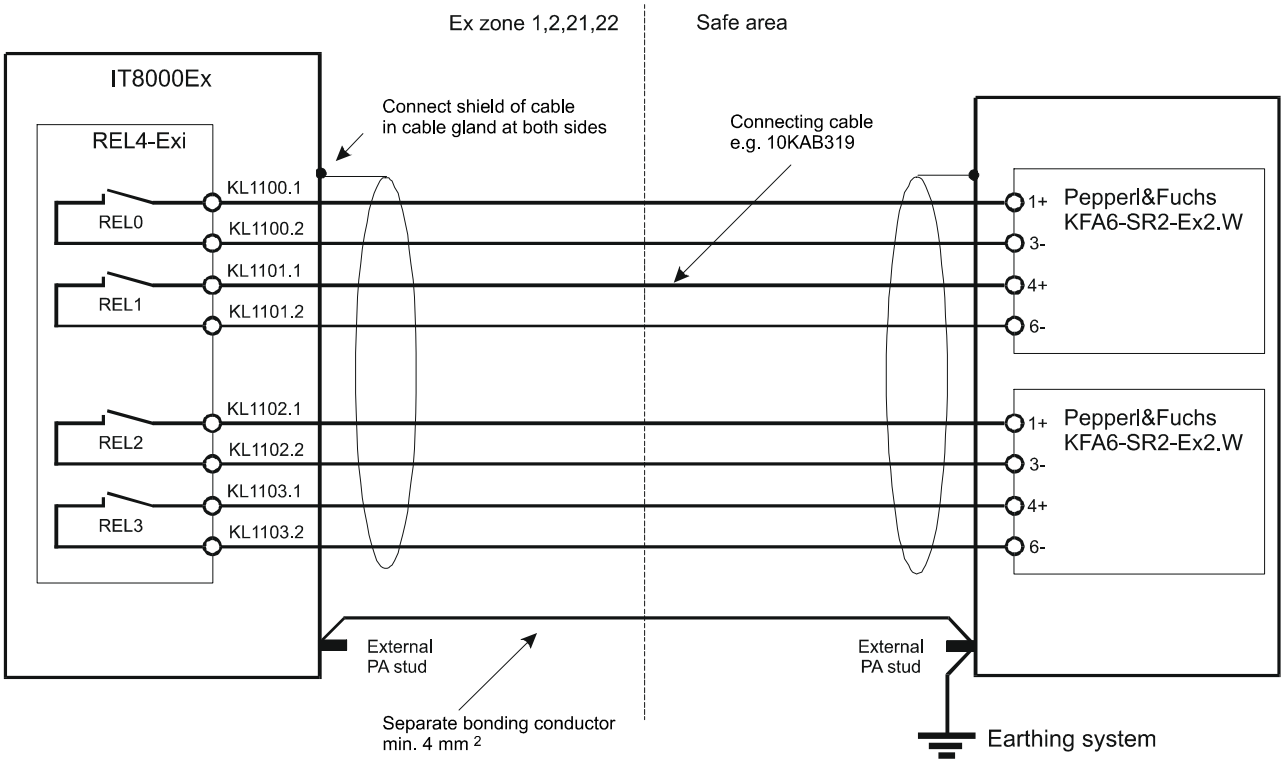
Ex **Documented evidence of intrinsic safety in compliance with EN 60079-14 is required.**



Module: REL4-Exi **Terminal: KL1100-K1103** **Terminal assignment**	
KL1100.1	REL0
KL1100.2	
KL1101.1	REL1
KL1101.2	
KL1102.1	REL2
KL1102.2	
KL1103.1	REL3
KL1103.2	

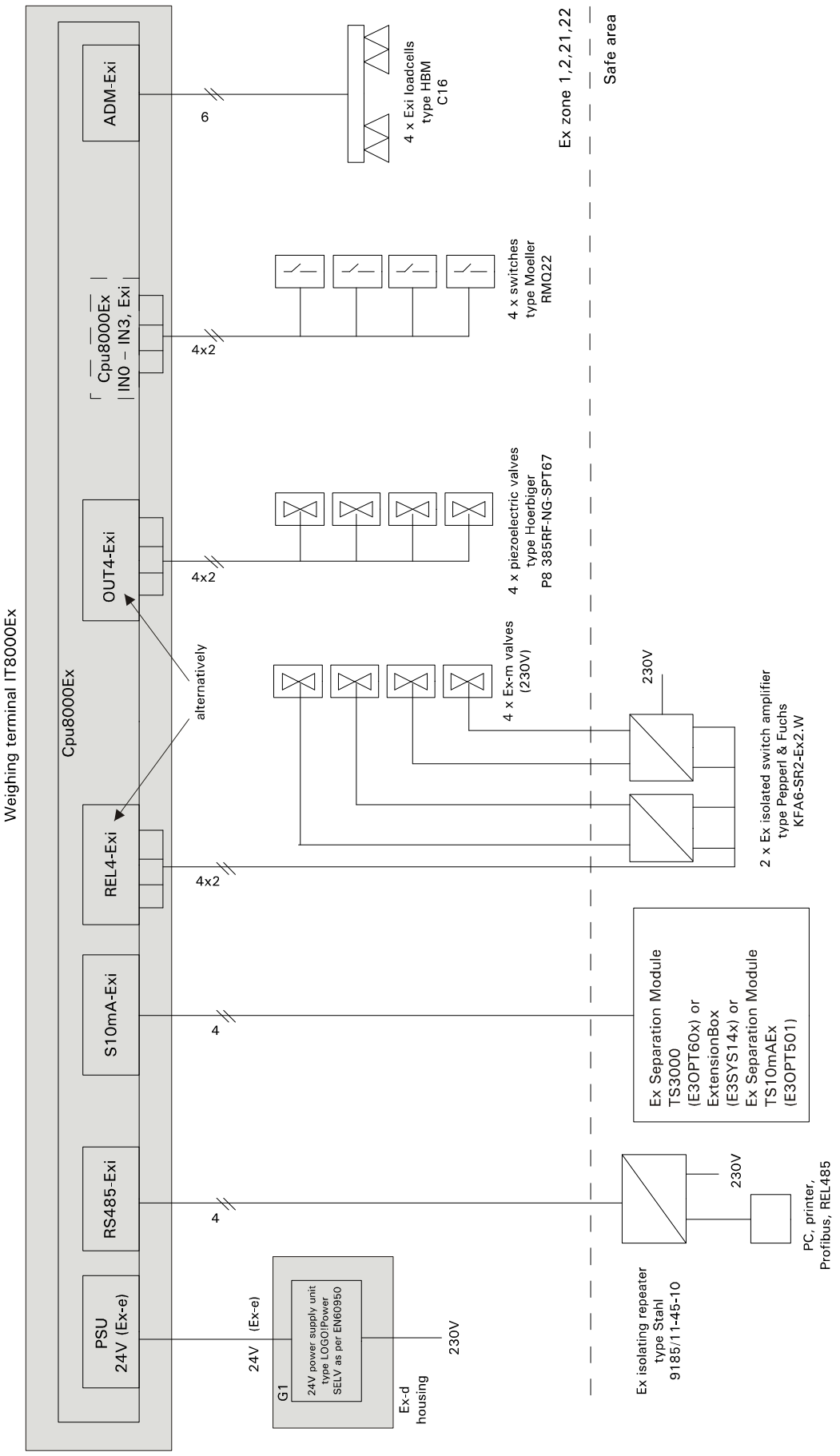
Only suitable shielded cable e.g. SysTec article-No. 10KAB319 may be used. The shield must be connected on both sides.

Principal schematics for the connection of the digital relay outputs on the REL4-Exi plug-on module



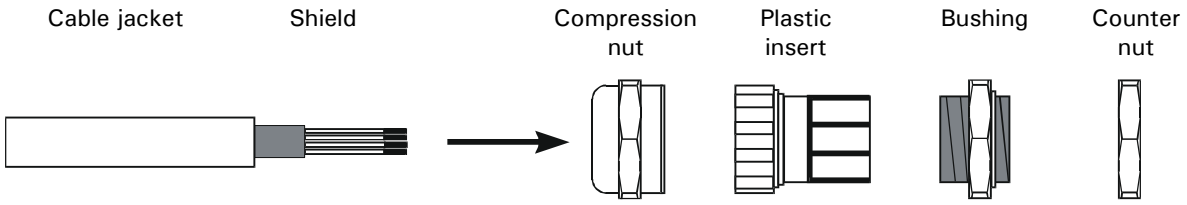
6.7 Installation Example IT8000Ex

Shown below is a typical system configuration:



6.8 Installation Of Cables

All cables are led into the housing through cable glands.



Cable connection through cable glands:

1. Slide compression nut over cable jacket;
2. Slide plastic insert (retainer) over cable jacket until inner end is aligned with cut end of jacket;
3. Unravel shield, bend over retainer and push into retaining comb to ensure good conductive contact with housing. Cut wires of shield to length of comb, avoid protruding wires that would endanger tightness of cable gland;
4. Insert retainer with cable into bushing;
5. Screw compression nut onto bushing and use wrench to tighten securely.

Ex **Use crimped wire end ferrules with plastic collar on stranded cables and avoid protruding wires!**

7 Commissioning

7.1 General

Prior to start up follow the check list below:

Ex	Check to make sure that during commissioning no potentially explosive atmosphere can be present.
	Check whether the conditions concerning the intended use are fulfilled (see section 'Utilization').
	Check assembly as described in 'Assembly'.
	Check of installation (equipotential bonding, connection of external components) as described in chapter 'Installation'.
	Check of documented evidence of intrinsic safety in compliance with EN 60079-14.
	Check whether housing is thoroughly closed with all hexagonal srews tightly fastened.
	Check to make sure that the components connected to the outputs and interfaces (valves, movable parts) cannot cause any damage.
	Switch on supply voltage.
	Configure weighing terminal (interface parameters...) in the Service Mode as described in section 'Service Mode'.
	Calibrate scale as described in Calibration Instructions.
	Test inputs/outputs, serial interface and scale function in Service Mode as described in section 'Hardware Test'.

8 Service Mode

8.1 General

The Service Mode is a program for configuration, calibration and hardware test of the IT8000Ex weighing terminal. In the configuration the operating sequence and the print format are defined. The following sections give an introduction on how to operate the terminal via keyboard and display and describe the individual functions of the Service Mode.

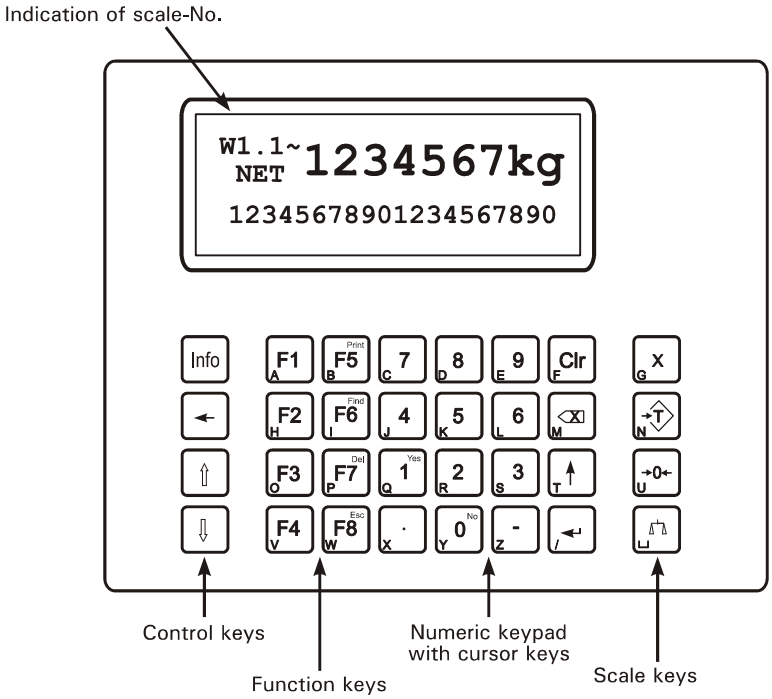
IT8000Ex and its associated equipment must be installed, adjusted and maintained by qualified personnel only!

Before accessing the Service Mode all peripheral devices must be installed and configured!

Access to the Service Mode is protected by the Service Password (see also last page of this manual).

Inappropriate changes of Service Mode settings may lead to malfunction and errors in the operating sequence!

8.2 Display And Keyboard



Upper display line		Gross or net weight or headline of special functions *)		
Lower display line		Prompts, left justified, or parameter entry, right justified *)		
Special keys	**Info**	Forward scrolling		
	←	Backwards scrolling		
	⇑ **Info**	Access to Service Mode		
	⇑	Pressed simultaneously with alpha key: upper case letter		
	⇓	Pressed simultaneously with alpha key: lower case letter		
	⇑	Press three times: activate contrast adjustment, increase contrast		
	⇓	Press three times: activate contrast adjustment, reduce contrast		
Function keys	**F1 - F4**	Functions depending on application program		
	F5 (Print)	Print	**F6 (Find)**	Search entry
	F7 (Delete)	Delete entry	**F8 (Esc)**	Abort function
Clear keys	**Clr**	Clear entry		
	⌫	Delete last character		
Cursor key	↑	Return to previous program step		
Enter key	↵	Confirm entry, continue with next program step		
Scale keys	**X**	Show net weight with tenfold resolution for 5 sec (only in tare step of operating mode Simple Weighing, if enabled in Service Mode)		
	→T←	Automatic taring, if scale is tared: clear tare		
	→0←	Set selected scale to zero		
	⚖	Select scale (not supported by IT8000Ex)		

*) Depending on the application program the display may be subdivided in a different way (e.g. 4 lines).

8.3 Operator Prompting

The following sections describe the operating sequence with operator prompts and the requested entries. In the Service Mode only two out of the maximum of 4 lines are used.

The content of the terminal display is shown in a frame on the left hand side. Next to the display the possible operator entries are listed, on the right hand side comments and explanations are shown.

Example:

```
   Service Mode
Password        ????
```

Entry of the 4-character service password

↑ Return to normal operation

Prompts or entries that apply only under certain conditions are shown in an extra frame. The condition is shown in bold face in the upper left hand corner of the frame.

Example:

If detail ident data is specified:

```
 Detail Ident Data
Delete after print Y
```

1,Y ID is cleared after printing.
0,N ID data is not cleared.

This display appears only if ID has been specified.

Enter Key ↵ and ↑-Key

In all program steps, unless otherwise specified, the Enter-key ↵ leads to the next step. Pressing the ↑-key leads to the previous step.

Parameter Choice, e.g. 'Product No. 99':

In program steps that require the selection of a parameter, the options can be displayed by means of the Info-key (scrolling). By pushing the Enter-key ↵ the displayed parameter is selected. The selection can be exited via the ↑-key.

Select Functions, e.g. 'Select Function 1-2':

In program steps that require the selection of a function, the options can be displayed by means of the Info-key (scrolling). By pressing the Enter-key ↵ the displayed function is selected. Alternatively, the function can also be started directly by entering the corresponding number in the step 'Select function'. Function selection can be exited by pressing the ↑-key.

Confirmation with Y (1) or N (0):

A prompt such as 'Save parameters? Y' is confirmed by pressing the key #1 and subsequently the ↵ -key. By pressing key #0 and ↵ -key the proposed action is rejected and in this example the parameters are not saved.

Numeric Entries (Numerals Only):

A requested numeric entry is depicted by '**99999**'. The length of the string corresponds to the maximum length of the entry, (e.g.: 99 = 2 digits, numeric).

Numeric entries are made from right to the left. As defined in the program, entry of decimal point and minus sign may be accepted. Fixed point data entries already show the right number of decimals

Alphanumeric Entry (Letters and Numerals):

A requested alphanumeric entry is depicted by '**XXXXXXX**'. The number of x characters corresponds to the length of the entry. Alphanumeric data entry is made from left to right. If the number of characters to be entered is greater than the number of characters that can be shown on the display, the content of the display is shifted to the left by one position for every newly entered character. By pressing the ← key the entry can be scrolled to the left - simultaneously pressing the ⇑ and ← keys scrolls the entry to the right.

Adjusting the contrast of the display:

As of version RTP 6.06 of the operating system **and** IT8000-CPU Index 006, the contrast of the display can be adjusted via the keyboard. Press the key ⇑ or ⇓ three times to activate the adjustment. Then press the ⇑ or ⇓ key again to increase or reduce the contrast in steps. Press any other key to exit adjustment..

8.4 Overview

After the power up messages with display of program version, date and time, the scale is started and the program proceeds to the initial step.

```
W1            0 kg
IT8000  XXXXX  V9.99
```

While program name and version number is displayed Service Mode can be accessed by simultaneously pressing the shift ⇑ and Info keys.

Während der kurzzeitigen Anzeige von Produkt-Bezeichnung und Versionsnummer gelangt man durch gleichzeitiges Drücken der Umschalttaste ⇑ und der Info-Taste in den Service Mode. (Bei Bildschirm-Geräten bitte nachfolgend angegebene Tasten verwenden.)

⇑ **Info** Call up Service Mode

```
    Service Mode
Password        ????
```

Entry of the 4-digit service password

↑ Return to normal operation

```
    Service Mode
  Select Group 1-7
```

1 Interface configuration

2 Header ident data

3 Detail ident data

4 Application setup

5 Data backup

6 Hardware test

7 S5 Data block

Info Scrolling

F5 Print Setup and configuration data

← Backwards scrolling

↑ Return to normal operation

When Service Mode is exited, the entered or modified parameters are stored. Parameters of the groups 1 and 4 (and the factory setting of the device assignment) are stored in Flash-EPROM, whereas all other parameters are stored in RAM. While Flash-EPROM is updated, a corresponding message is displayed:

Storing Parameters Please Wait...

Display while Flash-EPROM is updated

CAUTION
- **By no means switch off power during this operation, because that will inevitably destroy the contents of the Flash-EPROM and thus the program.**

Note: If the **Info-key** is pressed after power up, the version and the checksum of the RTP operating system is temporarily displayed.

RTP7.2 ID:9999999999

Version and checksum of RTP operating system.

8.5 Interface Configuration

Service Mode Select Group 1-7

1 Interface configuration

Serial Interfaces Scale 1 ADC

Info Select scale driver:

ADC	= Analog L/C connected to ADM	
Mettler	= *Mettler IDNet protocol*	*1)*
Sartorius	= *MC1 compatible protocol (SBI)*	*1)*
Summing	= *Summing scale*	*1)*
IS Scale	= *Sartorius IS platform*	*1)*
HBM C16i	= *Digital HBM loadcell*	*1)*
REVERE SLC	= *Digital Revere SLC loadcell*	*1)*
Disabled	= Scale temporarily out of operation	
off	= No scale	

1) Important note: These functions of the RTP operating system are not supported by IT8000Ex. The IT8000Ex weighing terminal is solely designed for connection to one platform with approved analog loadcells via the ADM8000-Exi weighing module! The correct setting is 'Scale 1 ADC'.

ADC selected:

Serial Interfaces Scale 1 Intern

Info For IT8000Ex this parameter must be set to 'Intern'.

Serial Interfaces Scale 2 OFF

Info For IT8000Ex this parameter must be set to 'OFF'.

Serial Interfaces Com1 Baudrate 99999

Info Select baud rate for serial interface #1, options:
300, 600, 1200, 2400, 4800, 9600, 19200

```
Serial Interfaces
Com1 Data Format  XX
```

Info Select data format for serial interface #1, options:

7N	= 7 data bits, no parity
7E	= 7 data bits, even parity
7O	= 7 data bits, odd parity
8N	= 8 data bits, no parity
8E	= 8 data bits, even parity
8O	= 8 data bits, odd parity

Always 1 stop bit is transmitted.

```
Serial Interfaces
Com1 Handshake   XXX
```

Info Select hardware handshake for interface #1, options:

CTS	= Control via RTS/CTS
XON	= Control via XON/XOFF
HDX	= Half duplex (for RS485)
4W_XON	= Control via XON/XOFF for 4-wire RS485 connection
–––	= No handshake

Setting of RS485 interfaces:

RS485 2-wire	HDX
RS485 4-wire, MultiDrop *)	HDX
RS485 4-wire, *) SysTec Multidrop protocol for PC *BATCH*	–––
RS485 4-wire software handshake	4W_XON

*) The connection from hazardous area (interface module RS485-Exi) to safe area (Ex fieldbus isolating repeater) must only be made in point-to-point connection.

```
Serial Interfaces
Com1 Protcl. XXXXXXX
```

Info Select protocol for interface #1, options:

TTY	Printer protocol (data only)
EPSON	Printer protocol EPSON ESC/P®
AckNak	Standard protocol (see below)
No-Ack	Standard protocol (see below)
Du3964	DUST 3964 (R)
RK512	RK512 telegram
SinecL1	Sinec L1 (point to point connection for I/Os) [1]
Ext.Bus	External Bus: DeviceBus for Sinec L2 or external IT8000Ex extensions [2]
Special	(application-specific)

[1] The Sinec L1 procedure is only implemented because of compatibility with programs written prior to 1995. Do not use for new applications!

[2] By default the interface COM2 is intended for the connection of external IT8000Ex components and pre-configured for DeviceBus.

If EPSON was selected as transmission protocol:

```
Serial Interfaces
Com1 Remote Prt.   N
```

0,N Standard printer protocol

1,Y Remote printer protocol

If AckNak or No-Ack was selected as protocol:

```
 Serial Interfaces
Com1 Start Char. 999
```

Entry of start character as decimal value
(e.g. 2 = STX)

For entry '0' no start character is transmitted.

```
 Serial Interfaces
Com1 End Char.   999
```

Entry of end character as decimal value
(e.g. 3 = ETX)

For entry '0' no end character is transmitted.

```
 Serial Interfaces
Com1 Checksum    XXX
```

Info Select 1-Byte checksum to be transmitted after the end character

Options:
CPL = Complement of two
XOR = Exclusive-Or checksum
––– = No Checksum

Note: For a detailed description of the ACK/NAK protocol see annex.

If a checksum was selected and a start character specified:

```
 Serial Interfaces
Com1 With Strt Chr Y
```

1,Y The start character is included in the checksum

0,N The start character is not included in the checksum

If a checksum was selected and an end character specified:

```
 Serial Interfaces
Com1 With End Char Y
```

1,Y The end character is included in the checksum

0,N The end character is not included in the checksum

If Du3964 was selected as transmission protocol:

```
 Serial Interfaces
Com1 With Checksum Y
```

1,Y Transmission with checksum (Dust3964R)

0,N Transmission without checksum

If RK512 was selected as transmission protocol:

```
 Serial Interfaces
Com1 Device-No.  999
```

Entry of target device-No.
(DB) 0–255

```
 Serial Interfaces
Com1 Word-No.    999
```

Entry of target word-No.
(DW) 0–255

If Sinec L1 was selected as transmission protocol:

```
 Serial Interfaces
Com1 Inp.Modules   9
```

Number of 8-bit input modules

```
 Serial Interfaces
Com1 Outp.Modules  9
```

Number of 8-bit output modules

Note: If Sinec L1 is selected, the digital I/Os of an S5 PLC are read and set via the serial interface (point to point connection). In this communication the IT8000Ex terminal is the master.

The parallel I/Os of the IT8000Ex are disabled.

If DeviceBus was selected as transmission protocol:

```
 Serial Interfaces
Com1 I/O-Module    9
```

Number of 8-bit input/output modules

```
 Serial Interfaces
Com1          SinecL2
```

Info Use Info-key to toggle:

SinecL2 or DeviceBus

Note: External IT8000Ex extensions are connected via the DeviceBus protocol (in combination with an RS485 interface). This applies to RS485 relay or transistor modules (REL485 / TRIO485) and analog 12-bit I/O modules. By default these extensions are assigned to interface COM2, which is configured to 'DeviceBus' and 'Number of I/O modules = 0'. When a value unequal 0 is entered, the I/Os of an external relay / transistor module are read and set via the serial interface. The parallel I/Os of the IT8000Rx are then disabled.

This feature is only available for relay and transistor modules with firmware 2.0 or higher, older versions cannot be connected.

Continued with settings for next interface.

8.6 Header Ident Data

If the application program supports the entry of IDs, they can be defined as 'Header Ident Data' and 'Detail Ident Data' in the Service Mode.

'Header Ident Data' are entered once -e.g. at the beginning of an order- and are valid for each item of the order. Example: Entry of '`Order-No. _____`' for an operating sequence with printout of a delivery note.

In the Service Mode up to 6 header IDs can be specified, including operator prompts and length of entry.

```
  Service Mode
Select Groupe 1-7
```

2 Header Ident Data

```
Header Ident Data 1
XXXXXXXXXXXXXXXXXXX
```

Entry of operator prompt for the first header-ID.

The length of the entry is specified by the number of remaining underline characters on the right hand side of the display. The length can be adjusted by entering space characters behind the operator prompt.

↑ Return to step '`Select Group`'

If ID was defined:

```
Header Ident Data 1
Delete After Print Y
```

1,Y The ID is cleared after printout.

0,N The ID is not cleared after printout.

Continued with next ID.

If no ID was defined, or after the sitxth ID, return to step '`Select Group`'.

8.7 Detail Ident Data

If the application program supports the entry of IDs, they can be defined as 'Header Ident Data' and 'Detail Ident Data' in the Service Mode.

'Detail Ident Data' are entered at the beginning of each weighing cycle.

Example: Entry of '`Article-No. _____`' for an operating sequence with printout of individual lines per article.

In the Service Mode up to 6 detail IDs can be specified, including operator prompts and length of entry.

```
  Service Mode
Select Group 1-7
```

3 Detail Ident Data

```
Detail Ident Data 1
XXXXXXXXXXXXXXXXXXX
```

Entry of operator prompt for the first detail-ID.

The length of the entry is specified by the number of remaining underline characters on the right hand side of the display. The length can be adjusted by entering space characters behind the operator prompt.

↑ Return to step '`Select Group`'

If ID was defined:

```
Detail Ident Data 1
Delete After Print Y
```

1,Y The ID is cleared after printout.

0,N The ID is not cleared after printout.

Continued with next ID.

If no ID was defined, or after the sixth ID, return to step '`Select Group`'.

8.8 Application Setup

The application setup serves to enter the parameters controlling the basic functions of the program. Listed below are the entries which apply to all application programs. Entry of further parameters may be required depending on the application program.

```
   Service Mode
 Select Group 1-7
```

4 Application setup

```
  Application Setup
Language    XXXXXXXX
```

Info Language for prompts and messages:

German, English, French, Polish, Dutch, Italian, Spanish

```
  Application Setup
PC Keyboard       DE
```

The IT8000Ex does not support the connection of an external keyboard

```
  Application Setup
Date Format XXXXXXXX
```

Info Selection of date format, options:

DD.MM.YY	DD-MM-YY	DD/MM/YY
MM.DD.YY	MM-DD-YY	MM/DD/YY
YY.MM.DD	YY-MM-DD	YY/MM/DD
D = Day	M = Month	Y = Year

```
  Application Setup
Decimal Char.  XXXXX
```

Info Select character to separate decimals, options:

Decimal point (e.g. 0.00)
Comma (e.g. 0,00)

Please note: With the selected decimal character also the transmitted key code is changed accordingly.

```
  Application Setup
Approval Signs     Y
```

1,Y Weights are printed with approval signs in compliance with former PTB regulations:

Example: Gross/Tare/Net

```
      <25.45kg> / <10.00kg>  / <15.45kg>
or    <25.45kg> /  10.00kgPT /  15.45kgC
```

0,N Weights are printed in compliance with EC regulations:

Example: Gross/Tare/Net

```
      25.45kg / 10.00kgT  / 15.45kgN
or    25.45kg / 10.00kgPT / 15.45kgN
```

```
  Application Setup
Unload After Tare  N
```

Configuration of tare function

1,Y Scale must be unloaded before tare can be cleared or changed.

0,N Tare can be cleared or changed at any time.

```
  Application Setup
Allow Expand Mode  Y
```

In the tare step the net weight can be displayed with tenfold resolution for approx. 5 sec after pressing the **X**-key.

(Function must be supported by the connected weighing platform.)

1,Y High resolution display enabled

0,N High resolution display disabled

Important Note:

All entries of further parameters in this group depend on the application program and are described in the Installation Instructions pertaining to the program.

8.8.1 Fieldbus Interface

Application programs supporting the IT8000Ex COMBUS module request the configuration of this interface at this step of the setup sequence.

```
  Application Setup
I/O over Profibus  N
```

Enable / disable control of digital I/Os over COMBUS instead of PIM modules.

Y Digital inputs/outputs over COMBUS

N Digital inputs/outputs over PIM modules

Note: If COMBUS communication is directly supported by the application program and not by the operating system, the function 'I/O over Profibus' must NOT be activated.

I/O over COMBUS = Y:

```
  Application Setup
SlaveAddress(0-31)__
```

Enter slave address

```
  Application Setup
Bus Protocol (0-6) _
```

Select COMBUS protocol, options:

0 No communication
1 COMBUS DIN 66019
2 Profibus DP (not supported by IT8000Ex)
3 Modbus RTU-Format
4 Protocol 3964/3964R
5 Protocol RK512
6 Special Mode

Depending on the selected protocol entry of further parameters is required:

COMBUS DIN 66019 or Modbus RTU selected:

```
  Application Setup
SlaveAddress(0-31)__
```

Enter slave address

```
  Application Setup
Debugmode ?        N
```

Enable / disable debug mode

DUST 3964 selected:

```
  Application Setup
No.words received __
```

Number of output words (as seen from master)

```
  Application Setup
No.words transm.  __
```

Number of input words (as seen from master)

Default setting is 16 input and 16 output words. Transmission is made 10 times per second.

RK512 selected:

```
  Application Setup
Debugmode ?        N
```

Switch on/off debug mode

If debug mode is switched on, status information on received send and fetch commands is available.

Note: After changing the setting for the protocol all interface parameters are reset to default values

8.9 RAM Data Backup

By means of the PC program Backup & Restore it is possible to backup individual files or all files on a PC and to restore them at a later time.

With the RTG programming environment also the complete contents of the memory can be transmitted for test purposes.

Data backup is made via the service channel.

```
    Service Mode
  Select Group 1-7
```

5 RAM data backup

```
  RAM Data Backup
1=RAM  /2=Data Base
```

1 Transfer complete RAM

2 Data base backup

↑ Return to step 'Select Group'

If complete RAM backup was selected:

```
  RAM Data Backup
Enter 1=to/2=from PC
```

1 Transfer data to PC

2 Load data from PC

↑ Return to step 'Select Group'

If data base backup was selected:

```
RAM Data Backup
Please Wait ...
```

Start PC program 'Backup & Restore'

↑ Return to step 'Select Group'

8.10 Hardware Test

The IT8000 Service Mode provides comprehensive test tools for hardware diagnostics.

```
Service Mode
Select Group 1-7
```

6 Hardware test

```
Hardware Diagnostics
Select Function 1-8
```

1 Test serial interfaces
2 Test parallel I/Os
3 Test memory
4 Test display
5 Test keyboard
6 Clear memory
7 Terminate application program
8 Assign devices
Info Forward scrolling
← Backwards scrolling
↑ Return to step 'Select Group'

8.10.1 Serial Input/Output Test

To test a serial RS485-Exi 4-wire or S10mA-Exi interface, characters are output and read back. This requires jump leads between transmitter and receiver (loop back connector). RS485-Exi 2-wire interfaces cannot be tested in this way.

```
Hardware Diagnostics
Select Function 1-8
```

1 Test serial interfaces

```
Serial IO Test
Select COM 1-2
```

Select test serial interfaces with key 1 - 2.
Return to 'Select Function'

```
Serial IO Test
Testing COM 9 ...
```

Display while interface test is running

```
Serial IO Test
 COM1 is ok
```

Press any key to continue

If test fails a corresponding message is displayed: 'Port X has failed'.

Return to 'Select Function'

8.10.2 Parallel Input/Output Test

```
Hardware Diagnostics
 Select Function 1-8
```

2 Test parallel I/Os

Test of the internal inputs/outputs:

```
Out:          0000
In:           0000
```

Status information 0 or 1 for outputs in the upper line of the display (Output 0 to 3 from right to left).

Status information 0 or 1 for inputs in the lower display line (Inputs 0 to 3 from right to left).

↵ Return to 'Select Function'

By pressing the 0-key repeatedly the output '0' can be intermittently set or reset. In the same way, the keys 1 - 3 are used to toggle the outputs 1 to 3. If outputs are wired on inputs, also input test can be performed.

Test inputs and outputs of external RS485 relay or transistor module:

Only if protocol DeviceBus is selected:

```
IO Test OUT:00000000
Module 1 IN:00000000
```

Status information 0 or 1 for outputs in the upper line of the display. (Outputs 0 to 7 from right to left).

Status information 0 or 1 for inputs in the lower line of the display. (Inputs 0 to 7 from right to left).

F1 - F8 Select relay or transistor module 1 to 8

↵ Return to step 'Select Function'

By pressing the 0-key repeatedly the output '0' can be intermittently set or reset. In the same way, the keys 1 - 7 are used to toggle the outputs 1 to 7. If outputs are wired on inputs, also input test can be performed.

8.10.3 Memory Test

```
Hardware Diagnostics
 Select Function 1-8
```

3 Test memory

```
   Memory Test
 Testing EPROM ...
```

Checksum test over CPU-EPROM

```
   Memory Test
 Testing RAM ...
```

Write/read test over CPU-RAM

```
   Memory Test
  Memory is OK
```

If a memory error was detected a corresponding message is displayed

↵ Return to 'Select Function'

8.10.4 Display Test

```
Hardware Diagnostics
 Select Function 1-8
```

4 Test display

```
••••••••••••••••••••
```

A block of 120 x 8 pixels (full width and a quarter of height of the display) is moved from top to bottom to detect defective pixels.

↵ Return to 'Select Function'

8.10.5 Keyboard Test

```
Hardware Diagnostics
 Select Function 1-8
```

5 Test keyboard

```
   Keyboard Test
Strike a Key      X
```

The key pressed is displayed

↵ Return to 'Select Function'

8.10.6 Delete Memory

In this group default setting of configuration parameters (as defined in the initialization part of the application program) can be restored, after the RAM memory of the terminal is cleared. This reverses all changes that might have been made in the Service Mode, and it can be required to again configure the terminal.

The scale calibration is not affected.

Note: After performing the clear memory function all data files are irrevocably lost!

```
Hardware Diagnostics
 Select Function 1-8
```

6 Delete memory

```
Hardware Diagnostics
Delete Memory?    N
```

0,N Return to step 'Select Function'

1,Y Continue

```
Hardware Diagnostics
Factory Reset     N
```

0,N Do **not** restore default setting and proceed

1,Y Restore default setting and proceed

Hardware Diagnostics Are you sure? N	Verification
0,N,↑	Return to step 'Select Function'
1,Y	Delete memory

Please note that also the language parameter is reset and that the following prompts appear in German.

Factory Reset = Yes:

Parameter speichern bitte warten...	'Storing Parameters Please Wait' Display while default setting is restored
Für Neustart Netz aus- und einschalten	'To Restart Program Switch Power off / on' The terminal must now be switched off and on again. After power up the memory is cleared.

If the Factory Reset was skipped, prompts appear in English again on power up. If a Factory Reset was performed, English must be selected again in group 4 of the Service Mode.

8.10.7 Terminate Program

This function can be used when the application program is to be stopped for testing or for download of a new program. Testing and download require the RTG programming environment.

Hardware Diagnostics Select Function 1-8	**7** Terminate application program
Hardware Diagnostics Exit program? N	
0,N,↑	Return to step 'Select Function'
1,Y	Continue
Service Channel COM1	Program is halted; Indication of service channnel

8.10.8 Assignment Of Devices

This function allows the assignment of external devices such as printer or host computer to the serial interfaces.

The application program accesses external devices via symbolic addresses, e.g. 'Host' or 'Prt1'. The default assignment of the serial interfaces of the IT8000Ex is shown below:

Peripheral Device	Symbolic Interface	Physical Interface
Host computer	Host	COM1 (Socket SIM1)
Printer 1	Prt1	COM2 (Socket SIM2)
Printer 2	Prt2	COM3 *)
Peripheral device 1	Aux1	COM4 *)
Peripheral device 2	Aux2	COM5 *)
Peripheral device 3	Aux3	COM6 *)
Service channel		COM1

The assignment of physical interfaces to the symbolic interfaces can be changed here.

*) COM3 and COM6 are wildcards, since the terminals has only a max. of 2 physical interfaces.

```
Hardware Diagnostics
 Select Function 1-8
```

8 Assign devices

```
 Device Assignment
Host Channel is COM1
```

Assignment of the symbolic address 'Host' to channel COM1; e.g. enter '2' for COM2.

↑ Return to 'Select Function'

```
 Device Assignment
Prt1 Channel is COM2
```

Assignment of the symbolic address 'Prt1' to channel COM2; e.g. enter '3' for COM3.

Continue with Prt2, ...

Please Note: Support of the channels Host, Prt1, Prt2, Aux1 to Aux3 depends on the application program.

8.11 S5 Data Block

If parts of the application software are programmed in STEP®5, the data words DW0 to DW63 can be entered to preset variables, timers and/or counters.

The data words DW0 and DW1 are reserved as follows:

DW0 = number of scales (0 .. 3) for the PLC task
DW1 = number of 8-bit input / output modules (0 .. 7)

All other data words are defined in the application program.

```
    Service Mode
  Select Group 1-7
```

7 S5 data block

```
    Service Mode
DW  0    = K?
```

Entry of data type for data word DW0, options:

0: KF = Integer number
1: KT = BCD-encoded timer value
2: KZ = BCD-encoded counter value

↑ Return to step 'Select Group'

If data type 'number' was selected:

```
    Service Mode
DW  0    = KF 9999999
```

Entry of integer number ranging from
–32768 to 32767

↑ Return to previous data word,
from DW0 return to 'Select Group'

F7 Return to entry of data type

If data type 'BCD-encoded timer value' was selected:

```
    Service Mode
DW  0    = KT   999,9
```

Entry of time with encoded time base ranging from 1,0 to 999,3.

The decimals left to the comma represent the value, the decimal right to the comma is the encoded time base:

0 = 0,01s 2 = 1s
1 = 0,1s 3 = 10s

↑ Return to previous data word,
from DW0 return to 'Select Group'

F7 Return to entry of data type

If data type 'BCD-encoded counter value' was selected:

```
    Service Mode
DW  0    = KZ     999
```

Entry of counter value ranging from
0 bis 999

↑ Return to previous data word,
from DW0 return to 'Select Group'

F7 Return to entry of data type

Continue with next data word.

9 Transport, Maintenance And Cleaning

9.1 Transport

Note:

- Transport and storage of the weighing terminal must only be made in designated cardboard box with foam cushions.
- Do not expose the unit to extreme temperatures, humidity, shocks or vibrations.
- Storage temperature –10 to +50°C at 95% max. relative humidity without condensation

9.2 Maintenance

Ex **Maintenance at regular intervals must be carried out by qualified personnel (see chapter 'Installation') authorized by SysTec GmbH. At these inspections first of all it must be made sure that the housing is tight, all cables are undamaged and all screws are securely fastened.**

Maintenance of scale platforms is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

A function check is possible with the program Service Mode.

9.3 Cleaning

- Only permit qualified personnel to operate this unit! Disconnect all power to this unit before cleaning!
- The keyboard overlay is resistant against acetone, trichlorine, alcohol, ether, nitric acid (20%), hexane, sulfuric acid (20%) and all-purpose cleaning agents.

Ex **Clean the keyboard with a soft clean cloth that has been dampened with a mild window type cleaner. Do not spray cleaner directly on the unit. Concentrated leaches or acids or pure alcohol must not be used. In order to avoid electrostatic charge, do not rub or wipe the keyboard with a dry cloth.**

If cleaning agents are used that contain leach, acid or alcohol, pure water must be used to wash off any residue.

The weighing terminal is protected to IP65.

9.4 Security Check

Ex **Safe operation is no longer warranted if:**

- **housing or keyboard is damaged**
- **connected cables, cable entry or equipotential bonding are damaged**
- **the connected power supply unit is damaged**
- **the display remains dark after switching the unit on.**

In these cases disconnect all power to the unit and contact your service station authorized by SysTec.

9.5 Functional Test

The functionality of the weighing terminal ist tested during calibration of the scale with test weights. The digital inputs / outputs and the serial interface can be tested in the Service Mode (hardware test).

9.6 Repair

Ex

Immediately put a damaged unit out of operation and disconnect all power to the instrument. The interior of the IT8000Ex does not contain any user servicable parts.

Users must not make any attempt at repairing a defective unit!

Only qualified service personnel (see chapter 'Installation'), authorized by SysTec GmbH, may carry out repair work using genuine factory supplied spare parts.

9.7 De-Installation

Ex

1. For the de-installation of the IT8000Ex weighing terminal observe all applicable standards, in particular the regulations for work on electrical installations and the specific safety rules.
2. Disconnect all power to the unit.
3. Remove cabling.
4. Use suitable tools to de-install weighing terminal.

9.8 Disposal

For the disposal of the weighing terminal all coutry-specific and locally applicable regulations must be observed!

10 Trouble Shooting

Ex

No alterations shall be made to the IT8000Ex weighing terminal!
IT8000Ex does not contain any customer servicable parts!
IT8000Ex may only be installed, adjusted and serviced by qualified personnel!

Ex

The weighing terminal may only be opened when all power to the unit is disconnected.

Ex

Immediately disconnect defective units from all power sources. Only qualified service personnel (see chapter 'Installation'), authorized by SysTec GmbH, may carry out repair work with genuine factory supplied spare parts, or serious risks for the user may evolve.

If any problem arises, please follow this check list:

- Disconnect the weighing terminal from all power sources.
- Check whether all cables including cable glands show any damages.
- Check whether housing and keyboard overlay are undamaged.

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the particular trouble.

Ex

Fault finding must not be carried out as long as any potentially explosive atmosphere can be present.
If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem the information as listed below is required:

- Serial-No. of the unit and its peripheral components.
- Exact wording of any error message displayed.
- Type and model of peripheral devices related to the problem (e.g. scale, printer, etc.)

To obtain professional assistance contact your service station stating the information listed above.

11 Technical Data

Housing	Stainless steel wall/desk housing
IP protection	IP65
Weight	Approx. 5 kg
Temperature Range	Storage: –10 °C to +50 °C at 95 % max. relative humidity without condensation Operation: –10 °C to +40 °C at 95 % max. relative humidity without condensation
Safety-relvant data	See chapter 'Definition Of Electrical Values'
Display	LCD with backlighting
Keyboard	Tactile membrane keyboard with 32 keys, alphanumeric entries via multiple key assignment, incl. 4 scale keys, 8 function keys, 8 control keys, numeric keypad
Options	Scale interface ADM8000-Exi, art.-No. E8OPT100-x
	Serial interface module S10mA-Exi, art.-No. E8OPT221-x
	Serial interface module RS485-Exi, art.-No. E8OPT222-x
	Digital transistor output module OUT4-Exi, art.-No. E8OPT310
	Digital relay output module REL4-Exi, art.-No. E8OPT311

12 Annex

12.1 ACK/NAK-Protocol

In group 1 of the Service Mode the transmission protocol for the serial interfaces can be selected. If the ACK/NAK-protocol is selected, data transmission is made as per the following pattern:

IT8000Ex -> PC

Control Character / Data	Example	Comment
Start character	STX	can be selected or deselected in Service Mode
Data fields in ASCII-format	Consec.-No. Date, Gross, Net	sequence of data fields with their length, position of decimal point, etc. depends on application program (e.g. IT *BASIC*, IT *COUNT*, etc.), see also product related Installation Instructions.
End character	ETX	can be selected or deselected in Service Mode
Checksum	XOR	can be selected or deselected in Service Mode, options: XOR, compliment of two, no checksum

PC -> IT8000Ex

Control Character	Comment
ACK	positive confirmation for correctly received data string

or

PC -> IT8000Ex

Control Character	Comment
NAK	negative confirmation for not correctly received data string

The IT8000Ex timeout delay for the reception of ACK or NAK is 6 sec. If a response cannot be received within 6 sec or if a negative response is received (NAK), the transmission of the data string is repeated up to 4 times. If after a total of 5 transmission attempts a response cannot be received or if only negative responses are received, an error message is indicated on the display of the IT8000 terminal which must be acknowledged by the operator. The operator has the choice either to start the transmission anew (e.g. after rectifying the problem) or switch off the data transmission.

As an alternative to the ACK/NAK protocol, several other transmission protocols can be selected in the Service Mode: DUST3964(R), RK512 telegram, and No-ACK (same as ACK/NAK, however without confirmation).

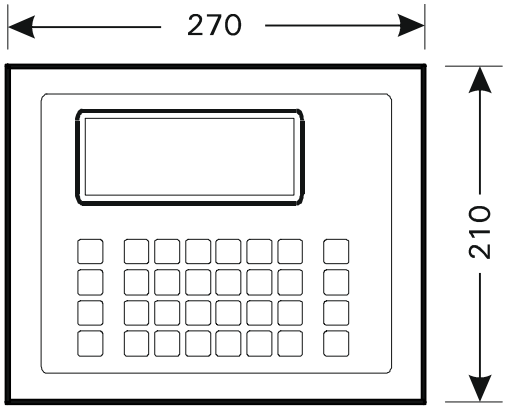
12.2 Replacing The Battery

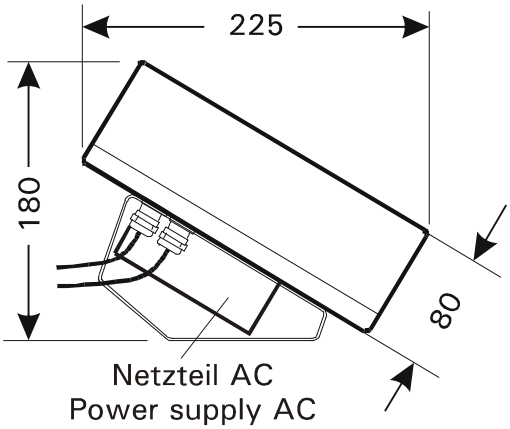
For the storage of data IT8000Ex contains a lithium battery. This battery has a lifetime of at least three years in normal operation. Thus, the battery needs to be replaced at 3-year intervals.

Risk of explosion if battery is replaced improperly! Replace only with battery supplied by SysTec. Disposal of used batteries only as indicated by manufacturer.

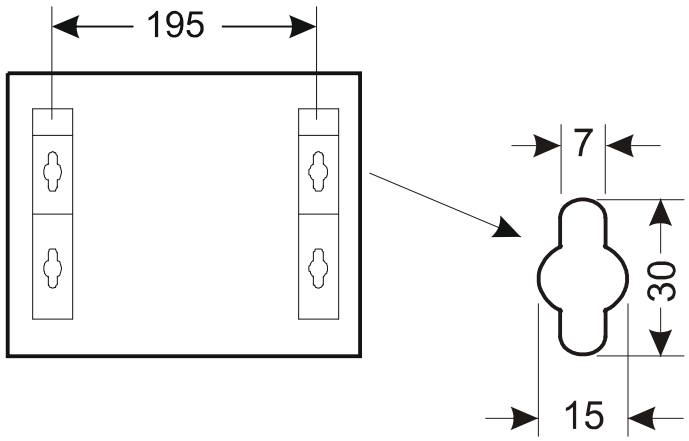
The battery may only be replaced by qualified personnel, authorized by SysTec GmbH (see chapter 'Installation'). Make absolutely sure before replacing the battery that no potentially explosive atmosphere can be present at any time!

13 Dimensions

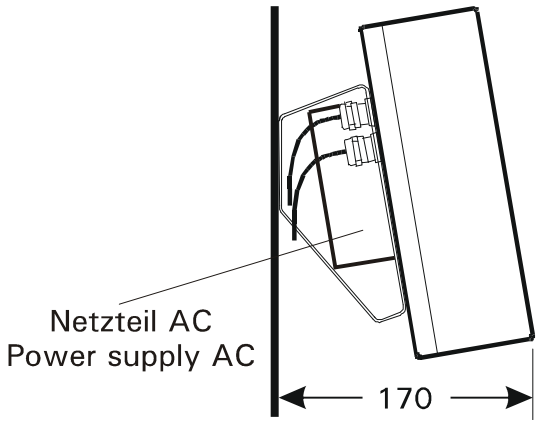




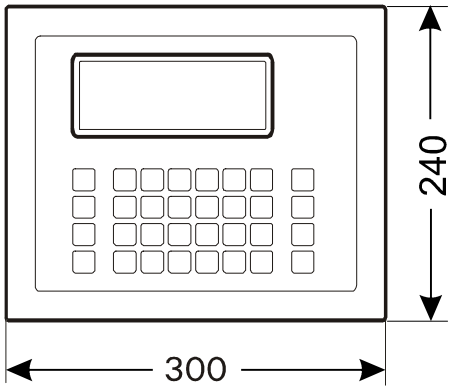
Fixing holes

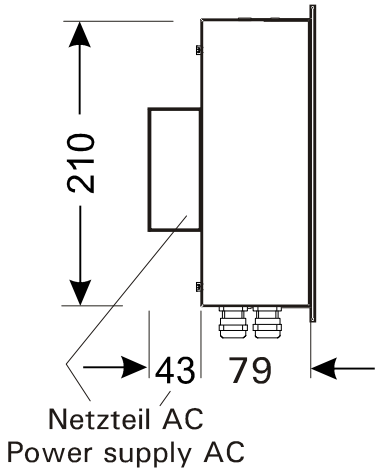


Wall installation

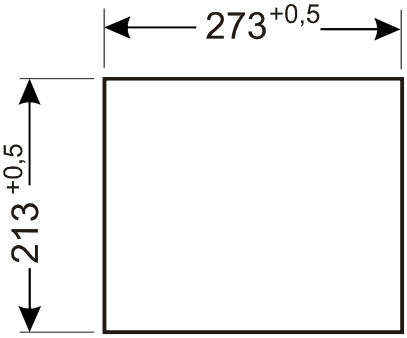


Panel-mount installation





Cut-out in panel



14 Type Approval Certificate

DEKRA

Translation

(1) **EC-Type Examination Certificate**

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) **BVS 06 ATEX E 034**

(4) **Equipment:** **Terminal type IT8000Ex-AAA***

(5) **Manufacturer:** **SysTec Systemtechnik und Industrieautomation GmbH**

(6) **Address:** **50129 Bergheim-Glessen, Germany**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.

(8) The certification body of EXAM BBG Prüf- und Zertifizier GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment 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 test and assessment report BVS PP 06.2023 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2004	General requirements
EN 60079-7:2003	Increased safety 'e'
EN 50020:2002	Intrinsic safety 'i'
EN 60079-18:2004	Encapsulation 'm'

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

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate

(12) The marking of the equipment shall include the following:

II 2G (2GD) Ex e mb [ib] IIB/IIC T4

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 08. March 2006

Signed: Dr. Jockers — Certification body

Signed: Dr. Eickhoff — Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110 E-mail zs-exam@dekra.com
(until 31.03.2007 EXAM BBG Prüf- und Zertifizier GmbH)

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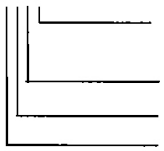
(13) Appendix to

(14) # EC-Type Examination Certificate

BVS 06 ATEX E 034

(15) 15.1 Subject and type

Terminal type IT8000Ex-****
Instead of the placeholder **** letters are inserted in the full designation specifying the plug-on modules for the individual functions fitted to the mainboard.
Type IT8000Ex-****



A = Output module Out4-Exi
B = Relay output module REL4-Exi
A = Interface RS485-Exi
A = Interface RS485-Exi
A = Weighing module ADM-Exi

15.2 Description
The IT8000Ex is a W&M approved weighing terminal for a variety of applications, such as weighing, parts counting and filling. A printed circuit board with the electronic components is built into a stainless steel housing. On the printed circuit board there are the potted power supply unit, four slots for the optional plug-on modules, connectors for display and keyboard and screw terminals for the power supply and the digital inputs. In the lid there is the LCD display with keyboard.
Different types of plug-pn modules with different output circuits can be fitted. On the modules there are the terminals for the external intrinsically safe circuits. The terminal is used in areas requiring explosion-protected equipment compliant to category 2G.
Ancillary devices installed in areas 2G or 2D may be connected to the intrinsically safe input/output circuits, provided that they are appropriately certified.

15.3 Parameters

15.3.1 Supply circuit input power supply unit, connecting terminals ST1700 3 and 4.

Nominal voltage	Un	DC	9 - 36	V
Nominal current	In		0.3	A
Maximal voltage	Um	DC	60	V
Max. short circuit current of the power supply		Ik		100A

15.3.2 Intrinsically safe circuits

15.3.2.1 Input circuits, connecting terminals KL200 1(+) and 2 (Gnd), KL201 1(+) and 2 (Gnd), KL202 1(+) and 2 (Gnd) uad KL203 1(+) and 2 (Gnd)
Values for each circuit

Voltage	Uo	5.3	V
Current	Io	22	mA
Internal resistance	Ri	248	Ω
linear output characteristic			

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External inductance and external capacitance according to the following table:

Lo [mH]	0	0.01	0.2	70
Co [µF]	50	14	4.7	0

Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

15.3.2.2 Output circuits weighing module ADM-Exi, connecting terminals KL1

Voltage	Uo	5.3	V
Current	Io	220	mA
Power	Po	1.116	W

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	0.05	1	2.5	0	0.01	0.1	0.15
Co [µF]	1000	43	7	0	67	10	1	0

15.3.3.3 Interface module RS 485-Ex-i
Connecting terminals KL1400 1(Tx+/A) and KL 1400 2 (Tx-/B)
Connecting terminals KL1401 1(Rx+) and KL 1401 2 (Rx-)

Voltage	Uo	5.3	V
Current	Io	9	mA
Internal resistance	Ri	588	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	0.05	50	100	0	0.05	0.2	100
Co [µF]	1000	50	9.4	0	71	7.6	5	0

Max. voltage	Ui	6.5	V
Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

15.3.3.4 Relay module REL4-Exi
Connecting terminals KL1100 1 and 2 relay 1 Out, KL1101 1 and 2 relay 2 Out, KL1102 1 and 2 Relay 3 Out and KL1103 1 and 2 relay 4 Out
Potential free contacts for the connection of one each intrinsically safe circuit.

Switched voltage	Ui	60	V
Switched current	Ii	3	A
Internal inductivity	Li	negligible	
Internal capacity	Ci	negligible	

The contacts are separated from each other up to a sum of peak voltages of 60 V.

15.3.3.5 Output module Out4-Exi
Connecting terminals KL1000 1 and 2, KL1001 1 and 2, KL1002 1 and 2 and KL1003 1 and 2
Values for each circuit

Voltage	Uo	5.3	V
Current	Io	108	mA
Internal resistance	Ri	49	Ω

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External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	0,5	5	19	0	0,01	0,2	4,5
Co [µF]	1000	22	11	0	71	14	4,7	0

15.3.4 Ambient temperature range Ta -10 °C up to +40 °C

(16) Test and assessment report
BVS PP 06.2023 EG as of 08.03.2006

(17) Special conditions for safe use
None

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 31.01.2008
BVS-Schu/Ar E 0034/08

DEKRA EXAM GmbH

Certification body Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110 E-mail zs-exam@dekra.com
(until 31.03.2007 EXAM BBG Prüf- und Zertifizier GmbH)

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Translation

1st Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
BVS 06 ATEX E 034

Equipment: **Terminal type IT8000Ex-AAA***

Manufacturer: **SysTec Systemtechnik und Industrieautomation GmbH**

Address: **50129 Bergheim-Glessen, Germany**

Description
The terminal can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 60079-0:2004	General requirements
EN 60079-7:2003	Increased safety 'e'
EN 50020:2002	Intrinsic safety 'i'
EN 60079-18:2004	Encapsulation 'm'

The marking of the equipment shall include the following:

II 2G (2GD) Ex e mb [ib] IIB/IIC T4

Test and assessment report
BVS PP 06.2023 EG as of 27.03.2007

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 27. March 2007

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

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We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 31.01.2008
BVS-Schu/Ar E 0034/08

DEKRA EXAM GmbH

Certification body

Special services unit

DEKRA

Translation

2nd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
BVS 06 ATEX E 034

Equipment: **Terminal type IT8000Ex-******

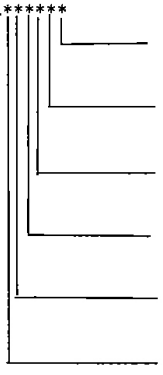
Manufacturer: **SysTec Systemtechnik und Industrieautomation GmbH**

Address: **50129 Bergheim-Glessen, Germany**

Description
The terminal can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report (enclosure, fastening elements, circuitry of the boards can be modified and a new interface S10mA-Exi can be used).

Instead of the placeholder **** letters are inserted in the full designation specifying the plug-on modules for the individual functions fitted to the mainboard. If no modul is plugged, a 0 or * is inserted.

Type IT8000Ex-******



0 = Wall-/table version
3 = fitting version

0/* = Fuse with 100A breaking capacity
1 = Fuse with 1500A breaking capacity

C = Output module Out4-Exi
D = Relay output module REL4-Exi

B = Interface RS485-Exi
E = Interface S10mA-Exi

B = Interface RS485-Exi
E = Interface S10mA-Exi

A = Weighing module ADM-Exi

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 60079-0:2006	General requirements
EN 60079-7:2003	Increased safety 'e'
EN 60079-11:2007	Intrinsic safety 'i'
EN 60079-18:2004	Encapsulation 'm'

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The marking of the equipment shall include the following:

⟨Ex⟩ II 2G (2GD) Ex e mb [ib] IIB/IIC T4

Modified parameters

1 Supply circuit input power supply unit, connecting terminals ST1700 3 and 4

Nominal voltage	Un	DC 9 - 36	V
Nominal current	In	0.3	A
Maximal voltage	Um	DC 60	V
Max. short circuit current of the power supply			
for type IT8000Ex-****0*	Ik	100	A
for type IT8000Ex-****1*	Ik	1500	A

2 Interface module RS 485-Ex-i
Connecting terminals KL1400 1(Tx+/A) and KL 1400 2 (Tx-/B)
Connecting terminals KL1401 1(Rx+) and KL 1401 2 (Rx-)

2.1 Values for one output

Voltage	Uo	5.3	V
Current	Io	9	mA
linear output characteristic			
Internal resistance	Ri	588	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	0.05	50	100	0	0.05	0.2	100
Co [µF]	1000	50	9.4	0	71	7.6	5	0

Max. voltage	Ui	6.5	V
Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

2.2 Values for two outputs connected in parallel

Voltage	Uo	5.3	V
Current	Io	18	mA
linear output characteristic			
Internal resistance	Ri	294	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC		
Lo [mH]	0	1	5	100	0	5	100
Co [µF]	1000	19	13	0	71	2.5	0

Max. voltage	Ui	6.5	V
Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

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2.3 Values for one output with connection to GND

Voltage	Uo	5.3	V
Current	Io	36	mA
linear output characteristic			
Internal resistance	Ri	147	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	1	5	100	0	1	5	38
Co [µF]	1000	19	13	0	71	3.3	2.3	0

Max. voltage	Ui	6.5	V
Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

2.4 Values for two outputs connected in parallel connected with GND

Voltage	Uo	5.3	V
Current	Io	72	mA
linear output characteristic			
Internal resistance	Ri	73.5	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	1	5	41	0	1	5	9.8
Co [µF]	1000	18	12	0	71	3.1	1.8	0

Max. voltage	Ui	6.5	V
Internal inductance	Li	negligible	
Internal capacitance	Ci	negligible	

3 InterfaceS10mA-Exi
Connecting terminals KL1500 1 Tx in
Connecting terminals KL1500 2 TX out
Connecting terminals KL1500 3 GND
Connecting terminals KL1500 4 RX out

Voltage	Uo	5.3	V
Current	Io	32.5	mA
Internal resistance	Ri	163.5	Ω

External inductivity and external capacity according to the following table:

	IIB				IIC			
Lo [mH]	0	5	20	100	0	1	2	47
Co [µF]	1000	13	9.6	0	71	3.3	2.8	0

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Translation

3rd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate

BVS 06 ATEX E 034

Equipment: **Terminal type IT8000Ex-******

Manufacturer: **SysTec GmbH**

Address: **50129 Bergheim-Glessen**

Description
The terminal type IT8000Ex-****** may now also be used in dust-hazardous areas of category 21 and may now also be modified according to the descriptive documents as mentioned in the pertinent test and assessment report.

The basic Health and Safety requirements of the modified version are met by compliance with the following standards:

EN 60079-0:2006	General requirements
EN 60079-7:2007	Increased Safety
EN 60079-11:2007	Intrinsic Safety
EN 60079-18:2004	Encapsulation
EN 61241-0:2006	General requirements
EN 61241-1:2004	Protection by Enclosure
EN 61241-11:2006	Intrinsic Safety

The marking of the equipment shall include the following:

II 2G Ex e mb [ib] IIB/IIC T4
II 2D Ex tD A21 [ibD] IP65 T60°C

Special conditions for safe use
Not applicable.

Test and assessment report
BVS PP 06.2023 EG, as of 28.10.2008

DEKRA EXAM GmbH
Bochum, dated 28. October 2008

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

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We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 28.11.2008
BVS-Ld/Kr/Ar E 1662/08

DEKRA EXAM GmbH

Certification body

Special services unit

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15 System Description IT8000Ex

15.1 General

In the following a typical IT8000Ex system configuration is described. The safety-relevant values are:

Temperature class	T4
Group	IIC
Range of ambient temperature	−10°C ... +40°C

It consists of the following components with the max. permissible cable lengths as specified:

Weighing terminal IT8000Ex	Connected components	Type of cable	Length
Power supply circuit CPU8000Ex, supply module, Ex-e	1 x power supply unit Siemens LOGO!Power 24V SELV as per EN60950	Oelflex 540 CP 2 x 1.0mm²	**200 m**
Inputs CPU8000Ex, IN0 - IN3, Ex-i	4 x switches Moeller RMQ22	Unitronic EB JE-LiYCY..BD 4x2x0.5mm²	**125 m**
Weighing module ADM8000-Exi	4 x Ex-i loadcells HBM C16	Kerpen Kabel KSv2YCYFL 4 x AWG20/7 + 2 x 1.0mm²	**48 m**
Output module OUT4-Exi	4 x Ex-i piezoelectric valves Hoerbiger P8-385RF-NG-SPT67	Unitronic EB JE-LiYCY.BD 4x2x0.5	**50 m**
Interface module S10mA-Exi	1 x Ex separation module SysTec TS3000	Unitronic EB JE-LiYCY.BD 2x2x0.5	**250 m**
Relay module REL4-Exi	2 x dual-channel isolated switch amplifier Pepperl&Fuchs KFA6-SR2-Ex2.W	Unitronic EB JE-LiYCY.BD 4x2x0.5	**125 m**
Interface module RS485-Exi	1 x fieldbus isolating repeater Stahl 9185/11-45-10	Unitronic EB JE-LiYCY.BD 2x2x0.5	**250 m**

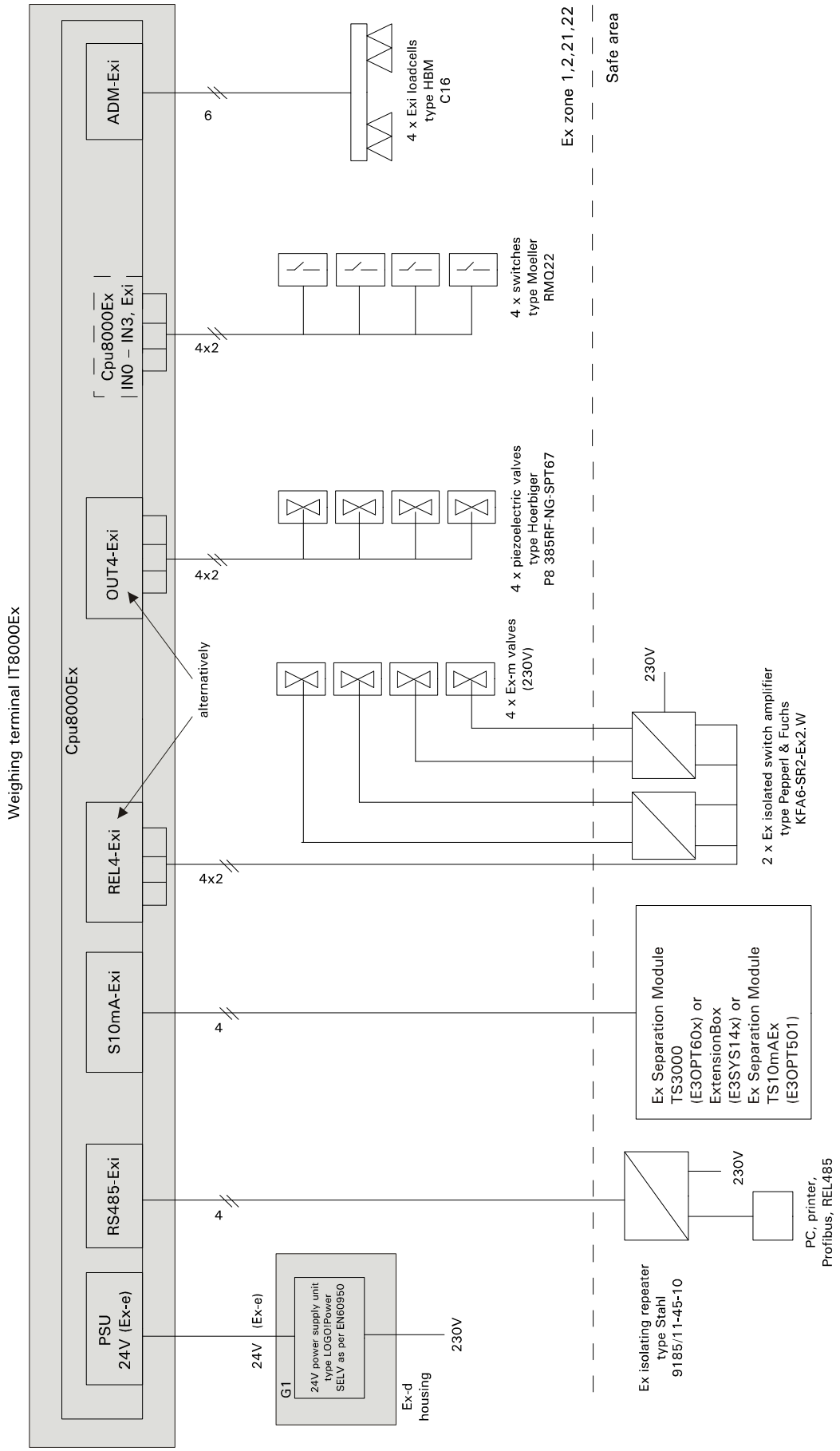
Installation must be carried out in compliance with EN60079-14 or EN61241-14. Also, all country-specific regulations at the place of installtion must be observed.

In compliance with EN60079-14 or EN61241-14 and the EC type approval certificate, all components must be integrated into the equipotential bonding system of the installation. The bonding conductor must have a cross section of min. 4mm².

Alternatively to the components listed above, also the components listed in the following section 'System Components' may be used. If other components or other cables with less favorable characteristics are used, the documented evidence of intrinsic safety must be rendered again.

Only one cable gland is available in the rear plate of the IT8000Ex for each Ex-i circuit of the plug-on modules. Thus, it was assumed for the calculation of the max. cable lengths that the intrinsically safe circuits of the OUT4-Exi, REL4-Exi, RS485-Exi and CPU8000Ex (IN0-3) are running together in one cable each (see EN60079-14 section 12.2.2.8 type C). This must be taken into consideration for the recorded evidence of intrinsic safety of other components and/or cables.

15.2 Installation Example IT8000Ex



15.3 System Components

15.3.1 Weighing Terminal

Designation	EC type approval certificate	Ex-i interfaces	Uo (V)	Io (mA)	Po (mW)	Co (µF)	Lo (mH)	Ui (V)	Ii (A)	Ci (V)	Li (mH)
IT8000Ex article-No. E8SYS0xx	BVS 06 ATEX E 034	CPU8000Ex IN0-IN3 digital inputs values per circuit *)	5.3	22	30	4.7	0.2	—	—	0	0
		ADM8000-Exi weighing interface	5.3	220	1116	1	0.1	—	—	—	—
		OUT4-Exi digital transistor outputs values per circuit *)	5.3	108	143.1	4.7	0.2	—	—	—	—
		REL4-Exi digital relay outputs values per circuit *)	—	—	—	—	—	60	3	0	0
		RS485-Exi send / transmit line values per circuit *)	5.3	9	12	5	0.2	6.5	—	0	0
		S10mA-Exi Serial 10mA interface	5.3	32.5	43	3.3	1	—	—	—	—

*) If several circuits are combined in one cable, possible effects of current/voltage addition in the case of a fault must be considered (see EN60079-14 section 12.2.2.8 (Typ C)).

15.3.2 External Power Supply Units

Designation	SysTec article-No.	EC type approval certificate	Type of protection
Power supply unit 230V/24VDC for use in safe area	E3OPT901-xx E3OPT902-xx	—	—
Power supply unit 230V/24VDC Typ CCA-0 for use in hazardous area	E3OPT903	KEMA 03 ATEX 2045 LCIE 97 ATEX 6006 X	Flame proof enclosure Ex-d
Power supply unit VG230Ex for use in hazardous area	E8PWS002	BVS 11 ATEX E 070 X	II 2G Ex mb IIC T4 Gb II 2D Ex mb IIIC T125°C Db
AkkuBox Ex with miniCLIX connector Type SLB 12 for use in hazardous area	E3AKK001	EPS 10 ATEX 1 241 X	II 2G Ex eb mb IIC T6 II 2D Ex tb IIIC T80°C
AkkuBox Ex with DXN1 connector Type Ex 12V A512 SI / 16 G5 for use in hazardous area	E3AKK002	BVS 07 ATEX E 065 X	II 2G Ex e mb II T5 II 2D Ex tD A21 T 90°C

15.3.3 Pushbuttons/Switches (Connection To CPU8000Ex IN0 - IN3)

The pushbuttons and/or switches are considered as 'simple apparatus' and must comply the the requirements of EN60079-11:2007 section 5.7.

In compliance with the requirements as above, the switching element must meet the values as specified below:

$U_{nominal} > 5.3$ V

$I_{nominal} > 88$ mA

$P_{nominal} > 117$ mW

Ci = 0

Li = 0

15.3.4 Ex-i Loadcells (Connection To ADM8000-Exi)

Manufacturer	Type of loadcell	EC type approval certificate	Ui (V)	Ii (mA)	Pi (W)	Ci (nF)	Li (μH)
Flintec GmbH	PCB, PC2, PC6, SB2, SB4, SB6, SB14, RC1, RC2, RC3, UB1, UB6	KEMA 02 ATEX 1123 X	17	500	2.1	~0	~0
	PC1, SB5, SLB	KEMA 02 ATEX 1123 X	17	500	2.1	~0	~0
Revere Transducers Europe B.V.	SHBxR, BSP, CSP-M, CP-M, HPS, SSB, HCB, 9102,5103, 9103, RLC with max. 25m cable (RLC with capacity 60kg, 130kg, 28t, 60t not permitted)	KEMA 00 ATEX 1132 X	19.1	323	2.75	0.4	~0
Hottinger Baldwin Messtechnik GmbH	C16, C2, U2, PW with max. 10m cable	PTB 01 ATEX 2208 and 1. amendment	22	469	1.25	1.62	6
Avery Berkel Ltd	T109	DEMKO 01 ATEX 129328 X	24	400	1.3	0.32	1.5
	T110	DEMKO 01 ATEX 129328 X	24	400	1.3	0.504	2.28
	T203; T204	DEMKO 01 ATEX 129328 X	24	400	1.3	1.3	6

15.3.5 Separation Module TS3000 Or ExtensionBox With Ex Separation Module TS10mAEx (Connection To S10mA-Exi)

Designation	SysTec article-No.	EC type approval certificate	Ex-i interface	Ui (V)	Ii (mA)	Pi (mW)	Ci (nF)	Li (μH)
TS3000	E3OPT60x-xxx	TÜV 05 ATEX 7231 X	TS10mAEx	-	50	100	0	0
ExtensionBox	E3SYS14x-xxx	TÜV 05 ATEX 7231 X	TS10mAEx	-	50	100	0	0

15.3.6 Ex-i Loadcell Junction Box (Connection To ADM8000-Exi)

Designation	SysTec article-No.	EC type approval certificate	Ui/Uo	Ii/Io	Pi/Po	Ci	Li
EEx i shift adjust junction box type 10ZUB456	10ZUB456	SEV 04 ATEX 0115	≤ 20V	≤ 400mA	≤ 1.3W	0	0

15.3.7 Ex-i Piezoelectric Valves (Connection To OUT4-Exi)

Manufacturer	Type	EC type approval certificate	Ui (V)	Ii (mA)	Pi (W)	Ci (nF)	Li (µH)
Hörbiger	P8 385RF-NG-SPT67	DMT 01 ATEX E 026 X	9	—	—	12	—

15.3.8 Ex Isolated Switch Amplifier (Connection To REL4-Exi)

Designation	SysTec article-No.	EC type approval certificate	Uo (V)	Io (mA)	Po (mW)	Co (µF)	Lo (mH)	Ci (µF)	Li (mH)
Pepperl&Fuchs KFA6-SR2-Ex2.W	—	PTB 00 ATEX 2081	10.6	38.2	102	2.32	24	0	0

15.3.9 Ex Fieldbus Isolating Repeater (Connection To RS485-Exi)

Designation	SysTec article-No.	EC type approval certificate	Uo (V)	Io (mA)	Po (mW)	Co (µF)	Lo (mH)	Ui (V)	Ci (µF)	Li (mH)
Stahl 9185/11-45-10	E3OPT60x-xxx	DMT 02 ATEX E 246 X	5.88	50	73.3	43	15	±5.88	0	0

15.3.10 Connecting Cables

IT8000Ex interface	Cable SysTec article-No.	Construction	Outer diameter	Color of cable jacket
Loadcells (ADM8000-Exi)	10KAB215	KSv2YCYFL 4 x AWG20/7 + 2 x 1.0mm² shielded flame retardant	10.0 mm	blue
Serial interface (RS485-Exi) Serial interface (S10mA-Exi)	10KAB318	JE-LiYCY 2 x 2 x 0.5 mm² twisted pair shielded flame retardant	7.5 mm	blue
Digital transistor outputs (OUT4-Exi) Digital relay outputs (REL4-Exi)	10KAB319	JE-LiYCY 4 x 2 x 0.5 mm² twisted pair shielded flame retardant	10.0 mm	blue
12-30VDC power supply (Ex-e)	10KAB316	flexible PUR cable 2 x 1,0 mm² shielded flame retardant	9.6 mm	yellow

Ex

W A R N I N G

It is mandatory to repeat the procedure of rendering documented evidence of intrinsic safety if other components are used or if safety-relevant data of a component have changed, e.g. through an amendment of an existing approval. Thus, it is required to verify the accuracy and validity of these safety-relevant data.