



HAZARDOUS AREA TRANSMITTER MANUAL

SMART PRESSURE TRANSMITTERS

**PYRP-2000ALW, PYRP-2000ALW SAFETY,
PYRP-2000ALW/IS, PYRP-2000ALW/L../IS**

SMART PRESSURE DIFFERENTIAL TRANSMITTERS

**PYRD-2000ALW, PYRD-2000ALW SAFETY, PYRD-2000GALW,
PYRD-2200ALW, PYRD-2000ALW/IS, PYRD-2200ALW/IS,
PYRD-2000GALW/IS, PYRD-2000ALW/L../IS,
PYRD-2200ALW/L../IS**

SMART LEVEL PROBES





PYRD-2000YALW, PYRL-2000YALW/IS



Pyropress Ltd, Bell Close, Plymouth, PL7 4JH. UK
tel. +44 1752 333933

www.pyropress.com e-mail: sales@pyropress.com

Symbols used

Symbol	Description
	Warning to proceed strictly in accordance with the information provided in the documentation in order to ensure safety and full functionality of the device.
	Information particularly useful during device installation and operation.
	Information particularly useful for Ex device installation and operation.
	Information on disposal of used equipment.

BASIC REQUIREMENTS AND OPERATION SAFETY



- The manufacturer shall not be liable for any damage resulting from incorrect installation, failure to maintain the device in proper condition, or device use other than intended.
- Installation should be carried out by qualified staff having the required authorization to install electrical and I&C equipment. The fitter is responsible for performing the installation in accordance with this manual and with the electromagnetic compatibility and safety regulations and standards applicable to the type of installation.
- If leakage in systems with I&C equipment occurs, pressurized medium poses a threat to personnel. All safety and protection requirements must be observed during transmitter installation, operation and inspections.
- If a malfunction occurs, the device should be removed and returned for repair to the manufacturer or a facility authorized by the manufacturer.



In order to minimize the risk of malfunction and associated risks to staff, do not install or use the device in particularly adverse conditions, where the following hazards occur:

- Possible mechanical impacts, excessive shocks and vibration;
- Excessive temperature fluctuation;
- Water condensation, dust, icing.



Installations of this equipment should be made with particular care and in accordance with standards and regulations applicable to this type of installations.

Continuous development may result in changes to specification without prior notice. The latest version can be found on the manufacturer's website: www.pyropress.com.

TABLE OF CONTENTS

1. INTRODUCTION	5
2. SAFETY	5
3. COMPLETE DELIVERY CHECKLIST	5
4. IDENTIFICATION MARKS.....	6
5. TRANSMITTER DESIGN	6
6. ELECTROSTATIC HAZARDS	7
7. SPECIAL CONDITIONS OF USE	7
8. TRANSMITTER PROTECTION LEVEL (EPL) AND HAZARDOUS AREAS	8
9. INTRINSICALLY-SAFE Exi TRANSMITTERS COVERED BY CERTIFICATES KDB 20 ATEX 0016X AND IECEx KDB 20.0004X.....	9
9.1. Standards used for assessment.....	9
9.2. Transmitter Ex certification designations according with certificates KDB 20 ATEX 0016X and IECEx KDB 20.0004X.	9
9.3. Minimum supply voltage.....	10
9.4. Load resistance.....	10
10. INTRINSICALLY-SAFE Exi TRANSMITTERS COVERED BY CERTIFICATES FTZU 11 ATEX 0281X AND IECEx FTZU 15.0028X.....	10
10.1. Standards used for assessment.....	10
10.2. Transmitter Ex certification designations according with certificates FTZU 11 ATEX 0281X and IECEx FTZU 15.0028X	10
10.3. Minimum supply voltage.....	11
10.4. Load resistance.....	11
11. PERMISSIBLE PARAMETERS OF Exi TRANSMITTERS.....	11
11.1. Linear power supply example.....	12
11.2. Trapezoidal power supply example.....	12
11.3. Orthogonal power supply example.....	12
12. CONNECTING Exi TRANSMITTERS AND PROBES	13
13. FLAMEPROOF Exd TRANSMITTERS COVERED BY CERTIFICATES KDB 20 ATEX 0016X AND IECEx KDB 20.0004X.....	14
13.1. Standards used for assessment.....	14
13.2. Transmitters Ex certification designations according with certificates KDB 20 ATEX 0016X and IECEx KDB 20.0004X.	14
14. PERMISSIBLE PARAMETERS OF Exd TRANSMITTERS	15
14.1. Ambient temperature range and temperature classes	15
14.2. Power supply, connection and operation of Exd transmitters.....	16
15. ADDITIONAL INFORMATION	21
15.1. Additional information.....	21
15.2. History of revisions.....	21

LIST OF DRAWINGS

Figure 1. Sample transmitter nameplate with common Exi and Exd designation	6
Figure 2. Transmitter installation in potentially explosive areas.	8
Figure 3. Principle of power supply from a linear source.....	12
Figure 4. Principle of power supply from a trapezoidal source.....	12
Figure 5. Connecting Exi transmitters and probes	13
Figure 6. Connecting Exd transmitters and probes	16
Figure 7. Installation of cable entries and blanking plugs	18
Figure 8. Flameproof joints of enclosure.	20

LIST OF TABLES

Table 1. Minimum supply voltage of and Exi transmitter with reference to certificates KDB .. ATEX and IECEx KDB	10
Table 2. Minimum supply voltage of and Exi transmitter with reference to certificates..... FTZU 11 ATEX 0281X and IECEx FTZU 15.0028X.....	11
Table 3. Permissible input parameters of an Exi transmitter.....	11
Table 4. Ambient temperature range and temperature classes for Exd transmitters	15
Table 5. Maximum supply voltage for Exd transmitters	16
Table 6. List of equivalent cable entries.....	18
Table 7. List of equivalent blinding plugs	19
Table 8. List of flameproof joints in a flameproof enclosure.....	20

1. INTRODUCTION

This manual is only applicable to the PYRP-2000ALW, PYRP-2000ALW Safety, PYRD-2000ALW, PYRD-2000ALW Safety, PYRD-2200ALW, PYRD-2000GALW and PYRD-2000YALW series transmitters in Ex (explosion-proof), Exi (intrinsically safe), Exd (flameproof), and both Exi and Exd variants. Ex information are included in the "Product Certificate".

The manual contains highly important information for intrinsically safe and flameproof transmitters compliant with ATEX directive and IECEx requirements. If Ex certified transmitters are installed, refer to this manual and also:

- MAN.PYRP.PYRD.SA.002 manual for PYRP-2000ALW Safety, PYRD-2000ALW Safety series transmitters,
- MAN.PYRP.PYRD.EX.002 manual for PYRP-2000ALW, PYRD-2000ALW, PYRD-2200ALW, PYRD-2000GALW and PYRD-2000YALW series transmitters with Exd certification and dual Exi and Exd certification,
- MAN.PYRP.PYRD.EX.003 manual for PYRP-2000ALW/IS, PYRD-2000ALW/IS, PYRD-2200ALW/IS, PYRD-2000GALW/IS and PYRD-2000YALW/IS series transmitters with normal and Exi certification.

2. SAFETY



- Read this manual carefully before installing, commissioning and operating the transmitter.
- Installation and maintenance should be carried out by qualified staff having the required authorisation to install electrical and measuring devices.
- The transmitter should be used as intended within permissible parameters.
- Power source must be disconnected before installing or removing the transmitter.
- No repairs or alterations to the transducer electronic system are permitted. Only the manufacturer or a facility authorised by the manufacturer may assess damages and repair the device (if possible).
- Do not use damaged instruments. In case of failure, the device must be disconnected.



- If the equipment is used in Ex zones, the technical requirements specified in this manual and applicable local (national) regulations must be followed.

3. COMPLETE DELIVERY CHECKLIST

The user receives the following with the transmitter:

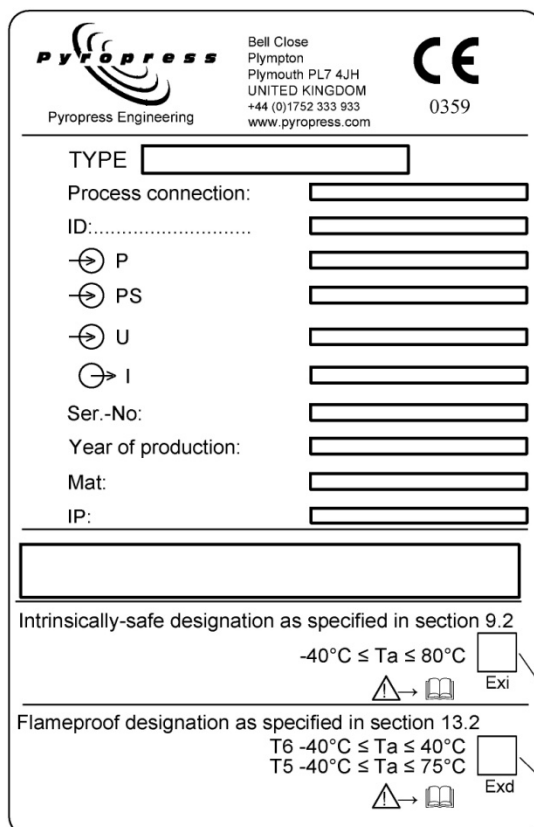
- a) Declaration of Conformity.
- b) Certificate copy (on request).
- c) MAN.PYRP.PYRD.EX.001 hazardous area transmitter manual.
- d) MAN.PYRP.PYRD.SA.002 user manual or MAN.PYRP.PYRD.EX.002 user manual or MAN.PYRP.PYRD.EX.003 user manual.

Items are available at www.pyropress.com.

4. IDENTIFICATION MARKS.

Ex transmitters are delivered with a nameplate which contains data specified in section 6.2, MAN.PYRP.PYRD.SA.002 or MAN.PYRP.PYRD.EX.002 or MAN.PYRP.PYRD.EX.003 and also the following:

- Designation of Ex design type, certificate number.
- Parameter values, e.g. Ui, li, Ci, Li for Exi transmitters.
- Year of manufacture.
- “SA Version” inscription — isolated power supply for intrinsically safe transmitters with overvoltage protection in which ground isolated power supply should be used.



The nameplate is a rectangular label with a black border. At the top left is the PyroPress logo. To its right is the company address: Bell Close, Plympton, Plymouth PL7 4JH, UNITED KINGDOM, +44 (0)1752 333 933, www.pyropress.com. At the top right is the CE mark and the number 0359. Below this is a section for 'TYPE' with a blank box. This is followed by 'Process connection:' with a blank box. Then 'ID:.....' with a blank box. Below that are four rows for process types: P, PS, U, and I, each with a blank box. Then 'Ser.-No:' with a blank box, 'Year of production:' with a blank box, 'Mat:' with a blank box, and 'IP:' with a blank box. Below these is a large blank box. Then 'Intrinsically-safe designation as specified in section 9.2' with a temperature range $-40^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$ and a blank box for 'Exi'. Below this is 'Flameproof designation as specified in section 13.2' with two temperature ranges: $T6 -40^{\circ}\text{C} \leq T_a \leq 40^{\circ}\text{C}$ and $T5 -40^{\circ}\text{C} \leq T_a \leq 75^{\circ}\text{C}$, and a blank box for 'Exd'. A line from the 'Exi' and 'Exd' boxes points to a note below the nameplate.

For a transmitter with common Exi and Exd designation, the box indicating the intended Exi or Exd explosion proof protection type should be permanently marked before the transmitter is installed

Figure 1. Sample transmitter nameplate with common Exi and Exd designation

5. TRANSMITTER DESIGN

The basic transmitter components are: an enclosure in 316 (1.4401) stainless steel or aluminum, measuring head where a pressure signal is converted to an electrical signal, and an electronic module converting the signal from the head to an output signal. Transmitters in aluminum enclosures are permitted for groups II and III, and transmitters in steel enclosures are permitted for groups I, II and III.

6. ELECTROSTATIC HAZARDS

The paint, plastic nameplate and diaphragm seals coated with PTFE form a non-conducting layer applied on a conducting base of enclosure or diaphragm seals. Transmitters with this design in a dust-explosion zone should be installed in a place where electrostatic charging is impossible, in particular by contact with electrically charged dust falling off or blown from neighbouring devices.

7. SPECIAL CONDITIONS OF USE

- a) The maximum temperature of the external heating source cannot heat the transmitter above the maximum declared ambient temperature.
- b) Some gaps of flameproof joint are smaller and longer than those required in table 3 of EN 60079-1 (see **Table 8**).
- c) In hazardous dust applications, transmitters with painted aluminum enclosures as well as transmitters equipped with plastic nameplate and PTFE-coated diaphragm separator components should be installed in way that prevents electrostatic charging specified in accordance with point 6.
- d) A diaphragm seal or similar with titanium components must be protected from mechanical impacts.
- e) An intrinsically safe transmitter version with surge arrester, marked on the nameplate as "SA" does not meet the requirements of clause 10.3 of EN 60079-11 (500Vrms). The device should be installed in accordance with point 12.
- f) If a transmitter with a nameplate containing dual certified designs is used, the applied protection type must be permanently marked on the nameplate before installation (see Figure 1).
- g) For a transmitter with a flameproof enclosure, the diaphragm should not be exposed to damage during transmitter installation and operation. The transmitter diaphragm is made of stainless steel, Hastelloy or tantalum and must not be exposed to contact with a medium that may damage it.
- h) Galvanically separated part of apparatus within the measuring head is electrically connected to the enclosure. This should be taken into account when installing the apparatus with remote measuring head and cable.

8. TRANSMITTER PROTECTION LEVEL (EPL) AND HAZARDOUS AREAS

Ga/Gb (Da/Db) EPL protection level allows the transmitter to be installed in Zone 1 (21) or 2 (22), and the transmitter process connectors can connect to Zone 0 (20). Gb (Db) EPL protection level allows the transmitter and process connector to be installed in Zone 1 (21) or 2 (22). Da EPL protection level allows the transmitter and process connector to be installed in Zone 20 or 21. Transmitters for mining applications Mb should be turned off if explosion hazard occurs.

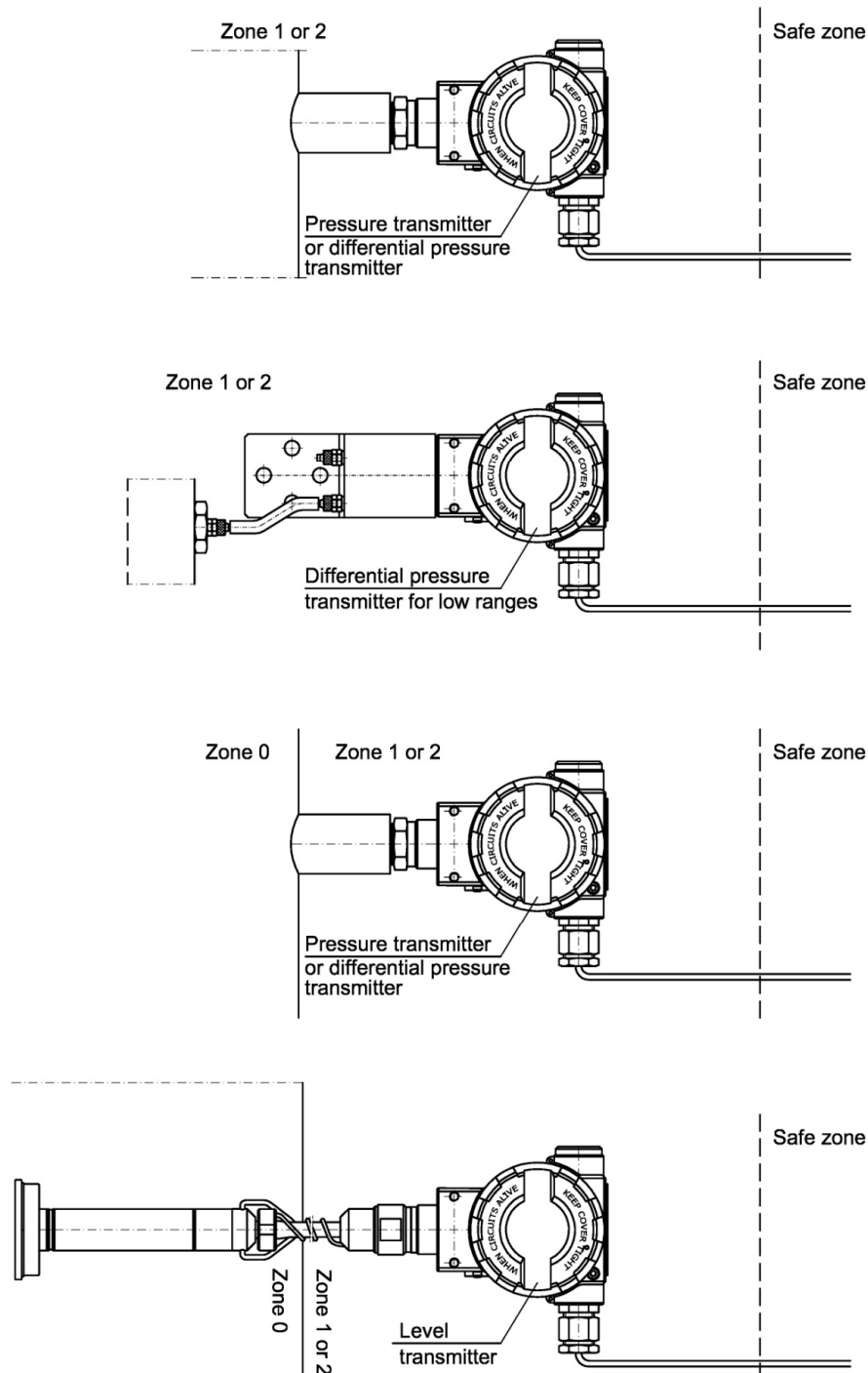


Figure 2. Transmitter installation in potentially explosive areas.

9. INTRINSICALLY-SAFE Exi TRANSMITTERS COVERED BY CERTIFICATES KDB 20 ATEX 0016X AND IECEX KDB 20.0004X.

9.1. Standards used for assessment

The transmitters are manufactured in compliance with the following standards:

EN 60079-0:2012+A11:2013 (IEC 60079-0:2011 ed. 6.0)

EN 60079-11:2012 (IEC 60079-11:2011 ed. 6.0).

9.2. Transmitter Ex certification designations according with certificates KDB 20 ATEX 0016X and IECEX KDB 20.0004X.

ATEX:



II 1/2G Ex ia IIC T4/T5 Ga/Gb

II 1D Ex ia IIIC T105°C Da

I M1 Ex ia I Ma

(for the version with 1.4401 (316) steel enclosure)

KDB 20 ATEX 0016X

IECEX:

Ex ia IIC T4/T5 Ga/Gb

Ex ia IIIC T105°C Da

Ex ia I Ma

(for the version with 1.4401 (316) steel enclosure)

IECEX KDB 20.0004X



As standard, the transmitters are manufactured for explosive gas atmospheres.

A customer can also order a transmitter for explosive dust atmospheres and for mining applications.



Transmitters with common Exi and Exd designation, as presented in Figure 1, become intrinsically safe transmitters when Exi field is permanently marked.

9.3. Minimum supply voltage

Table 1. Minimum supply voltage of an Exi transmitter according with certificates KDB 20 ATEX 0016X and IECEx KDB 20.0004X.

Minimum supply voltage for transmitters with backlight off	Minimum supply voltage for transmitters with backlight on *)
11.5 V	14.5 V
*) Backlight can only be turned on at transmitter manufacturing stage	

9.4. Load resistance

- a) For a linear power supply from a barrier

$$R_{o \max} [\Omega] = \frac{U_{app} - 11.5 V - (R_W * 0.02066 A)}{0.02066 A}$$

- b) For power supply from a trapezoidal or orthogonal source.

$$R_{o \max} [\Omega] = \frac{U_{app} - 11.5 V}{0.02066 A}$$

R_W – barrier resistance;

U_{app} – minimum voltage of the barrier used

10. INTRINSICALLY-SAFE Exi TRANSMITTERS COVERED BY CERTIFICATES FTZU 11 ATEX 0281X AND IECEx FTZU 15.0028X

10.1. Standards used for assessment

The transmitters are manufactured in compliance with the following standards:

EN 60079-0:2012+A11:2013 (IEC 60079-0:2011 ed. 6.0)

EN 60079-11:2012 (IEC 60079-11:2011 ed. 6.0).

10.2. Transmitter Ex certification designations according with certificates FTZU 11 ATEX 0281X and IECEx FTZU 15.0028X

ATEX:



II 1/2G Ex ia IIC T4/T5 Ga/Gb

II 1/2G Ex ia IIB T4/T5 Ga/Gb (version with PTFE-shielded cable)

II 1D Ex ia IIIC T105°C Da

I M1 Ex ia I Ma (for the version with 1.4401 (316) steel enclosure)

FTZU 11 ATEX 0281X

IECEx:

Ex ia IIC T4/T5 Ga/Gb

Ex ia IIB T4/T5 Ga/Gb (version with PTFE-shielded cable)

Ex ia IIIC T105°C Da

Ex ia I Ma (for the version with 1.4401 (316) steel enclosure)

IECEx FTZU 15.0028X



As standard, the transmitters are manufactured for explosive gas atmospheres. A customer can also order a transmitter for explosive dust atmospheres and for mining applications.

10.3. Minimum supply voltage

Table 2. Minimum supply voltage of an Exi transmitter according with certificates FTZU 11 ATEX 0281X and IECEx KDB 15.0028X

Minimum supply voltage
10.5 V

10.4. Load resistance

- a) For a linear power supply from a barrier

$$R_{o \max [\Omega]} = \frac{U_{app} - 10.5 V - (R_W * 0.022 A)}{0.022 A}$$

- b) For power supply from a trapezoidal or orthogonal source.

$$R_{o \max [\Omega]} = \frac{U_{app} - 10.5 V}{0.022 A}$$

R_W – barrier resistance;

U_{app} – minimum voltage of the barrier used

11. PERMISSIBLE PARAMETERS OF EXi TRANSMITTERS

Table 3. Permissible input parameters of an Exi transmitter

Linear power supply	Orthogonal power supply		Trapezoidal power supply
$U_i = 30 V$	$U_i = 24 V$	$U_i = 24 V$	$U_i = 24 V, U_Q = 48 V$
$I_i = 0.1 A$	$I_i = 0.025 A$	$I_i = 0.05 A$	$I_i = 0.05 A$
$P_i = 0.75 W$	$P_i = 0.6 W$	$P_i = 1.2 W$	$P_i = 0.7 W$
$C_i = 2.5 nF$	$C_i = 2.5 nF$	$C_i = 2.5 nF$	$C_i = 2.5 nF$
$L_i = 18 \mu H$	$L_i = 18 \mu H$	$L_i = 18 \mu H$	$L_i = 18 \mu H$
$-40^\circ C \leq T_a \leq +80^\circ C (T5)$	$-40^\circ C \leq T_a \leq +80^\circ C (T5)$	$-40^\circ C \leq T_a \leq +80^\circ C (T4)$	$-40^\circ C \leq T_a \leq +80^\circ C (T5)$



The transmitters should be powered via approved intrinsically safe barriers / galvanic isolators. The parameters of their outputs to the hazardous area should not exceed the limit power supply parameters for the below specified transmitters.

11.1. Linear power supply example

For example, linear power supply is provided by a typical barrier with the following parameters

$U_o = 28V$; $I_o = 0.1A$; $P_o = 0.7W$; $R_w = 280\Omega$.

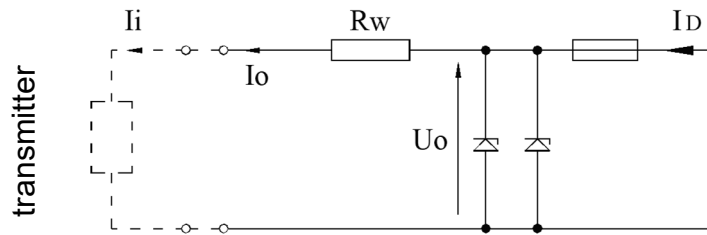


Figure 3. Principle of power supply from a linear source.

11.2. Trapezoidal power supply example

$U_o = 24V$; $I_o = 50mA$; $P_o = 0.7W$

An example of trapezoidal power supply is shown in **Figure 4**.

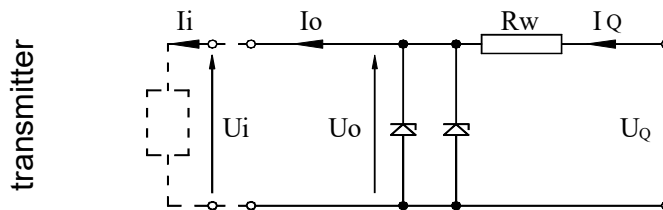


Figure 4. Principle of power supply from a trapezoidal source.

If $U_o > \frac{U_Q}{2}$, U_Q , I_o , P_o have the following relations:

$$P_o = \frac{U_Q * I_o}{4}$$

If $U_o \leq 1/2 U_Q$, U_Q , I_o , P_o have the following relations:

$$P_o = \frac{U_o(U_Q - U_o)}{R_w}$$

Resistance R_w :

$$R_w = \frac{U_Q}{I_o}$$

11.3. Orthogonal power supply example

$U_o = 24 V$ $I_o = 25 mA$ $P_o = 0.6 W$

$U_o = 24 V$ $I_o = 50 mA$ $P_o = 1.2 W$

Orthogonal power supply means that the voltage of an intrinsically safe power adapter does not change until the current limiter is activated.

The level of protection of orthogonal power supply adapters is usually "ib". A transmitter supplied from such power adapter is usually an "ib" intrinsically safe device.

An example of power supply in practice:

A stabilized power adapter with $U_0 = 24\text{ V}$, "ib" protection level and current limited to $I_0 = 25\text{ mA}$.

12. CONNECTING Exi TRANSMITTERS AND PROBES



The transmitter and other devices in the measuring loop should be connected in accordance with the current Intrinsically Safe equipment installation regulations and the conditions for use in designated hazardous areas.

Failure to observe the above can increase the risk of explosion and the resulting hazard to people and property.

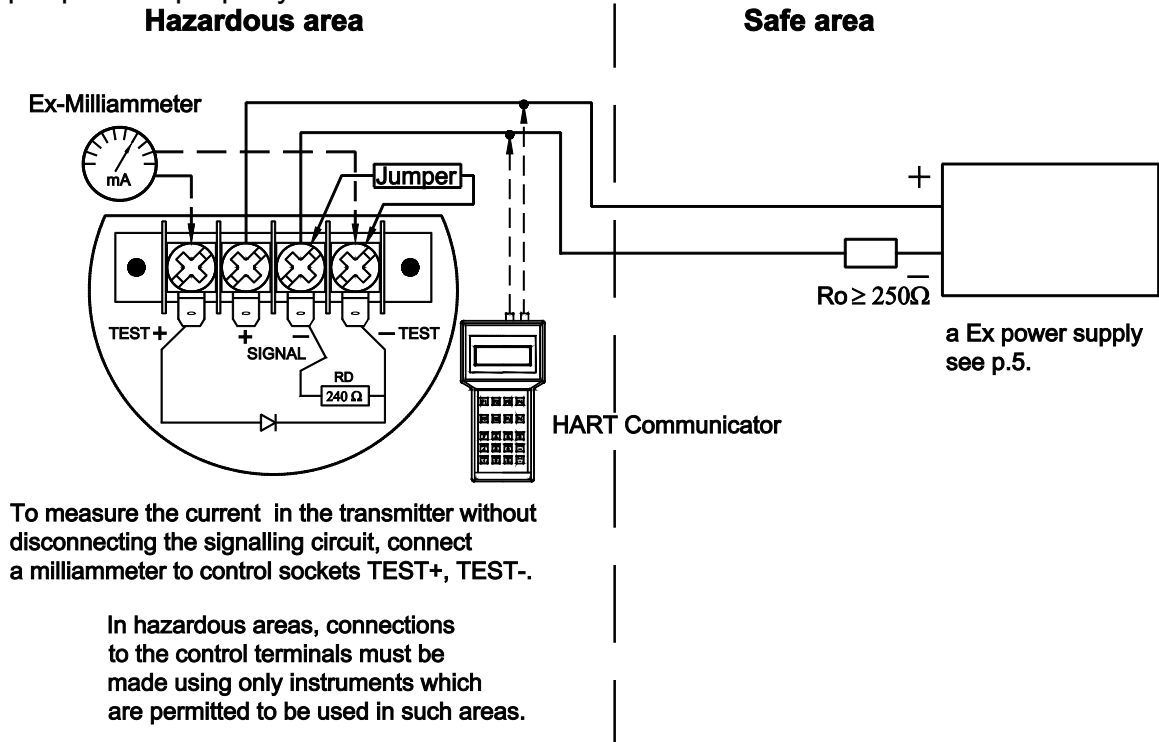


Figure 5. Connecting Exi transmitters and probes



The transmitter is equipped with an additional communication resistor $R_D=240\Omega$. <SIGNAL -> and <TEST -> terminals are short-circuited in factory. R_D resistor is used when transmitter local communication is required and the $R_o < 240\Omega$. <SIGNAL -> and <TEST -> terminals must be open-circuited then.



If the medium temperature can exceed $T_a=80^\circ\text{C}$, elements, such as diaphragm seals, siphon tubes, etc., should be used. The transmitter operating temperature T_p must meet the $T_p \leq T_a$ condition.



The electrical system for connecting transmitters should meet installation requirements of applicable standards.



No repairs or alterations to the transmitter electrical system are permitted. Only the manufacturer or a facility authorised by the manufacturer may assess damage and repair the device (if possible).

MAN.PYRP.PYRD.EX.001



“Version SA” transmitters should be supplied from devices equipped with a galvanically isolated power supply. If a galvanically isolated power supply is not available, the transmitter or metal parts connected to it should be properly grounded, for instance with equipotential wiring or an equipotential bonding between the transmitter and the negative pole of power supply barrier.



The transmitter enclosure has two entries (one with blanking plug) in either M20x1.5 or 1/2 NPT threads. Transmitters with common Exi and Exd designation, as presented in Figure 1, become intrinsically safe transmitters when Exi field is permanently marked. If such transmitter is delivered without a cable gland, the customer is obliged to install a cable gland with at least IP66 protection and operation temperature range suitable for the installation site. In transmitters used in dust explosion zones, the cable glands installed by the customer should be certified and have a designation proper to dust zones where the transmitters are used.

13. **FLAMEPROOF Exd TRANSMITTERS COVERED BY CERTIFICATES KDB 20 ATEX 0016X AND IECEx KDB 20.0004X.**

13.1. **Standards used for assessment**

The transmitters are manufactured in compliance with the following standards:

EN 60079-0:2012+A11:2013 (IEC 60079-0:2011 ed. 6.0)

EN 60079-11:2012 (IEC 60079-11:2011 ed. 6.0)

EN 60079-1:2014 (IEC 60079-1:2014 ed. 7.0)

EN 60079-31:2014 (IEC 60079-31:2013 ed. 2.0)

EN 60079-26:2015 (IEC 60079-26:2014 ed. 3.0)

13.2. **Transmitters Ex certification designations according with certificates KDB 20 ATEX 0016X and IECEx KDB 20.0004X.**

ATEX:



II 1/2G Ex ia/db IIC T6/T5 Ga/Gb

II 1/2D Ex ia/tb IIIC T105°C Da/Db

I M2 Ex db ia I Mb

(for the version with 1.4401 (316) steel enclosure)

KDB 20 ATEX 0016X



II 2G Ex ia/db IIC T6/T5 Gb

II 2D Ex ia/tb IIIC T105°C Db

I M2 Ex db ia I Mb

(for the version with 1.4401 (316) steel enclosure)

KDB 20 ATEX 0016X

IECEX:

Ex ia/db IIC T6/T5 Ga/Gb

Ex ia/tb IIIC T105°C Da/Db

Ex db ia I Mb

(for the version with 1.4401 (316) steel enclosure)

IECEX KDB 20.0004X

Ex ia/db IIC T6/T5 Gb

Ex ia/tb IIIC T105°C Db

Ex db ia I Mb

(for the version with 1.4401 (316) steel enclosure)

IECEX KDB 20.0004X



Transmitters with common Exi and Exd designation, as presented in Figure 1, become flameproof transmitters when Exd field is permanently marked.

14. PERMISSIBLE PARAMETERS OF Exd TRANSMITTERS

14.1. Ambient temperature range and temperature classes

Table 4. Ambient temperature range and temperature classes for Exd transmitters

Operating temperature range		Temperature class and maximum surface temperature
Ambient temperature	Process temperature	
$-40^{\circ}\text{C} \leq T_a \leq 40^{\circ}\text{C}$	$-40^{\circ}\text{C} \div 40^{\circ}\text{C}$	T6/T105°C
$-40^{\circ}\text{C} \leq T_a \leq 75^{\circ}\text{C}$	$-40^{\circ}\text{C} \div 75^{\circ}\text{C}$	T5/T105°C



If the medium temperature can exceed $T_{a\max}$, elements, such as diaphragm seals, siphon tubes, etc., should be used. The transmitter operating temperature T_p must meet the $T_p \leq T_{a\max}$ condition.

14.2. Power supply, connection and operation of Exd transmitters



Connect the transmitter according to the wiring diagram (**Figure 6**). The transmitter electrical connections in potentially explosive zones should be made by personnel having necessary knowledge and experience. The transmitters should be properly grounded by means of a grounding terminal. If the transmitter has metal contact with grounding structural elements or piping, separate transmitter grounding is not necessary.



The transmitter and equipment in the transmitter measurement loop must be connected in compliance with the relevant Ex installation standards and conditions for application in explosion risk zones. If these rules are not followed, explosion may occur and personnel may be exposed to danger.

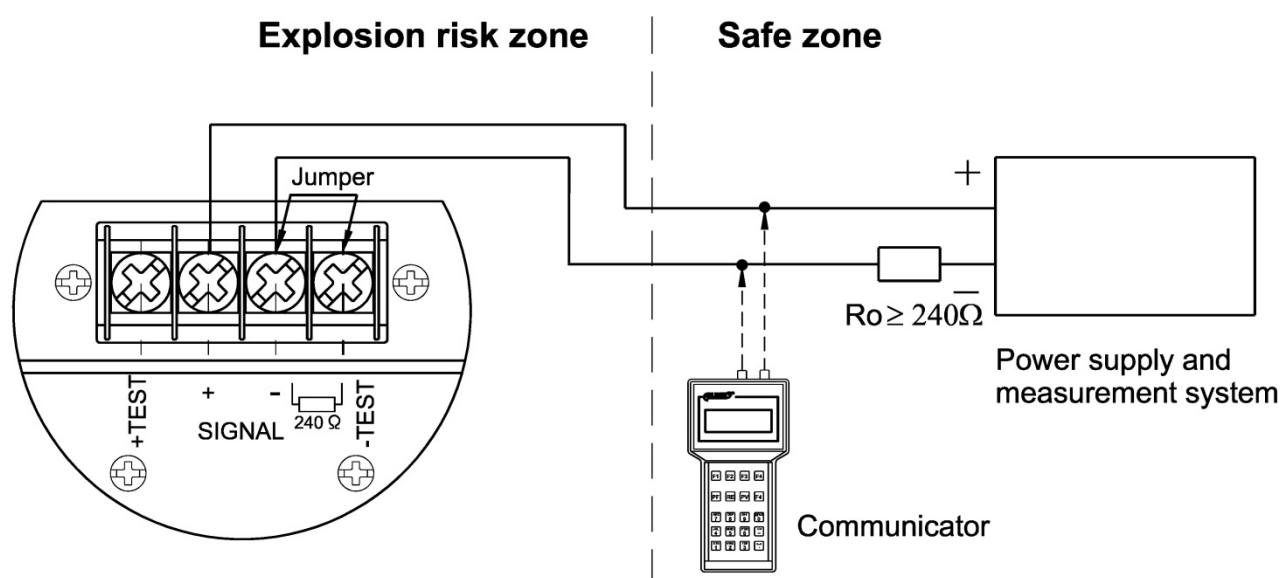


Figure 6. Connecting Exd transmitters and probes



The transmitters should be supplied with maximum voltage specified in the table below (24 VDC rating) from transformer power supplies or other devices providing at least enhanced isolation between primary and secondary winding in which voltages cannot exceed 250 VAC. It is responsibility of the user to provide power supply compliant with the requirements above.

Table 5. Maximum supply voltage for Exd transmitters

Maximum supply voltage	
PYRP-2000ALW Safety, PYRD-2000ALW Safety	PYRP-2000ALW, PYRD-2000ALW, PYRD-2200ALW, PYRD-2000GALW, PYRD-2000YALW
36 VDC	55 VDC



In a hazardous area, do not remove the cover of the transmitter, or connect to the terminals or change the position of local indicator (display) without first electrically isolating the transmitter.

For transmitter calibration or check outside a hazardous area, a communicating device can be connected to <SIGNAL +> and <TEST +> terminals.



The transmitter is equipped with a communication resistor $R_D = 240 \Omega$, which is short-circuited at <SIGNAL -> and <TEST -> terminals in factory. R_D resistor is used when transmitter local communication is required and the $R_o < 240 \Omega$. <SIGNAL -> and <TEST -> terminals must be open-circuited then.



The cover locking security & sealing is shown in MAN.PYRP.PYRD.SA.002 or MAN.PYRP.PYRD.EX.002 or MAN.PYRP.PYRD.EX.003 user manuals.



No repairs or alterations to the transmitter enclosure elements and electrical system are permitted. Only the manufacturer or a facility authorised by the manufacturer may assess damages and repair the device (if possible).



Due to the type of enclosure material (light alloy with high aluminum content), the user is obliged to ensure that in the transmitter installation site its enclosure cannot be impacted and, consequently, damaged.



The transmitter enclosure has two cable entries (one with blanking plug) in either M20x1.5 or 1/2 NPT threads. After consultation with the manufacturer, the user can purchase a transmitter with a cable gland or purchase the missing cable gland separately. As standard, the transmitter is delivered to the customer without cable gland installed. In cable gland locations, a transport plug can be installed. In such case, the transport plug should be removed and appropriate cable gland fitted (**Figure 7**) before the transmitter is installed. It is responsibility of the user to install a certified cable gland compliant with the list of equivalent cable glands in **Table 6**. List of equivalent cable entriesAs a blanking plug, a plug supplied with the transmitter or a certified blinding plug compliant with the list of equivalent blinding plugs in **Table 7** can be used. It is permitted to install other types of certified cable entries and blanking plugs with marking Exd IIC Gb, Extb IIIC Db and Exd I Mb with at least IP66 protection and -40°C...75°C temperature range.

Apply LOCTITE 577 on the 1/2 NPT thread of cable gland before installation.

When connecting, make sure that the cable type and diameter is suitable for the cable gland used and temperature at the installation site.

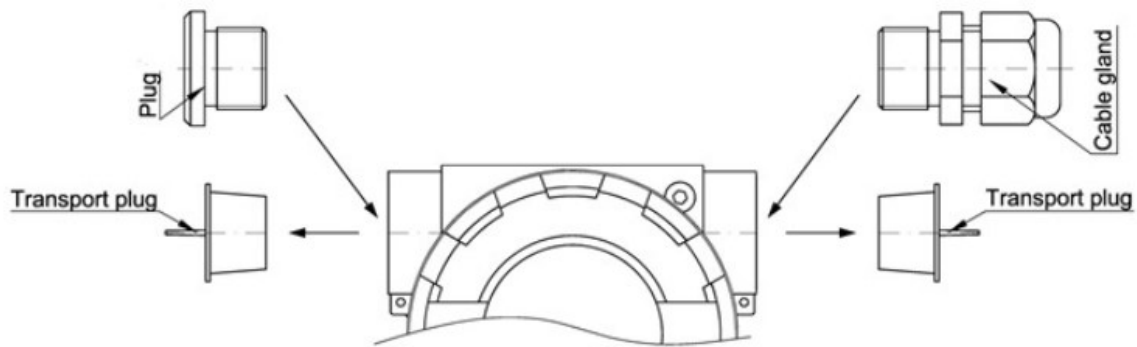


Figure 7. Installation of cable entries and blanking plugs

Table 6. List of equivalent cable entries

Cable entry type	Manufacturer	Thread	Designation	IP	Certificate no.
501/423	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	CML 19ATEX1167X
501/421	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	CML 19ATEX1167X
ICG 623	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	Baseefa 06ATEX0058X
501/453/RAC	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	CML 19ATEX1167X
501/453/Universal	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	CML 18ATEX1268X
ICG/653/Universal	Hawke International	M20x1.5 (1/2" NPT)	Exdb IIC Gb Extb IIIC Db	67	CML 18ATEX1268X
ICG/653/Universal/L	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Db	67	CML 18ATEX1268X
A2F, A2FRC	CMP-Products	M20x1.5 (1/2" NPT)	Exd IIC Gb Exta IIIC Da	67	CML 18ATEX1321X
SS2K	CMP-Products	M20x1.5 (1/2" NPT)	Exd IIC Gb Exta IIIC Da	67	CML 18ATEX1321X
E1FW, E2FW	CMP-Products	M20x1.5 (1/2" NPT)	Exd IIC Gb Exta IIIC Da Exd I Mb	67	CML 18ATEX1324X
PX2K, PXSS2K, PX2KX	CMP-Products	M20x1.5 (1/2" NPT)	Exdb IIC Gb Exta IIIC Da Exdb I Mb	67	CML18ATEX1325 X

Table 7. List of equivalent blanking plugs

Plug type	Manufacturer	Thread	Designation	IP	Certificate no.
475	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Da Exd I Mb	67	Baseefa 10ATEX0262X
477	Hawke International	M20x1.5 (1/2" NPT)	Exd IIC Gb Extb IIIC Da Exd I Mb	67	Baseefa 10ATEX0262X
747, 757 and 767	CMP-Products	M20x1.5 (1/2" NPT)	Exd IIC Gb Exta IIIC Da Exd I Mb	67	CML 18ATEX1320X

Use a shielded or unshielded, non-reinforced cable with compact structure and circular cross-section in an non-hygroscopic sheath made of an elastomer, e.g. YKSLY 2*1, YnTKSYekw 1*2*1, LIYCY 2*1.



If a cable of different design has to be used, it should be agreed on with the transmitter manufacturer in order to choose a suitable cable gland or individually purchase a cable gland suited to the cable used. The list of equivalent cable entries is given above (**Table 6**). The cables should be protected from damage by routing them in cable trays, conduits, cable ladders, and secured by using fixed mounts, etc.



When periodic inspections are performed, the cover tightness, cable entry and cable wiring into the cable entry should be checked. Visually check the enclosure and cable for mechanical damage, and the nameplate for legibility. The diaphragm should also be included in periodic inspections. It should have no signs of damage. It is recommended to apply acid-free petroleum jelly on threads during maintenance.

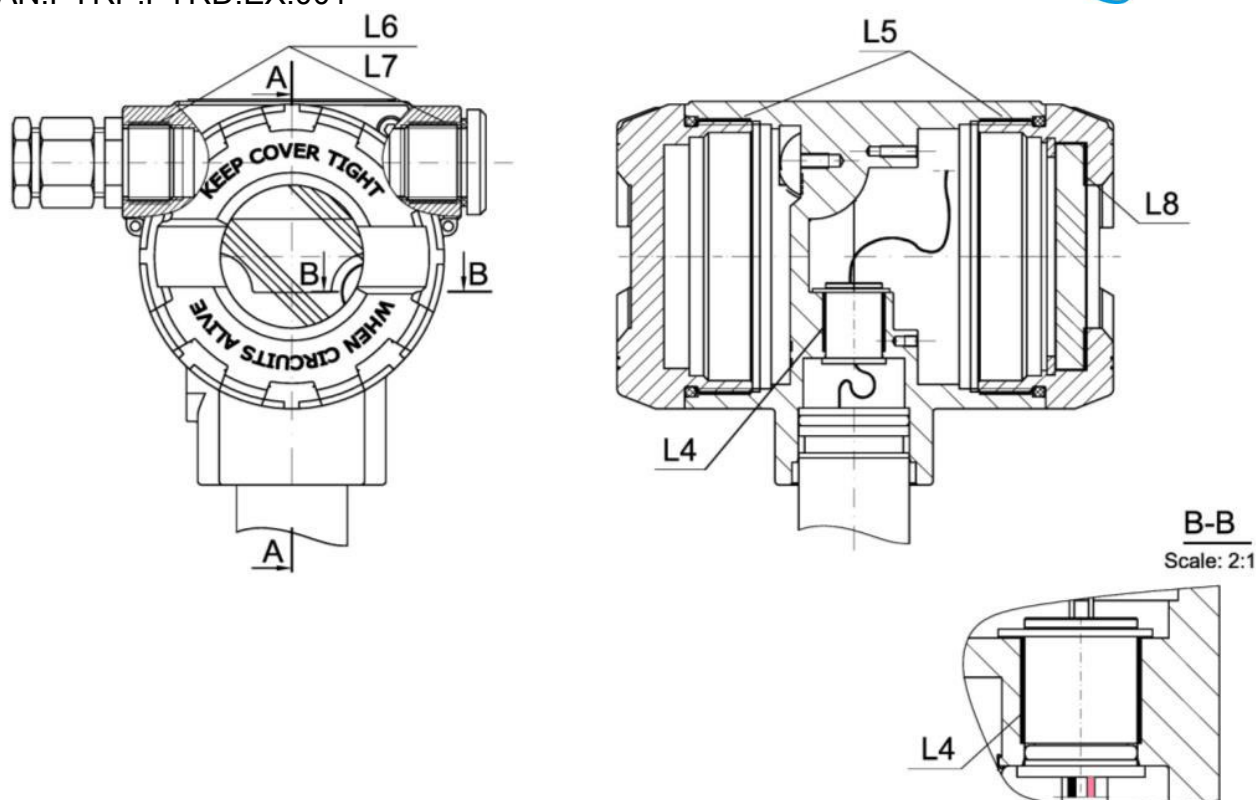


Figure 8. Flameproof joints of enclosure.

Table 8. List of flameproof joints in a flameproof enclosure

No	Length of joint (min. actual) L [mm]	Diameter		D-d [mm]	Quantity of joint	Comments (min. values acc. to EN 60079-1)
		D [mm]	d [mm]			
L4	13.2	$\varnothing 15^{+0.027}$	$\varnothing 15^{-0.040}_{-0.070}$	0.097	2	length of joint min.12,5
L5	12	M72x1. 5	M72x1. 5		2	min. 5 meshing turns
L6	9	M20x1. 5	M20x1. 5		2	min. 5 meshing turns
L7	12.7	1/2 NPT	1/2 NPT		2	min. 5 meshing turns on each surface
L8	10				1	Bonded joint, length of joint min.10



The diaphragm should not be exposed to damage during transmitter installation and operation. The transmitter diaphragm is made of stainless steel or Hastelloy and must not be exposed to contact with a medium that may damage it.



The general rules of connecting and operating an Exd transmitter should be compliant with the rules and standards applicable to devices in a flameproof enclosure:

EN 60079-14 – Electrical devices in explosive atmospheres. Part 14: Electrical installations in risk areas (other than mines).

EN 60079-17 – Electrical devices in explosive atmospheres. Part 17: Electrical installations inspection and maintenance in risk areas (other than mines).



The transmitter should not be installed in an application where the ambient temperature exceeds 80°C due to possible damage. This also applies when the transmitter is not mounted in a hazardous area.

15. ADDITIONAL INFORMATION

15.1. Additional information

The manufacturer reserves the right to introduce structural and technological changes to the device, which does not deteriorate its performance.

15.2. History of revisions

Revision No	Document revision	Description of changes
-	A – Feb 2020	Initial document version. Prepared by PM