

UNCERTIFIED ELECTRICAL SYSTEMS

Instruction manual

DRT6432

B - 2024/02

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Services



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Maintenance program

An annual maintenance program (including or not the consumables to be replaced during each intervention) can be considered with the partnership of Sames. It is associated with a preventive maintenance plan established during a first audit visit which details the control points necessary to guarantee the performance of the installed equipment.

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Hotline

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1. Health and Safety Instructions

1.1. Marking

Every electrical system must be identified by a label resuming its type and placed near the interface IS/ NIS of the electrical system.

Detector of rinsing box	DET 1.15
Detector of Booster	DET 1.12
Detector of PaintSave shuttle	DET 5.13
Bistable solenoid valve of Booster	ELE 1.1
Sensor PPS 16 bar	TRA1.10
Sensor PPS 40 bar	TRA1.11

1.2. Meaning of pictograms

				
Warning electricity	Warning Automatic start-up	Warning Hot surfaces	Warning Explosive material	General warning sign
				
Warning High pressure	Warning Crushing of hands	Warning for explosive atmospheres	Warning Flammable material	Warning Corrosive substance
				
Warning: Toxic material	Warning Harmful products	No access for people with active implanted cardiac devices	Wear ear protection	Wear a face shield
				
Wear respiratory protection	Wear safety footwear	Wear protective clothing	Wear protective gloves	Wear head protection
				
Opaque eye protection must be worn	General mandatory action sign	Connect an earth terminal to the ground	Refer to Instruction manual	

1.3. Precautions for use



Before any use of the equipment check that all operators:



- have previously be trained by the company **Sames**, or by their distributors registered by them for this purpose



- have read and understood the user manual and all rules for installation and operation, as laid out below.

It is the responsibility of the operators' workshop manager to ensure these two points and it is also his responsibility to make sure that all operators have read and understood the user manuals for any peripheral electrical equipment present in the spraying area.

1.4. Warnings



Refer to Standards EN 60079-14 and EN 60079-25 for installation and implementation of intrinsically safe electrical systems.



**The systems must be installed, connected and put into operation by trained and authorized operators.
The use of these electrical systems is the responsibility of the user.**



In case of failure of the electrical system, the defective element must be replaced by an equipment strictly identical to that installed.

2. Description

Intrinsically safe electrical systems described in this document are intended to interface intrinsically safe elements located in explosive atmosphere to devices checking the process situated in a panel in a non-hazardous area.

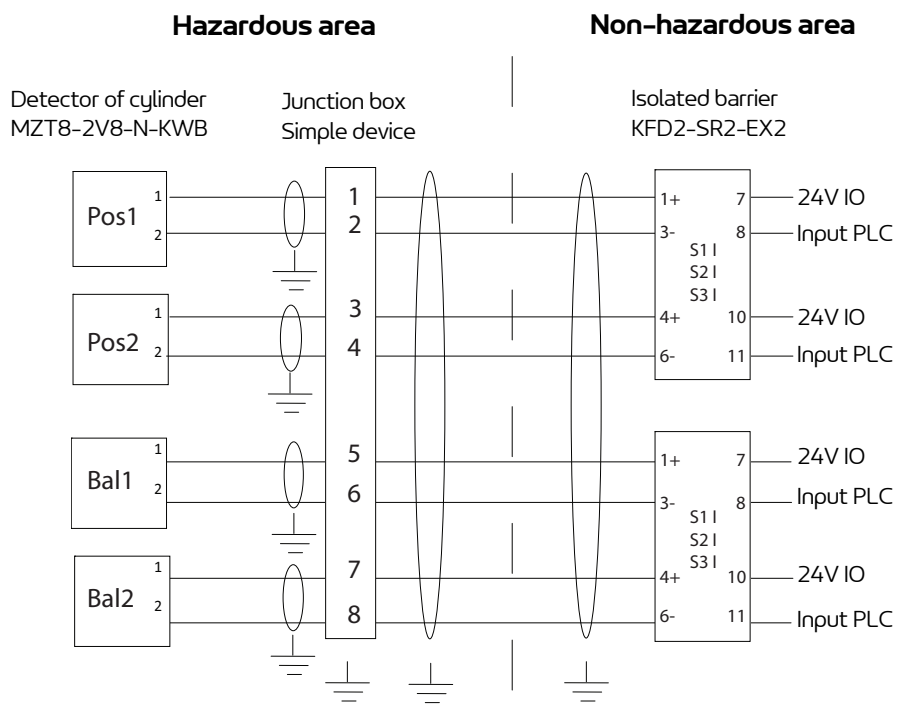
For these uncertified intrinsically safe electrical systems, intrinsically safe electrical equipment used in hazardous areas and the associated equipment used out of hazardous areas are certified by their respective suppliers.

3. Characteristics

3.1. Electrical DET 1.15 system associated to the cylinder detectors of the rinsing box

See [DRT7034](#) the instruction manual of rinsing box.

Connecting should be done as follows:



DES06172

The junction box has to be in accordance for a use in an explosive atmosphere and compatible with the electrical system.

It must be earthed if its casing is conductive.

Analysis of the DET 1.15 intrinsically safe system

	2 ways-isolated barrier	Detector	System
Manufacturer	PEPPERL+FUCHS GMBH	SICK	
Manufacturer P/N	KFD2-SR2-Ex2.W	MZT8-2V8-N-KWB	
Sames P/N	E6GPAS047AT	110003121AT	
Type	DET 1.	DET 15.	DET 1.15
Certificate ATEX	PTB 00 ATEX 2080	TUV 14ATEX143125	sans
Marking	II (1) G [Ex ia] IIC	II 1 G Ex ia IIC T4 Ga	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	with no	T4	
Ambient temperature	-20°C to +60°C	-25°C à +80°C	-20°C à +60°C
Comparison of the parameters			
Voltage	$U_o = 10.5 \text{ V}$	$U_i = 20 \text{ V}$	$U_i > U_o$
Current	$i_o = 13 \text{ mA}$	$i_i = 60 \text{ mA}$	$i_i > i_o$
Power	$P_o = 34 \text{ mW}$	$P_i = 100 \text{ mW}$	$P_i > P_o$
Parameters of the cables			
Capacity	$C_o = 2.41 \text{ }\mu\text{F}$	$C_i = 130 \text{ nF}$	$C_c \text{ max} = C_o - C_i$ $C_c \text{ max} = 2.28 \text{ }\mu\text{F}$
Inductance	$L_o = 210 \text{ mH}$	$L_i = 30 \text{ }\mu\text{H}$	$L_c \text{ max} = L_o - L_i$ $L_c \text{ max} = 209.97 \text{ mH}$
Earthing	Isolated	Isolated	Isolated
Maxi. length of cables (*)			11400 m

(*): Linear capacity of a standard cable : 200 pF/m

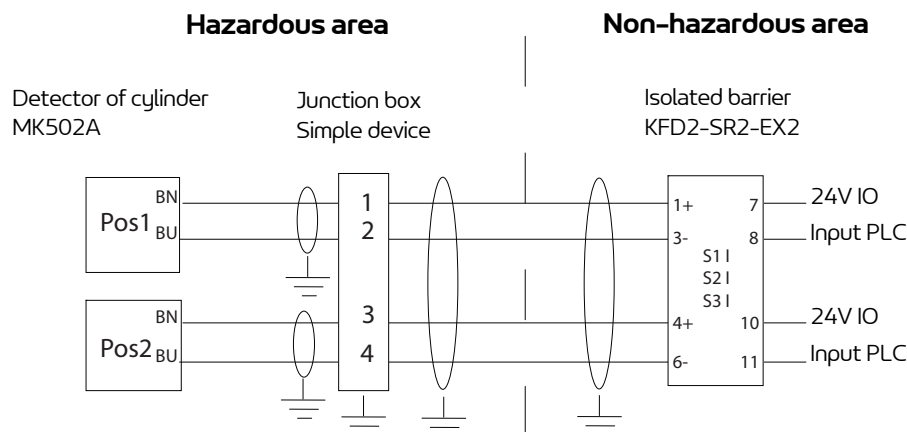
Linear inductance of a standard cable : 1 $\mu\text{H}/\text{m}$

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

3.2. Electrical DET 1.12 system associated to the cylinder detectors of the Booster Accubell 709 EVO

See [DRT7093](#) the instruction manual of Booster Accubell 709 EVO.

Connecting should be done as follows:



The junction box has to be in accordance for a use in an explosive atmosphere and compatible with the electrical system.

It must be earthed if its casing is conductive.

Analysis of the DET 1.12 intrinsically safe system

	2 ways-isolated barrier	Detector	System
Manufacturer	PEPPERL+FUCHS GMBH	Ifm electronic	
Manufacturer P/N	KFD2-SR2-Ex2.W	MK502A	
Sames P/N	E6GPAS047AT	180000234AT	
Type	DET 1.	DET .12	DET 1.12
Certificate ATEX	PTB 00 ATEX 2080	BVS 09 ATEX E164	with no
Marking	II (1) G [Ex ia] IIC	II 1G Ex ia IIC T4 Ga	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	with no	T4	T4
Ambient temperature	-20°C to +60°C	-25°C to +70°C	-20°C to +60°C
Comparison of the parameters			
Voltage	$U_o = 10.5 \text{ V}$	$U_i = 15 \text{ V}$	$U_i > U_o$
Current	$i_o = 13 \text{ mA}$	$i_i = 50 \text{ mA}$	$i_i > i_o$
Power	$P_o = 34 \text{ mW}$	$P_i = 120 \text{ mW}$	$P_i > P_o$
Parameters of the cables			
Capacity	$C_o = 2.41 \mu\text{F}$	$C_i = 140 \text{ nF}$	$C_c \text{ max} = C_o - C_i$ $C_c \text{ max} = 2.27 \mu\text{F}$
Inductance	$L_o = 210 \text{ mH}$	$L_i = 400 \mu\text{H}$	$L_c \text{ max} = L_o - L_i$ $L_c \text{ max} = 209.6 \text{ mH}$
Earthing	Isolated	Isolated	Isolated
Maxi. length of cables (*)			11350 m

(*): Linear capacity of a standard cable : 200 pF/m

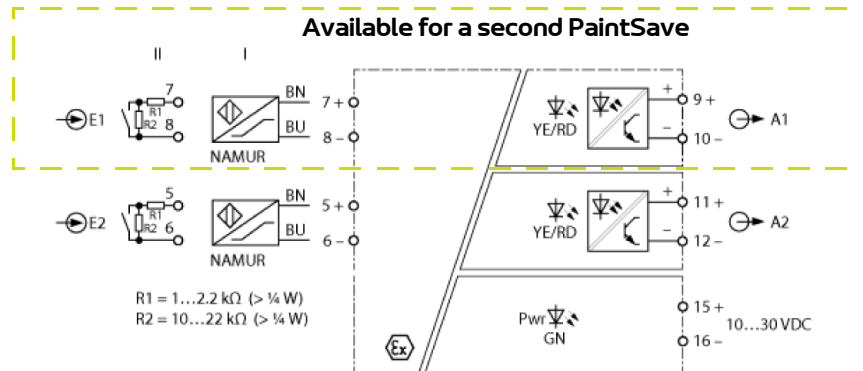
Linear inductance of a standard cable : 1 μH/m

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

3.3. Electrical DET 5.13 system associated to the PaintSave shuttle detection sensors

See [DRT162](#): the instruction manual of PaintSave

Connecting should be done as follows:



Analysis of the DET 5.13 intrinsically safe system

	2 ways-isolated barrier	Sensor	System
Manufacturer	TURCK BANNER	TURCK BANNER	
Manufacturer P/N	IMX12-DI01-2S-2T-0/24V	BIM-UNT-AY1X-0.3-RS4.21/S1139S1139	
Sames P/N	220000635AT	220000634AT	
Type	DET 5.	DET.13	DET 5.13
Certificate ATEX	TUV 14 ATEX 147004 X	KIWA 16ATEX0051 X	With no
Marking	II (1) G [Ex ia Ga] IIC T4 Gc	II 1 G Ex ia IIC T6 Ga	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	T4	T6	T4
Ambient temperature	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Comparison of the param-			
Voltage	Uo = 9.3 V	Ui = 20 V	Ui > Uo
Current	Io = 9.6 mA	Ii = 60 mA	Ii > Io
Power	Po = 22 mW	Pi = 80 mW	Pi > Po
Parameters of the cables			
Capacity	Co = 4.1 µF	Ci = 180 nF	Cc max = Co - Ci Cc max = 3.92 µF
Inductance	Lo = 100 mH	Li = 350 µH	Lc max = Lo - Li Lc max = 99.65 mH
Earthing	Isolated	Isolated	Isolated
Maxi. length of cables (*)			19600 m

(*): Linear capacity of a standard cable : 200 pF/m

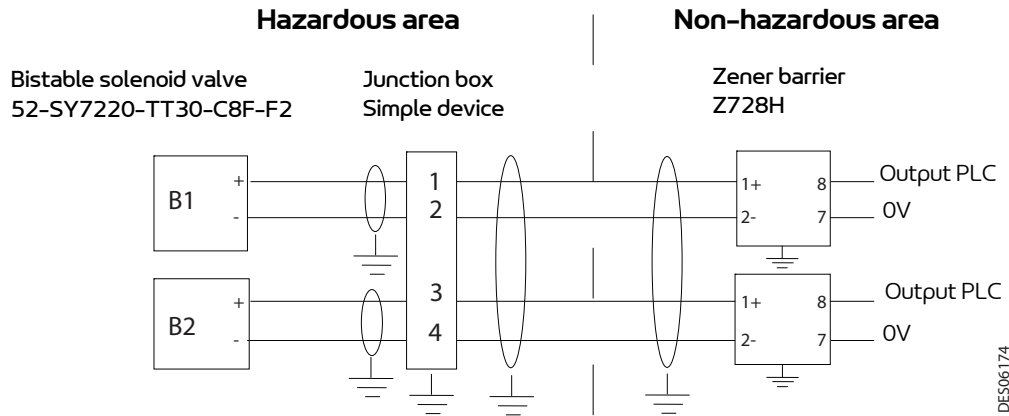
Linear inductance of a standard cable : 1 µH/m

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

3.4. Electrical ELE 1.1 system associated to the bistable solenoid valve of the Booster Accubell 709 EVO

See [DRT7093](#) the instruction manual of Booster Accubell 709 EVO.

Connecting should be done as follows:



The junction box has to be in accordance for a use in an explosive atmosphere and compatible with the electrical system.

It must be earthed if its casing is conductive.

Analysis of the ELE 1.1 intrinsically safe system

	Zener barrier	Solenoid valve	System
Manufacturer	PEPPERL+FUCHS	SMC	
Manufacturer P/N	Z728.H	52-SY7220-TT30-C8F-F2	
Sames P/N	110001602AT	220000216AT	
Type	ELE 1.	ELE .1	ELE 1.1
Certificate ATEX	BAS 01 ATEX 7005	DEKRA 11ATEX0273 X	with no
Marking	II (1) G [Ex ia Ga] IIC	II 2G Ex ia IIC T4..T6 Gb X	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	with no	T6	T6
Ambient temperature	-20°C to +60°C	-10°C to +45°C (T6)	-10°C to +45°C
Comparison of the parameters			
Voltage	$U_o = 28\text{ V}$	$U_i = 28\text{ V}$	$U_i \geq U_o$
Current	$I_o = 120\text{ mA}$	$I_i = 225\text{ mA}$	$I_i > I_o$
Power	$P_o = 0.83\text{ W}$	$P_o = 1\text{ W}$	$P_i > P_o$
Parameters of the cables			
Capacity	$C_o = 0.083\text{ }\mu\text{F}$	$C_i = 0\text{ nF}$	$C_c \text{ max} = C_o - C_i$ $C_c \text{ max} = 0.083\text{ }\mu\text{F}$
Inductance	$L_o = 2.46\text{ mH}$	$L_i = 0\text{ }\mu\text{H}$	$L_c \text{ max} = L_o - L_i$ $L_c \text{ max} = 2.46\text{ mH}$
Earthing	Non isolated	Isolated	Non isolated (*)
Maxi. length of cables (**)			415 m

(*): The circuit of intrinsic safety is connected with the earth in a single point.

(**): Linear capacity of a standard cable : 200 pF/m

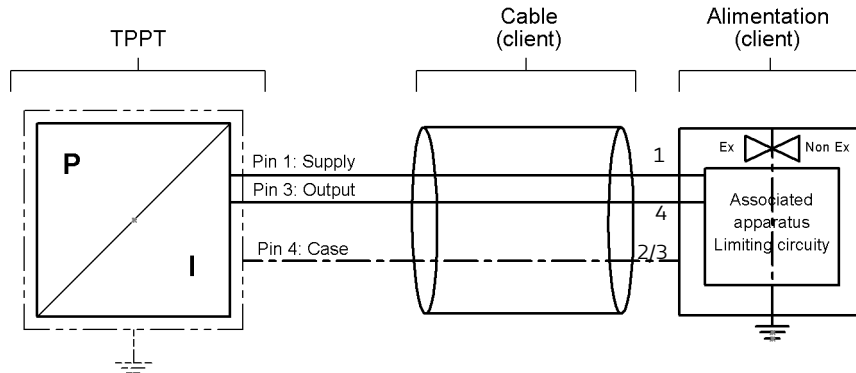
Linear inductance of a standard cable : 1 $\mu\text{H}/\text{m}$

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

3.5. Electric TRA 1.10 system associated to the 16 bar-PPS sensor

See [DRT7158](#): the instruction manual of PPS sensor.

Connecting should be done as follows:



Analysis of the TRA1.10 intrinsically safe system

	Zener barrier	Sensor	System
Manufacturer	PEPPERL+FUCHS	Sames	
Manufacturer P/N	Z787	2200006412AT	
Sames P/N	E6GPSR071AT	220000641AT	
Type	TRA 1.	TRA .10	TRA 1.10
Certificate ATEX	BAS 01 ATEX 7005	SEV 20 ATEX 0383X	with no
Marking	II (1) G [Ex ia Ga] IIC	II 1G Ex ia IIC T4 Ga	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	T4	T4	T4
Ambient temperature	-20°C to +60°C	-20°C to 100°C	-20°C to +60°C
Comparison of the parameters			
Voltage	$U_o = 28 \text{ V}$	$U_i = 30 \text{ V}$	$U_i \geq U_o$
Current	$i_o = 93 \text{ mA}$	$i_i = 100 \text{ mA}$	$i_i > i_o$
Power	$P_o = 650 \text{ mW}$	$P_i = 750 \text{ mW}$	$P_i > P_o$
Parameters of the cables			
Capacity	$C_o = 0,083 \mu\text{F}$	$C_i = 12 \text{ nF}$	$C_c \text{ max} = C_o - C_i$ $C_c \text{ max} = 0.071 \mu\text{F}$
Inductance	$L_o = 3,05 \text{ mH}$	$L_i = 0,3\text{mH}$	$L_c \text{ max} = L_o - L_i$ $L_c \text{ max} = 2.75 \text{ mH}$
Earthing	Non isolated	Isolated	Non isolated
Maxi. length of cables (*)			355 m

(*): Linear capacity of a standard cable : 200 pF/m

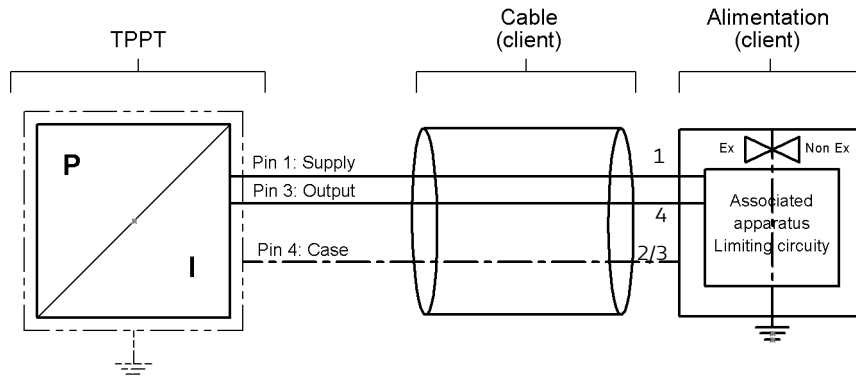
Linear inductance of a standard cable : 1 μH/m

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

3.6. Electric TRA 1.11 system associated to the 40 bar-PPS sensor

See [DRT7158](#): the instruction manual of PPS sensor.

Connecting should be done as follows:



Analysis of the TRA1.10 intrinsically safe system

	Zener barrier	Sensor	System
Manufacturer	PEPPERL+FUCHS	Sames	
Manufacturer P/N	Z787	220000642AT	
Sames P/N	E6GPSR071AT	220000642AT	
Type	TRA 1.	TRA .10	TRA 1.10
Certificate ATEX	BAS 01 ATEX 7005	SEV 20 ATEX 0383X	with no
Marking	II (1) G [Ex ia Ga] IIC	II 1G Ex ia IIC T4 Ga	
Appliance group	IIC	IIC	IIC
Level of protection	ia	ia	ia
Class of temperature	T4	T4	T4
Ambient temperature	-20°C to +60°C	-20°C to 100°C	-20°C to +60°C
Comparison of the parameters			
Voltage	$U_o = 28 \text{ V}$	$U_i = 30 \text{ V}$	$U_i \geq U_o$
Current	$I_o = 93 \text{ mA}$	$I_i = 100 \text{ mA}$	$I_i > I_o$
Power	$P_o = 650 \text{ mW}$	$P_i = 750 \text{ mW}$	$P_i > P_o$
Parameters of the cables			
Capacity	$C_o = 0,083 \mu\text{F}$	$C_i = 12 \text{ nF}$	$C_c \text{ max} = C_o - C_i$ $C_c \text{ max} = 0.071 \mu\text{F}$
Inductance	$L_o = 3,05 \text{ mH}$	$L_i = 0,3 \text{ mH}$	$L_c \text{ max} = L_o - L_i$ $L_c \text{ max} = 2.75 \text{ mH}$
Earthing	Non isolated	Isolated	Non isolated
Maxi. length of cables (*)			355 m

(*): Linear capacity of a standard cable : 200 pF/m

Linear inductance of a standard cable : 1 μH/m

The used cable has to resist a dielectric test of at least 500VAC or 750VCC, according to EN 60079-25.

4. Revision index History

Created by		Checked by: I. Chalier		Approved by: S. Court	
Date	By:	Index	Purpose of the modification and location		
2015/02	S. Court	A	First issue		
2024/02	S. Court	B	Change of identity and logo Updated graphic charter Deleted DET1.10 marking (Rinsing Box Detector)	§3.1	
			Added DET1.15 marking (new Rinsing box detector)	§3.1	
			Added DET 5.13 marking (shuttle detector)	§3.3	
			Added TRA1.10 and 1.11 marking (PPS sensors)	§3.5 and §3.6	

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Headquarter: 13, Chemin de Malacher - CS70086 - 38243 Meylan Cedex - France
☎ +33 (0)4 76 41 60 60 - www:sames.com