

Installation Manual
for
Ex Certified
Digital Weighing Systems
with certificates
SEV 23 ATEX 0689 X
IECEX SEV 23.0028 X

According to the following norms:

EN 60079-0: 2018
EN 60079-11: 2012

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Introduction

An Eilersen digital weighing system approved under SEV 23 ATEX 0689 X/IECEX SEV 23.0028 consists of the following components:

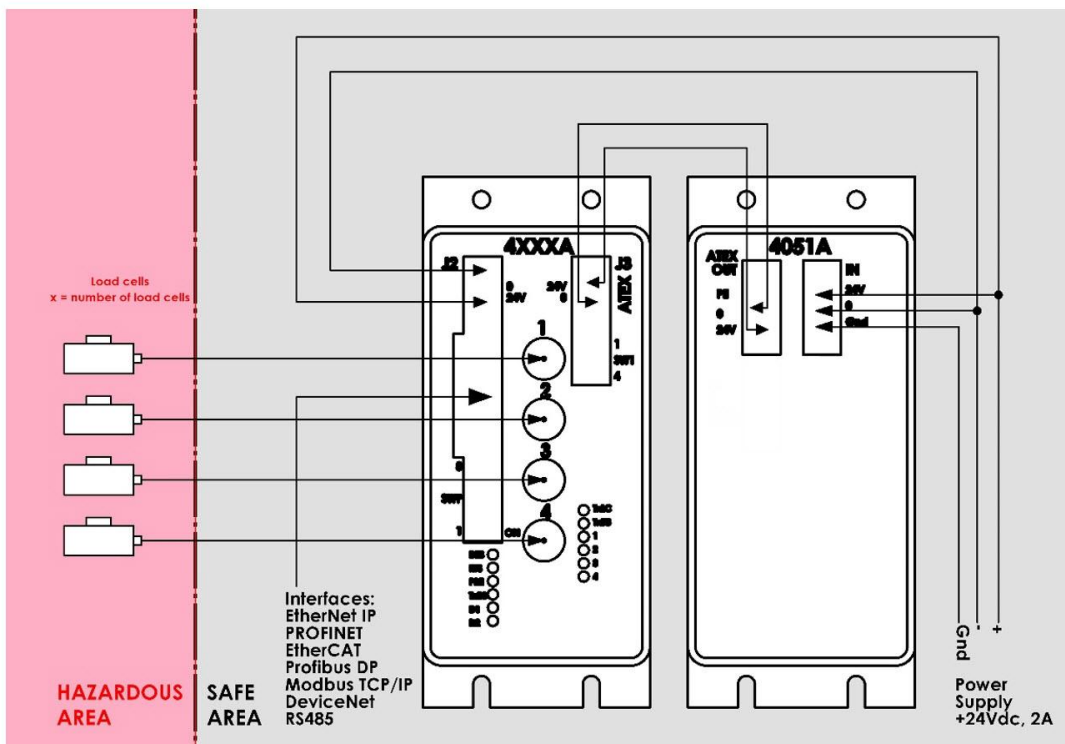
- 1) 1 pce. Ex certified power supply module type 4051A
- 2) 1 pce. Ex certified weighing module type 4XXXA with interface modules type 4015A and 4040A/B
- 3) 1-4 pcs. Ex certified load cells type CL-Ex, CM-EX, CH-Ex, ELCL-Ex, BL-Ex, BM-Ex, BH-Ex, SBL-Ex, XBL-Ex, XBM-Ex, XBH-Ex, HBL-Ex, HBM-Ex, TL-Ex, TM-Ex, DLC-Ex, DXLC-Ex, ELCL-Ex, DMC-Ex, SPSX-Ex, SPSXL-Ex, FBL-Ex, FBM-Ex

The power supply module type 4051A serves as an intrinsic safe supply to the weighing module type 4XXXA. The power supply module type 4051A must be installed outside the area at risk.

The weighing modules type 4XXXA are used to supply the load cells and consist of a carrier housing the Ex certified interface modules type 4015A and 4040A/B and a non-Ex certified communication module (e.g. Profibus DP module type 4035). The weighing modules type 4XXXA must be installed outside the area at risk.

The load cells are intrinsically safe equipment in "Ex ia IIC" type of protection that may be installed within the area of risk. The load cells are connected to the weighing module using a screened coaxial cable and a BNC plug. Up to four weighing cells can be connected to one weighing module.

Please refer to below drawing showing a system with a weighing module type 4XXXA for up to four ATEX (Ex) load cells supplied by the ATEX (Ex) power supply type 4051A (The requirements of IEC/EN 60079-14 and local ordinary installation requirements must be observed for installation and use):



Installation of the weighing modules type 4XXXA

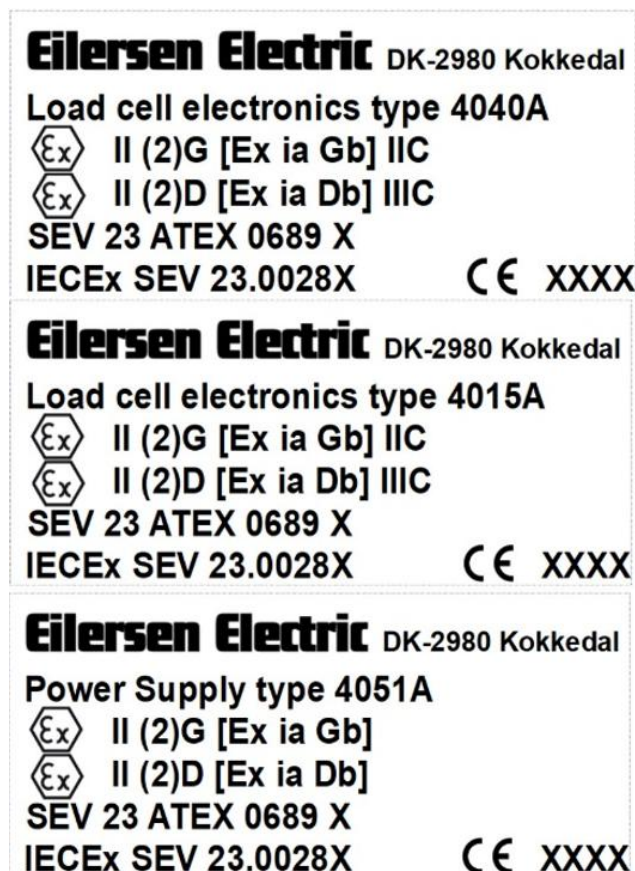
The weighing modules type 4XXXA contain the interface modules type 4015A and 4040A and a communication module as illustrated in appendix 1 "ATEX 4000 System". The weighing module **must be installed outside the ATEX (Ex) zone in safe area!**

The interface modules type 4015A and 4040A supply the load cells and galvanic separate the weighing module from external equipment.

The weighing module type 4XXXA (with interface modules type 4015A and 4040A/B) and the 24 VDC/24VDC galvanic separated power supply type 4051A **must be installed outside the ATEX (Ex) zone in safe area!**

The installation of the weighing modules must be done according to the special precautions X described on the following pages.

The weighing module type 4XXXA (with interface modules type 4015A and 4040A/B) and the power supply type 4051A are supplied with the following labels:



Overview weighing modules type 4XXXA

Description	Type
Module for 1 Load cell with Profibus DP interface	4135A
Module for 2 Load cells with Profibus DP interface	4235A
Module for 3 Load cells with Profibus DP interface	4335A
Module for 4 Load cells with Profibus DP interface	4435A
Module for 1 Load cell with DeviceNet interface	4137A
Module for 2 Load cells with DeviceNet interface	4237A
Module for 3 Load cells with DeviceNet interface	4337A
Module for 4 Load cells with DeviceNet interface	4437A
Module for 1 Load cell with RS485 interface	4140A
Module for 2 Load cells with RS485 interface	4240A
Module for 3 Load cells with RS485 interface	4340A
Module for 4 Load cells with RS485 interface	4440A
Module for 1 Load cell with Ethernet/IP or Modbus TCP/IP interface	4150A
Module for 2 Load cells with Ethernet/IP or Modbus TCP/IP interface	4250A
Module for 3 Load cells with Ethernet/IP or Modbus TCP/IP interface	4350A
Module for 4 Load cells with Ethernet/IP or Modbus TCP/IP interface	4450A
Module for 1 Load cell with EtherCAT interface	4160A
Module for 2 Load cells with EtherCAT interface	4260A
Module for 3 Load cells with EtherCAT interface	4360A
Module for 4 Load cells with EtherCAT interface	4460A
Module for 1 Load cell with PROFINET interface	4170A
Module for 2 Load cells with PROFINET interface	4270A
Module for 3 Load cells with PROFINET interface	4370A
Module for 4 Load cells with PROFINET interface	4470A
Module for 1 Load cell with 4-20mA or 0-10Vdc analog output	4179A
Module for 2 Load cells with 4-20mA or 0-10Vdc analog output	4279A
Module for 3 Load cells with 4-20mA or 0-10Vdc analog output	4379A
Module for 4 Load cells with 4-20mA or 0-10Vdc analog output	4479A

Special precautions X for installation of weighing modules type 4XXXA

1. The weighing module type 4XXXA must only be supplied by the ATEX (Ex) certified power supply type 4051A.
2. The ATEX (Ex) certified weighing module type 4XXXA (containing interface modules type 4015A and 4040A/B) and the ATEX (Ex) certified power supply type 4051A shall be installed outside the classified area
3. The ATEX (Ex) certified power supply module type 4051A and ATEX (Ex) certified weighing module type 4XXXA with interface module types 4015A and 4040A/B shall be installed in such a way that at least IP20 type of protection according to the standard IEC/EN 60529 is achieved.
4. The ATEX (Ex) certified power supply module type 4051A may be connected only to a feed current circuit if it is safely galvanically disconnected (PELV power circuit) and limited by to the rated current by a fusible link.
5. The maximum voltage of interface module types 4015A and 4040A/B on non-intrinsically safe power circuits must not exceed 60 Veff in case of a fault.
6. The output and supply power circuit (2-pole plug connection OUT 24V) of the power supply module type 4051A may only be connected outside of the area at risk of explosion.
7. Only for the ambient temperature range -40 °C to +70 °C.
8. In addition, the "ATEX 4000 System" diagram in appendix 1 must be observed for the connection of the weighing system.

Intrinsically safe ratings for power supply module type 4051A

Power Input circuit
(2 Pole connector IN 24V)

Rated voltage $U_m = 25,2 \text{ VDC}$
Only for connection to a galvanically safe separated supply circuit (PELV System) which is limited with a fuse to the rated current.

Output- and Supply circuit
(2 Pole Connector OUT 24V)

With intrinsically safe prelimiter [Ex ia Gb] for the weighing system with the following maximum ratings:

$U_o \leq 25,2 \text{ V}$
 $I_o \leq 783,0 \text{ mA}$
 $P_o \leq 2,0 \text{ W}$

Only for connection to the interface modules type 4015A and 4040A/B outside the ATEX (Ex) zone.

Intrinsically safe ratings for the interface modules type 4015A and 4040A/B

Output- and supply circuit
(2 Pole Connector J3 | 0/24V)

Only for connection to the Power Supply Module with intrinsically prelimiter [Ex ia Gb] with the following maximum values:

$$\begin{aligned}U_i &\leq 25,2 \text{ V} \\I_i &\leq 783,0 \text{ mA} \\P_i &\leq 2,0 \text{ W}\end{aligned}$$

Only for connection to the interface modules type 4015A and 4040A/B outside the ATEX (Ex) zone.

Supply of bus communication interface circuit
(2 Pole Connector J2 | 0/24V)

Non-intrinsic supply ($U_{\max.} = 24\text{VDC}$)

The intrinsic safe circuits are galvanically safe separated from the non-intrinsic safe circuits up to a peak voltage of 90 V.

Load cell supply and signal circuit (Connection with BNC Connector: Type 4015A J1-J5; Type 4040A J6)

With the type of protection intrinsically safety Ex ia IIC Gb

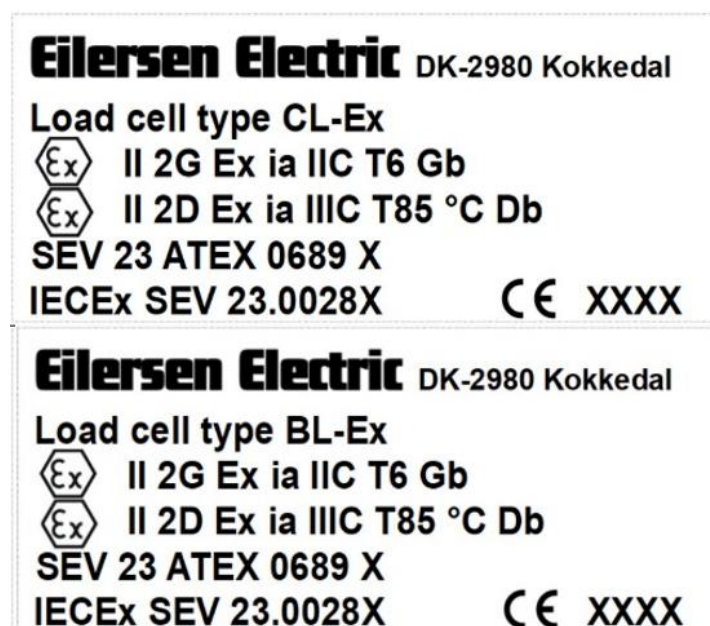
Maximum values:

$$\begin{aligned}U_o &\leq 20,4 \text{ V} \\I_o &\leq 81,0 \text{ mA} \\P_o &\leq 413,0 \text{ mW} \\C_o &\leq 206,0 \text{ nF (maximum external capacitance)} \\L_o &\leq 6,0 \text{ mH (maximum external inductance)}\end{aligned}$$

Installation of the Ex certified load cells

The ATEX (Ex) certified load cells type CL-Ex, CM-EX, CH-Ex, ELCL-Ex, BL-Ex, BM-Ex, BH-Ex, SBL-Ex, XBL-Ex, XBM-Ex, XBH-Ex, HBL-Ex, HBM-Ex, TL-Ex, TM-Ex, DLC-Ex, DXLC-Ex, ELCL-Ex, DMC-Ex, SPSX-Ex, SPSXL-Ex, FBL-Ex, FBM-Ex are each equipped with an Ex label.

Below is shown examples of the Ex label for the BL-Ex and CL-Ex load cells:



The installation of the load cells must be done according to the special precautions X described on the following page.

Special precautions X for installation of the Ex load cells

1. According to RL 2014/34/EU (ATEX 114) Appendix I, the load cells are devices of equipment group II, category 2G, which, according to RL 99/92/EC (ATEX 137) can be used in zones 1 and 2, as well as gas groups IIA, IIB, and IIC, which are potentially explosive due to combustible substances in the temperature classes T1 to T6.

The requirements of IEC/EN 60079-14 and local ordinary installation requirements must be observed for installation and use.

2. According to RL 2014/34/EU (ATEX 114) Appendix I, the load cells are devices of equipment group II, category 2D, which, according to RL 99/92/EG (ATEX 137) can be used in zones 21 and 22 in the presence of combustible dusts.

The requirements of IEC/EN 60079-14 and local ordinary installation requirements must be observed for installation and use.

3. The load cells are connected to the interface modules type 4015A and/or 4040A/B by a screened coaxial cable with a maximum length of 1200meters using a BNC connector or a screened Ex certified cable with a capacitance of < 100nF.
4. The load cells connected with the shield of the coaxial cable are to be included in the equipotential bonding (PA/PE) of the system along the entire length of the cable route.
5. Only for the ambient temperature range -40 °C to +70 °C.
6. In addition, the "ATEX 4000 System" diagram in appendix 1 must be observed for the connection of the weighing system.

Intrinsically safe ratings for the Ex certified load cells

Load cells type CL-Ex, CM-EX, CH-Ex, ELCL-Ex, BL-Ex, BM-Ex, BH-Ex, SBL-Ex, XBL-Ex, XBM-Ex, XBH-Ex, HBL-Ex, HBM-Ex, TL-Ex, TM-Ex, DLC-Ex, DXLC-Ex, ELCL-Ex, DMC-Ex, SPSX-Ex, SPSXL-Ex, FBL-Ex, FBM-Ex

Load cell supply and signal circuit (Connection with BNC Connector)

With the type of protection intrinsic safety Ex ia IIC T6 Gb; Ex ia IIIC T85°C Db only for connection to a certified intrinsically safe circuit.

Maximal values:

$$U_i \leq 20,4 \text{ V}$$

$$I_i \leq 81,0 \text{ mA}$$

$$P_i \leq 413,0 \text{ mW}$$

$$C_i = 0 \text{ (negligible small)}$$

$$L_i = 0 \text{ (negligible small)}$$

General precautions

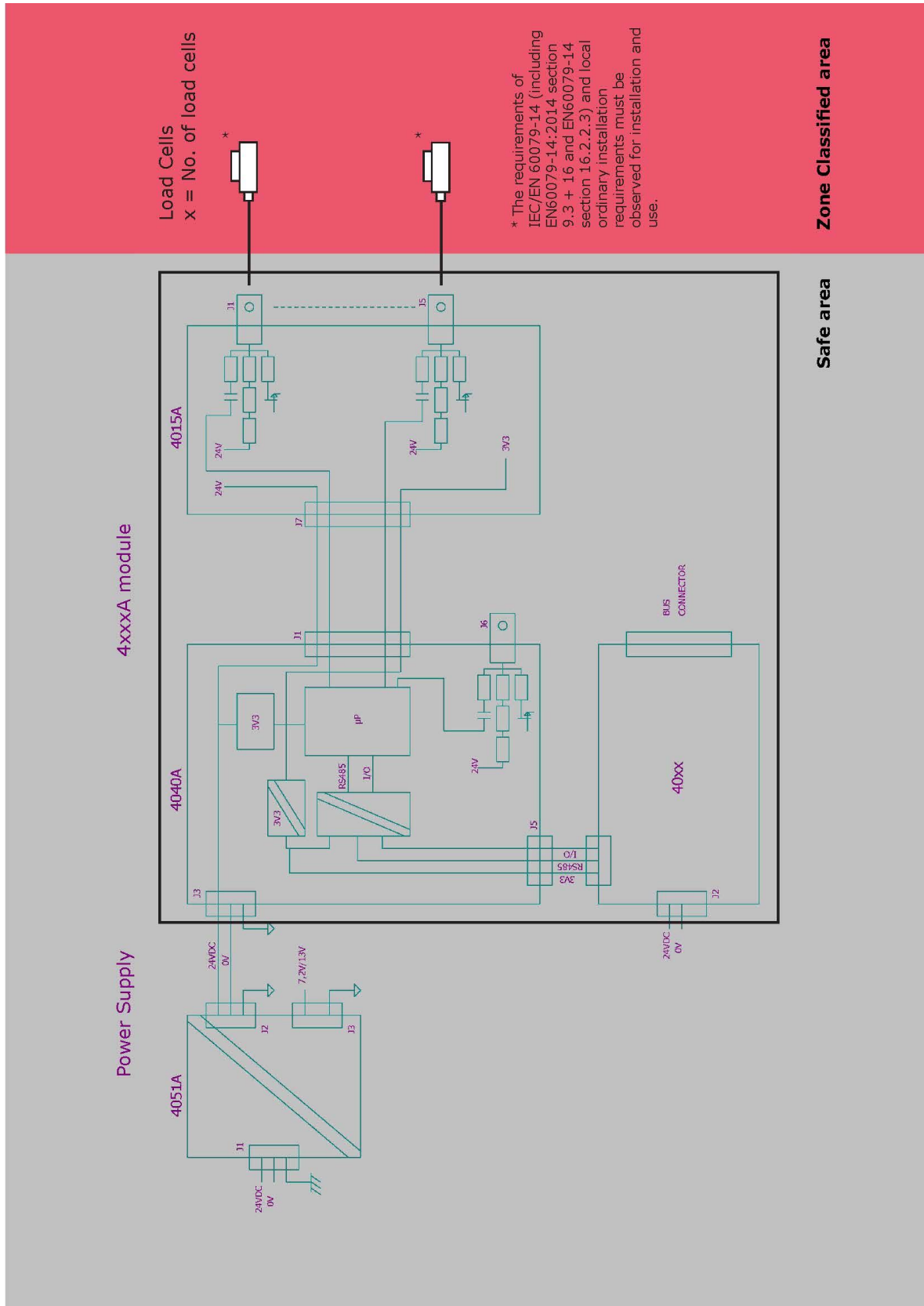
After the mechanical and electrical installation but before the load cells are connected to the weighing module type 4XXXA via the BNC connectors, the following precautions must be followed:

- The surrounding temperature must be in the range -40°C to $+70^{\circ}\text{C}$.
- The resistance measured between ground on the BNC connector and PA/PE must be max. 2,0 Ohm.
- The voltage measured between the conductor of the BNC connector and the shield of the coaxial cable must be max. 20,4 VDC.
- The shortcut current measured between the conductor of the BNC connector and the shield of the coaxial cable must be max. 90 mA.
- The 24 Vdc power supply must be cut off by all mechanical or electrical procedures in the hazardous Zone.

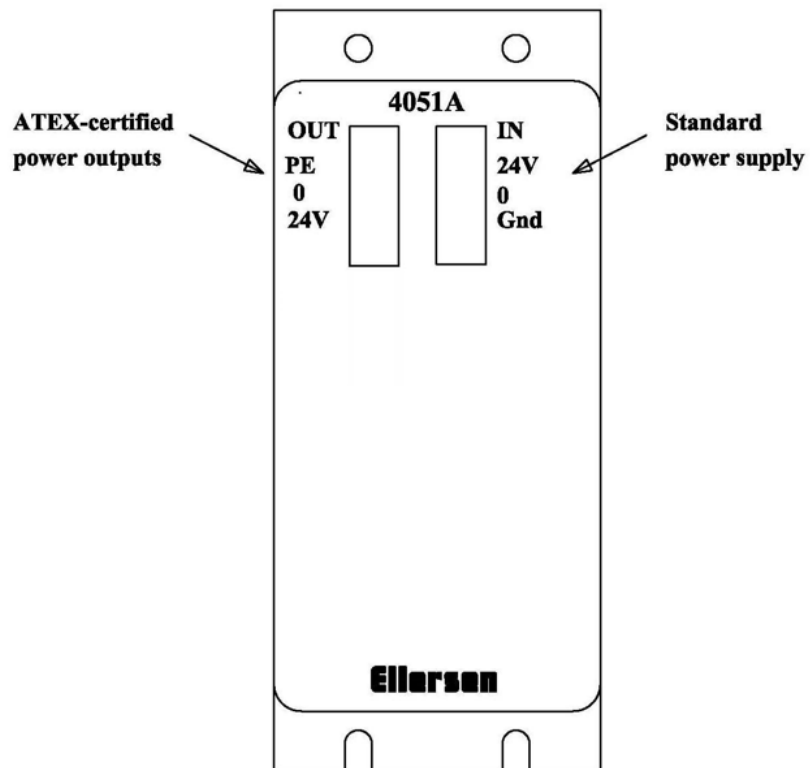
It is allowed to separate the BNC male/female connectors in Zone 1 and Zone 2 if the 24 Vdc power supply is cut off.

In general, no maintenance procedures are required. If a failure should occur, the defect component must be sent to Eilersen Electric A/S for analysis and repair.

Appendix 1 – ATEX 4000 System



Appendix 2 – ATEX (Ex) power supply type 4051A



Appendix 3 – ATEX (Ex) weighing module type 4435A

