



SAFETY NOTES



Zone 2/22 - Exic

DAT S 400 e MCT S 1302

INDEX

PRECAUTIONS	Page	2
INTRODUCTIONS.....	Page	3
REFERENCE STANDARD	Page	4
IDENTIFICATION	Page	5
DESCRIPTION AND SPECIAL CONDITIONS FOR SAFE USE	Page	6
CONSTRUCTION PARAMETERS	Page	8
BASIC DESIGN.....	Page	10
MARKING AND FACSIMILE PLATE	Page	17

PRECAUTIONS

READ this manual BEFORE operating or doing maintenance to the load cells.

FOLLOW these instructions carefully.

SAVE this manual for future use.



CAUTION

The installation and maintenance of these load cells are allowed only to qualified personnel.

Be careful when making checks, tests and adjustments with the instrument switched on.

Make electrical connections without voltage supply.

Not observing these precautions may be dangerous.

DO NOT allow untrained personnel to work, clean, inspect, repair or tamper with these load cells.

INTRODUCTION

This document, to be integrated in the overall equipment manual, includes specific aspects of installation, use and maintenance aimed at mitigating the risk of explosion due to gases, vapors, mists of the following equipment:

PAVONE SISTEMI S.r.l. Weighing instrument

Model:

DAT-S-400 (front panel controller with LED display 7 segments)

or

MCT 1302 S (front panel controller via TFT LCD touch panel)

REFERENCE STANDARD

STANDARDS REFERENCE USED FOR THE DESIGN AND CONSTRUCTION

The standards reference used for the design and manufacture development of the devices identified above are shown below:

- **EN 60079-0 : 2012** Explosive atmospheres - Part 0: Equipment - General requirements”
- **EN 60079-11 : 2012** Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”
- **EN 60079-15 : 2010** Explosive atmospheres - Part 15: Equipment protection by type of protection “n”
- **EN60079-31 : 2014** Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”

The standards reference used for the manufacture of the devices identified above are shown below:

- **EN ISO/IEC 80079-34:2011** Explosive atmospheres - Part 34: Application of quality systems for equipment manufacturer

STANDARDS REFERENCE TO BE USED FOR THE CORRECT SELECTION, INSTALLATION, INSPECTION AND MAINTENANCE

The standards reference to be used for the proper selection, installation, inspection and maintenance in addition and if not in conflict with local statutory and regulatory documents are the following:

- **EN 60079-14:2014** Explosive atmospheres - Part 14: Electrical installations design, selection and erection
- **EN 60079-25:2010** Explosive atmospheres - Part 25: Intrinsically safe electrical systems
- **EN 60079-17:2014** Explosive atmospheres - Part 17: Electrical installations inspection and maintenance

STANDARDS REFERENCE TO BE USED FOR THE CORRECT AREAS CLASSIFICATION

The standards reference to be used for the correct classification of areas in addition and if not in conflict with local statutory and regulatory documents are the following:

- **EN 60079-10-1** Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres
- **EN 60079-10-2** Explosive atmospheres - Part 10-1: Classification of areas - Explosive dust atmospheres

PERSONNEL INVOLVED IN THE DESIGN, INSTALLATION, TESTING AND MAINTENANCE QUALIFICATIONS

Refer to the Annexes F of the following standards:

- **EN 60079-14:2014** Explosive atmospheres - Part 14: Electrical installations design, selection and erection
- **EN 60079-17:2014** Explosive atmospheres - Part 17: Electrical installations inspection and maintenance

IDENTIFICATION

PAVONE SISTEMI S.r.l. Weighing instrument

Model:

DAT-S-400 (front panel controller with LED display 7 segments)

or

MCT 1302 S (front panel controller via TFT LCD touch panel)

DESCRIPTION AND SPECIAL CONDITIONS FOR SAFE USE

The equipment covered by this document is a weighing instrument for load cell interface, visualization and communication made with:

1. protection method based on "restricted breathing" and with the possibility of interfacing with load cells to "intrinsically safe" for gases, vapors, mists.
2. method to "seal of powders" and with the possibility of interfacing with load cells to "intrinsically safe" for combustible dusts

or marked as follows:

Gas, vapors, mists

II3(3)G Ex nR [ic IIC Gc] IIC T6 Gc -10°C≤Tamb≤+40°C

Dusts

II3(3)D Ex tc [ic IIIC Dc] IIIC T85°C Dc X -10°C≤Tamb≤+40°C

GASES, VAPORS, MISTS

In reason of the solution adopted, the apparatus is identifiable as the apparatus having Equivalent Level of Protection EPL comply with EN60079-0 standard equal to "Ga" or usable in areas not classified, or classified as Zone 2 for the presence of gases, vapors, mists. Due to the fact that the equipment associated with intrinsic security for a part of the input channels having equivalent EPL associated protection level according to EN60079-0 "(Gc)", it may interfere with equipment installed in an unclassified area or Zone 2 when installed and coordinated with intrinsically safe equipment and wiring cables in accordance with EN60079-14 and EN60079-25.

The equipment is marked IIC therefore it can be used in and interfaced through a part of the input channels, unclassified places or in area classified by the presence of gases, vapors, mists belonging to Group IIA or IIB or IIC when properly coordinated with associated intrinsically safe equipment and wiring cables according to EN60079-14 and EN60079-25

The equipment is marked in relation to environmental conditions and in relation to the maximum surface temperature as indicated above, it can therefore be used in areas unclassified or classified areas for the presence of gases, vapors, mists having a minimum ignition temperature not less than as indicated (more adequate safety margin) when installed in the room or when exposed (by conduction, convection or radiation) at temperatures not exceeding what is indicated and when properly coordinated with equipment associated with intrinsically safe and wiring cables in accordance with the EN60079 standards -14 and EN60079-25.

DUSTS

In reason of the solution adopted, the apparatus is identifiable as the apparatus having Equivalent Level of Protection EPL comply with EN60079-0 normally equal to "Dc" which is usable in areas not classified, or classified as Zone 22 for presence of combustible dusts. Due to the fact that the equipment associated with intrinsic security for a part of the input channels having equivalent EPL associated protection level according to EN60079-0 "(Dc)", it may interfere with equipment installed in an unclassified area or Zone 22 when installed and coordinated with intrinsically safe equipment and wiring cables in accordance with EN60079-14 and EN60079-25.

The equipment is marked IIIC therefore can be used in unclassified areas or classified areas for the presence of dusts belonging to the group IIIA or IIIB or IIIC when properly coordinated with associated intrinsically safe equipment wiring and cables in accordance with the standards EN 60079-14 and EN60079-25.

The equipment is marked in relation to environmental conditions and in relation to the maximum surface temperature as indicated above (in the cloud), so it can be used in areas unclassified or classified sites for the presence of dusts having a minimum ignition temperatures in cloud not lower than that specified (most adequate margin of safety) when installed in the room or when exposed (by conduction, convection or radiation) at temperatures not exceeding what is indicated and when properly coordinated with associated with intrinsically safe equipment and wiring cables within the meaning of EN60079-14 and EN60079-25 standards.

ELECTRICAL PARAMETERS OF THE INTRINSIC SAFETY ASSOCIATED EQUIPMENT

The input limitation parameters belonging to the devices associated with intrinsic safety (inputs normally intended for load cells made with intrinsically safe protection methods) are respectively the following:

Channel	Excitation (o alimentazione)		Sense		Signal			
Morsetti	CN3 1(+Exc) e 2(-Exc)		CN2 1(+Sns) e 2(-Sns)		1(+Sgn) e 2(Schermo) e 3(-Sgn)			
					CN1 1(+Sgn) e 3(-Sgn)		CN1 1(+Sgn) e 2(Schermo) oppure 3(-Sgn) e 2(Schermo)	
Parametri elettrici	U _o = 13,8 V I _o = 194 mA P _o = 0,670 W R _o = 71,3 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω		U _o = 17,4 V I _o = 27 mA P _o = 0,118 W R _o = 652 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω	
Parametri reattivi parassiti interni	C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0	
Massimo potere di interruzione in tensione (Um)	253 Vrms ac/dc		253 Vrms ac/dc		253 Vrms ac/dc		253 Vrms ac/dc	
Massimo potere di interruzione in corrente	1500 A		1500 A		1500 A		1500 A	
Parametri reattivi ammissibili esterni	IIC IIIC	C _o = 4,2 μF L _o = 1,00 mH L _o /R _o = 26,6 μH/Ω	IIC IIIC	C _o = 47 μF L _o = 54,0 mH L _o /R _o = 612,5 μH/Ω	IIC IIIC	C _o = 1,59 μF L _o = 54,0 mH L _o /R _o = 306,3 μH/Ω	IIC IIIC	C _o = 47 μF L _o = 54,0 mH L _o /R _o = 612,5 μH/Ω
	IIB IIIB IIIA	C _o = 34 μF L _o = 4,25 mH L _o /R _o = 106 μH/Ω	IIB IIIB IIIA	C _o = 1000 μF L _o = 164mH L _o /R _o = 2,45mH/Ω	IIB IIIB IIIA	C _o = 10,8 μF L _o = 164mH L _o /R _o = 1,22mH/Ω	IIB IIIB IIIA	C _o = 1000 μF L _o = 164mH L _o /R _o = 2,45mH/Ω
	IIA	C _o = 390 μF L _o = 8,50 mH L _o /R _o = 213μH/Ω	IIA	C _o = 1000 μF L _o = 438mH L _o /R _o = 4,90 mH/Ω	IIA	C _o = 44 μF L _o = 438mH L _o /R _o = 2,45 mH/Ω	IIA	C _o = 1000 μF L _o = 438mH L _o /R _o = 4,90 mH/Ω

X: SPECIAL CONDITIONS FOR SAFE USE

Special conditions for safe use of dust formation on the equipment. Dust layers are not allowed.

CONSTRUCTION PARAMETERS

DAT S 400

Load cells excitation	5 V _{cc} /120mA (max 8, 350 ohm load cells in parallel) short-circuit protected
Input sensitivity	0.02 mV min.
Linearity	< 0.01% of the Full Scale
Temperature drift	< 0.001% of the Full Scale / °C
Internal resolution	24 bit
Weight display resolution	Up to 60,000 divisions on the net capacity
Measuring range	from -0.5 mV/V to +3.5 mV/V
Frequency of weight capture	5 Hz - 50 Hz
Digital filter	To be selected from 0.2 Hz to 25 Hz
Number of weight decimals	0 ÷ 3 decimal places
Operating temperature	-10°C ÷ +40°C (max. humidity 85% non-condensing)
Storage temperature	-20°C ÷ +50°C
Weight display	Numerical 6 red led digits and 7 segments (h 20 mm)
Led	4 LEDs of 3 mm
Keyboard	4 mechanical keys
Logic inputs	2 opto-isolated at 24 Vdc PNP (external power supply)
Logic outputs	2 opto-isolated (dry contact), max 24Vdc / 60 mA each
Serial port (# 2)	RS232C or RS422/RS485
Maximum cable length	15m (RS232) and 1000m (RS422 and RS485)
Serial protocols	ASCII, Modbus RTU
Baud rate	2400, 9600, 19200, 38400, 115200 to be selected
Analog output (optional)	Voltage or current
Resolution	16 bits Voltage: 0÷5 or 0÷10V (R >10 KΩ); Current: 0/4÷20mA (R _{max} = 300 Ω)
Temperature drift	Linearity: < 0.03 % of the full scale 0.001% of the full scale / °C
Fieldbus (optional)	PROFIBUS DP V1, ETHERNET ETHERNET IP, PROFINET
Compliance with the standards	EN61000-6-2, EN61000-6-3 per EMC EN61010-1 for Electrical safety EN60079-0, EN60079-11, EN60079-15, EN60079-31 for ATEX

MCT 1302 S

Load cells power supply	5 Vcc/120 mA (max 8 cells x 350Ω in parallel)
Measuring range	From -4 mV/V to +4 mV/V
Input sensitivity	0.02 μV min.
Linearity	< 0.01% of full scale
Temperature drift	< 0.001% of full scale / C°
Display:	LCD Grafico 240x128 pixel
Convertitore A/D:	24 bit
Risoluzione visualizzabile:	999.999 divisioni visualizzabili sul peso netto
Valore divisioni:	xq, x2, x5, x10, x20, x50; ino a 4 decimali impostabili
Filtro:	selezionabile da 0,1 a 250 Hz
Tastiera:	touch screen resistivo 4 fili
Temperatura funzionamento:	-10/+40 °C (umidità max 85% senza condensa)
Temperatura stoccaggio:	-20/+70°C
Logic inputs	6 optoinsulated 24 Vdc PNP (external power)
Logic outputs	6 optoinsulated (free contact) max 24Vdc / 100 mA ea.
Serial port (n° 2)	RS232C and RS422/485
Maximum cable length	15m (RS232C) and 1000m (RS422 and RS485)
Serial protocols	ASCII, Modbus RTU
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 selectable
Analogue output (optional)	optoinsulated 16 Bit Voltage: 0÷5/10 V (R min10 K Ohm), Current: 0/4÷20 mA (R max 300 Ohm) Linearity: < 0,02% FS
Fieldbus (alternative to RS485)	PROFINET, ETHERNET IP, ETHERCAT,
Regulatory Compliance:	EN61000-6-2 and EN61000-6-3 for EMC; EN61010-1 for BT; EN45501 for OIML EN60079-0, EN60079-11, EN60079-15, EN60079-31 for ATEX

BASIC DESIGN

Housing

The equipment described in this documentation includes electronic boards for signal processing from load cells and serial interfacing, a card constituting a device associated with intrinsic safety, front panel display with seven-segment display, LED and push-button panel (DAT S 400) or LCD Touch Panel TFT (MCT 1302 S), all contained in body / cover casing made of AISI304 steel. The front panel is equipped with glued synthetic film to protect the devices behind and to protect the ingress of water and solid elements. The film also contributes to the implementation of the protection method adopted "nR", ie restricted breathing. The enclosure is equipped with separately certified cable entry accessories that contribute to the protection of water ingress and solid elements. The cable glands also contribute to the implementation of the "nR" protection method, that is, restricted breathing. The holes for unused cable entries are closed with a suitable plug separately Ex certified or alternatively with cable glands equipped with a closing accessory that restores IP protection degree in case of non-use.

Housing/cover seal

The cover / housing seal is made of closed cell expanded silicone sealing material that must be replaced by Pavone Sistemi in the event of damage and deterioration.

The seal is obtained from a single piece of die-cutting operation, therefore without discontinuity.

The COT of the expanded silicone foam is $-70^{\circ}\text{C}/+200^{\circ}\text{C}$ therefore compatible with the service temperature determined starting from an ambient temperature $-10^{\circ}\text{C}/+40^{\circ}\text{C}$ and to this adding a maximum increase overestimated inside the housing of 10°C .

The foam is applied inside the lid through acrylic adhesive in aqueous dispersion with a continuous temperature range of $-55^{\circ}\text{C} / +180^{\circ}\text{C}$.

Front panel film

The front panel protection film is made of a high quality structured polyester film, consisting of a polyester film covered with a flexible, structured, bonded and UV-treated covering layer that must be replaced in case of damage and deterioration by Pavone Sistemi.

The continuous operating temperature range $-40^{\circ}\text{C} / +120^{\circ}\text{C}$ is compatible with the service temperature determined starting from an ambient temperature of $-10^{\circ}\text{C} / +40^{\circ}\text{C}$ and to this adding a maximum increase overestimated inside the housing of 10°C .

The front film is applied to the outside of the cover by means of double-sided adhesive which, in case of damage and deterioration, must be replaced by Pavone Sistemi.

The COT of the double-sided adhesive is $-40^{\circ}\text{C} / +149^{\circ}\text{C}$ therefore compatible with the service temperature determined starting from an ambient temperature $-10^{\circ}\text{C} / +40^{\circ}\text{C}$ and to this adding a maximum increase overestimated inside the housing of 10°C .

Cable entries

The cable entry into the enclosure is made by means of six cable glands arranged in the rear wall passage and separately certified "II2G Ex e" or by participating in the "Ex nR" protection method.

Five of the six cable glands are designed to provide a cable entry function; one cable gland is intended to be used as a restricted breathing test point and it is always occluded by a special insert supplied.

Possible and verified models in terms of restricted breathing are selected by Pavone Sistemi: in case of damage and deterioration it must be replaced by Pavone Sistemi.

The unused cable glands must always be occluded with a special insert that can be separated and which restores the IP66 protection rating.

The cables used with the cable glands must be selected according to EN60079-14; they must also be circular, compact, full and non-hygroscopic extrusions.

EX NR PROTECTION METHOD

The enclosure and its parts are made according to the requirements of EN60079-15: 2010, paragraph 20, concerning "Additional provisions for restricted breathing enclosures that protect equipment producing arcs, sparks or hot surfaces". The adopted method of protection meets the requirement for restricted breathing equipment that must be limited in power dissipation so that the measured outdoor temperature does not exceed the requirements for the maximum surface temperature of IEC 60079-0.

Restricted breathing enclosure is rated as complete equipment including all options and accessories. The equipment does not contain normally scintillating devices but the requirements of the case are accentuated by applying those provided for equipment containing normally scintillating devices. For this reason, the power dissipation is limited so that the temperature measured on the external part of the enclosure does not exceed the external ambient temperature by more than 20 K. By virtue of this the prescriptions set out in 6.4, 6.5 and art. 7 of EN60079-15 do not need to be applied to components within the restricted breathing enclosure.

The cable glands, whether integral or separated, meet the requirements of EN60079-0.

The cable glands are an integral part of the housing and as specified above for storage: for this reason they are tested as part of the housing.

The elastic sealing gaskets are located in such a way as not to be subjected to mechanical damage during normal operating conditions and to maintain their sealing characteristics unaltered for the expected life of the device.

The apparatus is provided with a test port to allow the verification of the breathing properties limited to be performed after the installation, during the initial inspection and during the maintenance because of the following:

- once installed, the opening of the equipment is foreseen.

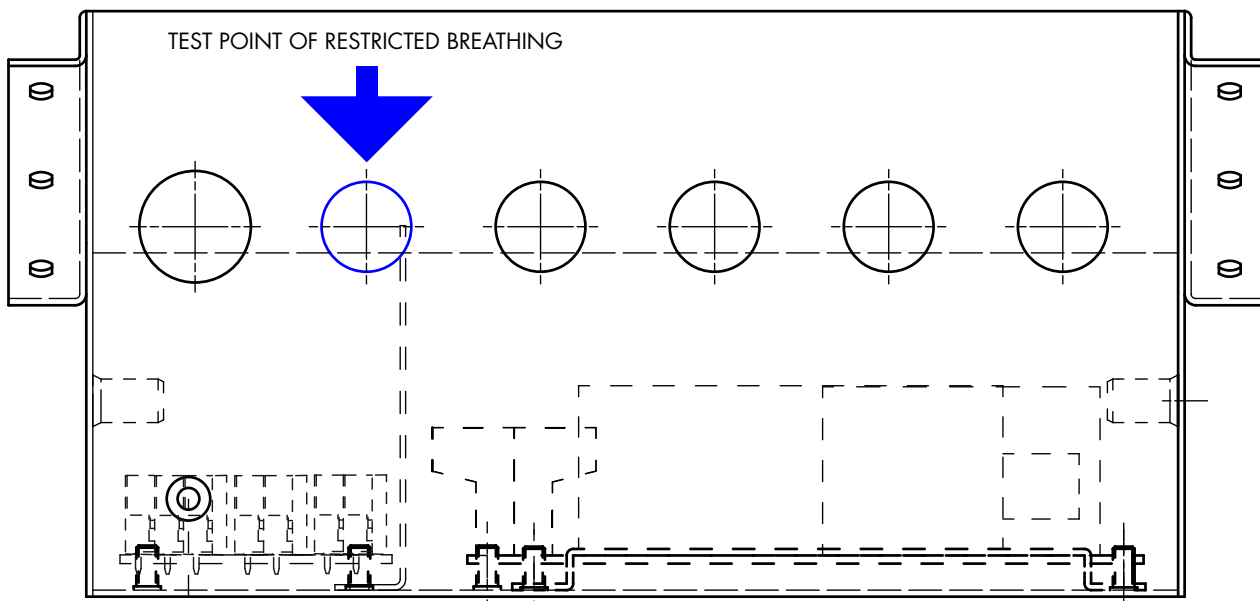
The device is subject to type testing without further individual testing (EN60079-15 article 22.6.2.2.2 "Type test with further individual tests"). The test was carried out under constant temperature conditions, the time interval required for the variation of the internal pressure by at least 0.3 kPa (30 mm of water column) below the atmospheric pressure, at half of the initial value, has been verified to be not less than 360 s.

RESTRICTED BREATHING TEST PORT

The apparatus is provided with a test port to allow the initial and regular checks of breathing properties limited to be performed after the installation, during the initial inspection and during maintenance. Refer to the test procedures for this manual, the EN60079-17 Standard and the pre-existing procedures in the installation site. The test port is on the back side of the instrument (cable gland side) and coincides with the second cable gland from the left looking at the rear side (see figure on the next page).

Ensure that the following operations can be performed safely and especially in the absence of potentially explosive atmospheres by means of suitable detection devices and by insulating the enclosure (adjust in this regard in relation to the procedures in place at the installation site according to the DPCE and the European Directive 1999/92/EC). Do not modify the wiring of the device, do not unscrew the cover, do not unscrew the cable glands occupied by the cables and do not remove the plugs on the unused cable glands. Remove the occlusion plug of the cable gland that constitutes the test point only. Insert the instrument grade air tube and tighten the cable gland / test point to achieve a better seal. Make sure that the air coming from the air test tube can not exceed a relative pressure of 0.5kPa (50mm of water column): otherwise there may be possibility of bursting or collapse of the housing with consequent danger for the operator. To this end, adopt an adequate safety valve on the adduction system to protect the operator. Through the air supply pipe, in constant ambient and service temperature conditions, raise the internal pressure of the enclosure until measuring 0.3 kPa (30 mm of water column) with a pressure gauge in calibration regime having a full scale at 1 kPa (100 mm of water column) mounted on the same supply line. Close a manual ball valve that you have set up on the air supply line and upstream of the pressure gauge, so that it can monitor the pressure decay inside the housing.

REAR VIEW (CABLE ENTRY SIDE / CABLE GLANDS SIDE)



The relative decay time at 0.15 kPa (15 mm water column) must be ≥ 90 Sec.

If the half-life of the internal overpressure is less than 90 Sec, re-run the test after having better tightened the cable glands and the cover screws. If the problem persists, contact Pavone Sistemi.

Carry out the test at least every 6 months or with shorter time intervals if the case is frequently opened (perform the test every time the housing or the cable glands are closed) or in particularly aggressive environments (refer in such cases to EN60079- 17).

EQUIPMENT ASSOCIATED WITH INTRINSIC SAFETY

In addition to other electronic devices designed to interface and process signals related to load cells, to display data on the front display and to realize serial communication, the equipment contains equipment associated with intrinsic safety with three channels that meet the characteristics listed below.

ISOLATION DISTANCES

The insulation distances in air, surface (creepage) and volume (clearance) are defined according to Table 5 of EN60079-11.

In particular, in the circuit sections **upstream of the zener diodes**, the following is guaranteed based on the choice stated in $U_m = 253V_{rms}$.

PRINTED CIRCUIT BOARD

The electronic components are mounted on PCB FR4 in single laminate 1,6mm double-sided copper.

TERMINALS

The terminals are selected by Pavone Sistemi: in case of damage and deterioration it must be replaced by Pavone Sistemi.

HIGH INTEGRITY IS EARTH CONNECTION

The high integrity IS earth connection is made at the factory by mounting the printed circuit on suitable conductive fixing towers. The anti-unscrewing is achieved through the use of an elastic washer (always) and strong thread-lock or anti-unscrewing nut. The fixing made on the 4 conductive towers, guarantees the minimum section foreseen in EN60079-11 and in EN60079-14 fixed in 4mm².

CALCULATION OF INTRINSIC SAFETY

CHANNEL 1: Excitation (o alimentazione)

1. Relevant parameters

Tamb = -10°C / +40°C; Maximum Internal Temperature increase: +10°C.

	Wiring to the classified area		Wiring to the unclassified area
Channel	Excitation (o alimentazione)		Excitation (o alimentazione)
Terminal board	IS-EXC (CN3, terminals 8 and 9)		EXC (CN6, terminals 1 and 2)
Terminals	1 (+Exc) and 2(-Exc)		1 (+Exc) and 2(-Exc)
Electrical parameters	$U_o = 13,8 \text{ V}$ $I_o = 194 \text{ mA}$ $P_o = 0,670 \text{ W}$ $R_o = 71,3 \Omega$		12V Max, 120mA Max
Reactive internal parasites parameters	$C_i = 0$ $L_i = 0$		N/A
Maximum breaking capacity in tension (Um)	N/A		253 Vrms ac/dc
Maximum breaking capacity in current	N/A		1500 A
External eligible reactive parameters	IIC, IIIC	$C_o = 4,2 \mu\text{F}$ $L_o = 1,00 \text{ mH}$ $L_o/R_o = 26,6 \mu\text{H}/\Omega$	N/A
	IIB, IIIB, IIIA	$C_o = 34 \mu\text{F}$ $L_o = 4,25 \text{ mH}$ $L_o/R_o = 106 \mu\text{H}/\Omega$	N/A
	IIA	$C_o = 390 \mu\text{F}$ $L_o = 8,50 \text{ mH}$ $L_o/R_o = 213 \mu\text{H}/\Omega$	N/A

CHANNEL 2: Sense

1. Relevant parameters

Tamb = -10°C / +40°C; Maximum Internal Temperature increase: +10°C.

	Wiring to the classified area		Wiring to the unclassified area
Channel	Sense		Sense
Terminal board	IS-SNS (CN2, terminals 10 e 11)		SNS (CN5, terminals 3 and 4)
Terminals	1 (+Sns) and 2 (-Sns)		1 (+Sns) and 2 (-Sns)
Electrical parameters	$U_o = 8,7 \text{ V}$ $I_o = 27 \text{ mA}$ $P_o = 0,059 \text{ W}$ $R_o = 326 \Omega$		10V Max, 25mA Max
Reactive internal parasites parameters	$C_i = 0$ $L_i = 0$		N/A
Maximum breaking capacity in tension (Um)	N/A		253 Vrms ac/dc
Maximum breaking capacity in current	N/A		1500 A
External eligible reactive parameters	IIC, IIIC	$C_o = 47 \mu\text{F}$ $L_o = 54,0 \text{ mH}$ $L_o/R_o = 612,5 \mu\text{H}/\Omega$	N/A
	IIIB, IIIB, IIIA	$C_o = 1000 \mu\text{F}$ $L_o = 164 \text{ mH}$ $L_o/R_o = 2,45 \text{ mH}/\Omega$	N/A
	IIA	$C_o = 1000 \mu\text{F}$ $L_o = 438 \text{ mH}$ $L_o/R_o = 4,90\text{mH}/\Omega$	N/A

CHANNEL 3: Signal

1. Relevant parameters

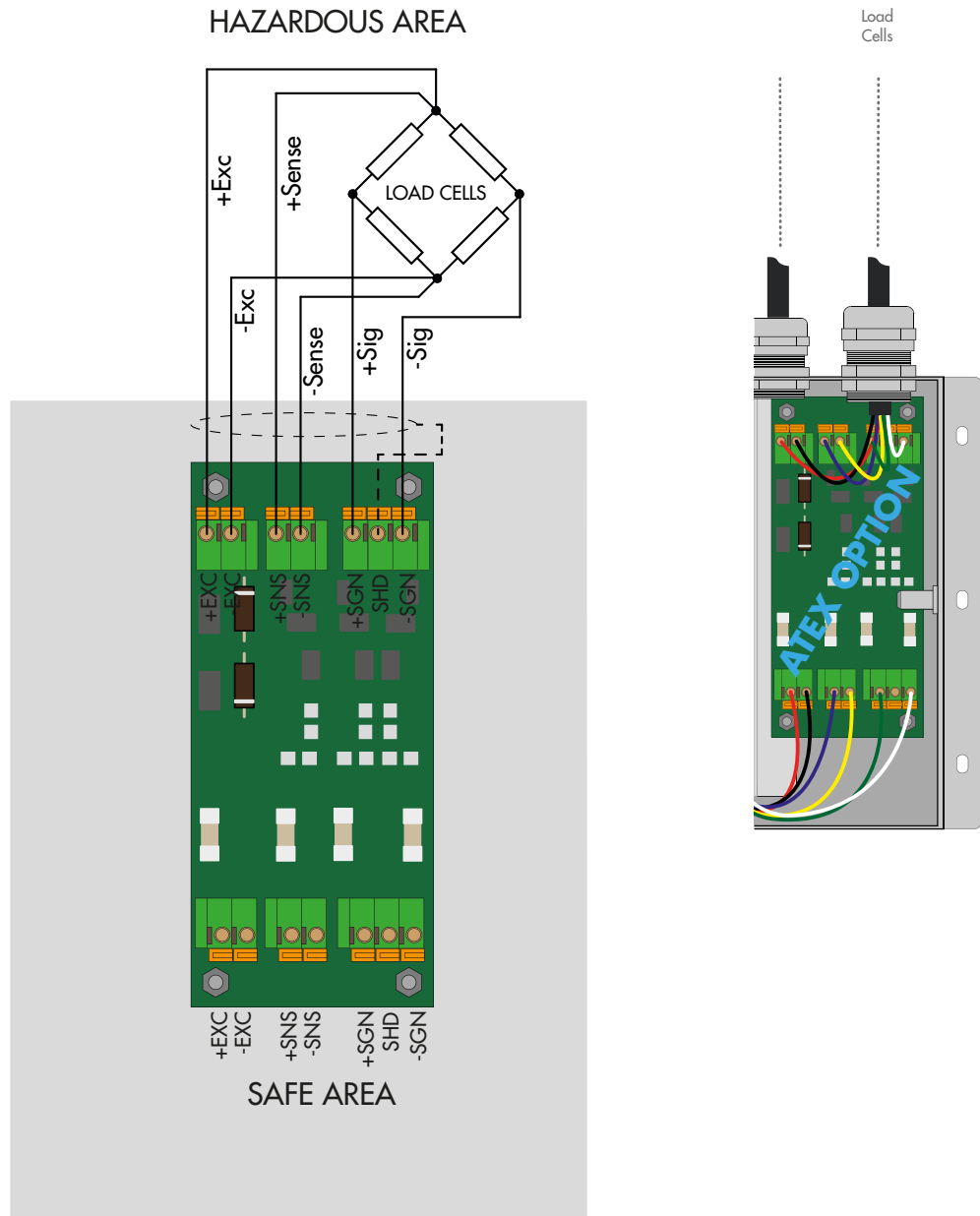
Tamb = -10°C / +40°C; Maximum Internal Temperature increase: +10°C.

	Wiring to the classified area		Wiring to the unclassified area		
Channel	Signal		Signal		
Terminal board	IS-SGN (CN1, terminals 12, 13 e 14)		SGN (CN4, terminals 5, 6 and 7)		
Terminals	CN1 1(+Sgn) and 3(-Sgn)	CN1 1(+Sgn) and 2 (Shield) or 3(-Sgn) and 2(Shield)	1(+Sgn) and 2(-Sgn) and 3(Gnd)		
Electrical parameters	Uo = 17,4 V Io = 27 mA Po = 0,118 W Ro = 652 Ω	Uo = 8,7 V Io = 27 mA Po = 0,059 W Ro = 326 Ω			
Reactive internal parasites parameters	$C_i = 0$ $L_i = 0$	$C_i = 0$ $L_i = 0$	N/A		
Maximum breaking capacity in tension (Um)	/	/	253 Vrms ac/dc		
Maximum breaking capacity in current	/	/	1500 A		
External eligible reactive parameters	IIC IIIC	Co = 1,59 μF Lo = 54,0 mH Lo/Ro = 612,5 μH/Ω	IIC IIIC	Co = 47 μF Lo = 54,0 mH Lo/Ro = 612,5 μH/Ω	N/A
	IIB IIIB IIIA	Co = 10,8 μF Lo = 164 mH Lo/Ro = 1,22 mH/Ω	IIB IIIB IIIA	Co = 1000 μF Lo = 164 mH Lo/Ro = 2,45 mH/Ω	N/A
	IIA	Co = 44 μF Lo = 438 mH Lo/Ro = 2,45mH/Ω	IIA	Co = 1000 μF Lo = 438 mH Lo/Ro = 4,90mH/Ω	N/A

LOAD CELLS CONNECTIONS

The load cell cable must be connected to the terminals of the zener barrier board as shown in the drawings below.

The connection between the output of the Zener Barriers board and the input of the DAT-S 400 or MCT 1302-S instrument is made by Pavone Sistemi.



MARKING AND FACSIMILE PLATE

The following table shows an example of plate and legend of the respective markings therein:

Pavone Sistemi S.r.l. Via Tiberio Bianchi, 11/13/15 20863 Concorezzo (MB) – ITALIA							
Weight indicator		MCT 1302 S		S/N		aa-xxxxx	
CE				Vn		xxx V	
	II3(3)G Ex nR [ic IIC Gc] IIC T6 Gc						
	II3(3)D Ex tc [ic IIIC Dc] IIIC T85°C Dc X						
	-10°C ≤ Tamb ≤ +40°C						
CN3 1(+Exc) and 2(-Exc)		CN2 1(+Sns) and 2(-Sns)		1(+Sgn) and 2(Shield) and 3(-Sgn)		CN1 1(+Sgn) and 2(Shield) or 3(-Sgn) e 2(Shield)	
U _o = 13,8 V I _o = 194 mA P _o = 0,670 W R _o = 71,3 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω		U _o = 17,4 V I _o = 27 mA P _o = 0,118 W R _o = 652 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω	
C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0	
U _m = 253 V		U _m = 253 V		U _m = 253 V		U _m = 253 V	
IIC IIIC	C _o = 4,2 μF L _o = 1,00 mH L _o /R _o = 26,6 μH/Ω	IIC IIIC	C _o = 47 μF L _o = 54,0 mH L _o /R _o = 612,5 μH/Ω	IIC IIIC	C _o = 1,59 μF L _o = 54,0 mH L _o /R _o = 306,3 μH/Ω	IIC IIIC	C _o = 47 μF L _o = 54,0 mH L _o /R _o = 612,5 μH/Ω
IIB IIIB IIIA	C _o = 34 μF L _o = 4,25 mH L _o /R _o = 106 μH/Ω	IIB IIIB IIIA	C _o = 1000 μF L _o = 164mH L _o /R _o = 2,45 mH/Ω	IIB IIIB IIIA	C _o = 10,8 μF L _o = 164mH L _o /R _o = 1,22 mH/Ω	IIB IIIB IIIA	C _o = 1000 μF L _o = 164 mH L _o /R _o = 2,45 mH/Ω
IIA	C _o = 390 μF L _o = 8,50 mH L _o /R _o = 213μH/Ω	IIA	C _o = 1000 μF L _o = 438 mH L _o /R _o = 4,90 mH/Ω	IIA	C _o = 44 μF L _o = 438 mH L _o /R _o = 2,45 mH/Ω	IIA	C _o = 1000 μF L _o = 438 mH L _o /R _o = 4,90 mH/Ω

Or

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Weight indicator				S/N		aa-xxxx		
	II3(3)G Ex nR [ic IIC Gc] IIC T6 Gc		DAT S 400					
	II3(3)D Ex tc [ic IIIC Dc] IIIC T85°C Dc X				Vn		xxx V	
	-10°C ≤ Tamb ≤ +40°C							
CN3 1(+Exc) and 2(-Exc)		CN2 1(+Sns) and 2(-Sns)		1(+Sgn) and 2(Shield) and 3(-Sgn)				
				CN1 1(+Sgn) and 3(-Sgn)		CN1 1(+Sgn) and 2(Shield) or 3(-Sgn) and 2(Shield)		
U _o = 13,8 V I _o = 194 mA P _o = 0,670 W R _o = 71,3 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω		U _o = 17,4 V I _o = 27 mA P _o = 0,118 W R _o = 652 Ω		U _o = 8,7 V I _o = 27 mA P _o = 0,059 W R _o = 326 Ω		
C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0		C _i = 0 L _i = 0		
U _m = 253 V		U _m = 253 V		U _m = 253 V		U _m = 253 V		
IIC IIIC	Co = 4,2 μF Lo = 1,00 mH Lo/Ro = 26,6 μH/Ω	IIC IIIC	Co = 47 μF Lo = 54,0 mH Lo/Ro = 612,5 μH/Ω	IIC IIIC	Co = 1,59 μF Lo = 54,0 mH Lo/Ro = 306,3 μH/Ω	IIC IIIC	Co = 47 μF Lo = 54,0 mH Lo/Ro = 612,5 μH/Ω	
IIB IIIB IIIA	Co = 34 μF Lo = 4,25 mH Lo/Ro = 106 μH/Ω	IIB IIIB IIIA	Co = 1000 μF Lo = 164 mH Lo/Ro = 2,45 mH/Ω	IIB IIIB IIIA	Co = 10,8 μF Lo = 164 mH Lo/Ro = 1,22 mH/Ω	IIB IIIB IIIA	Co = 1000 μF Lo = 164 mH Lo/Ro = 2,45 mH/Ω	
IIA	Co = 390 μF Lo = 8,50 mH Lo/Ro = 213 μH/Ω	IIA	Co = 1000 μF Lo = 438 mH Lo/Ro = 4,90 mH/Ω	IIA	Co = 44 μF Lo = 438 mH Lo/Ro = 2,45 mH/Ω	IIA	Co = 1000 μF Lo = 438 mH Lo/Ro = 4,90 mH/Ω	

Manufacturer: **Pavone Sistemi S.r.l. Via Tiberio Bianchi, 11/13/15 Concorezzo (MB) – ITALIA**

Type of equipment: **Weight indicator**

xxxx: symbol relating to the CE marking, internal manufacturing control (Annex VII of the ATEX Directive 2014/34/UE)

Model: DAT S 400 /MCT 1302 S

S/N : serial number or unique identifier of the device having the corresponding prefix to the year of manufacture and five-digit number showing progressive number of manufacturing

: community symbol related to equipment suitable for areas with risk of explosion

- **3(3)G:** or category 3 equipment suitable for places classified by the presence of flammable substances (gases, vapors, mists) or zone 2, having a part of conductors connectable to intrinsically safe equipment installed in zone 2, by virtue of equipment associated with internal intrinsic safety equipment.

• **Ex nR [ic IIC Gc] IIC T6 Gc:**

marking applied in compliance with EN60079-0, EN60079-11, EN60079-15 with the following meaning:

- **Ex nR IIC T6 Gc:** equipment with restricted breathing enclosure for installation in Zone 2, IIC group

(representative gases: hydrogen and acetylene), with minimum ignition temperatures above T₆ (85°C).

- **[Ex ic IIC Gc]:** “intrinsically safe” protection method according to EN60079-11 EPLc, concerning part of the conductors protected by associated equipment inside the equipment and connectable to suitable intrinsically safe equipment installed in Zone 2, IIC group (representative gases: hydrogen and acetylene)
- **3(3)D:** or category 3 equipment suitable for places classified by presence of combustible substances (powders) or zone 22 having a part of conductors connectable to intrinsically safe equipment installed in zone 22 by virtue of intrinsically safe equipment inside the apparatus.
- **Ex tc [ic IIIC Gc] IIIC T85°C Dc X:**

marking applied in compliance with EN60079-0, EN60079-11, EN60079-31 with the following meaning:

- **Ex tc IIIC T85°C Dc X:** equipment equipped with an IP66 dustproof housing, for installation in Zone 22, group IIIC (conductive powders), with minimum ignition temperatures above T_{85 ° C} (85 ° C).
- **[Ex ic IIIC Dc]:** “intrinsically safe” protection method according to EN60079-11, EPLc concerning part of the conductors protected by associated equipment inside the equipment and connectable to suitable intrinsically safe equipment installed in Zone 22, group IIIC (conductive powders)
- **X:** special conditions for safe use (see specific paragraph in this manual)
- **Ci ≈ 0:** maximum parasitic capacitance at the input
- **Li ≈ 0:** maximum parasitic inductance at the input
- **Um = 253 V:** maximum breaking capacity at the fault voltage
- **Uo:** maximum possible output voltage (limited by equipment associated with intrinsic safety inside the equipment)
- **Io:** maximum possible current at the output (limited by equipment associated with intrinsic safety inside the equipment)
- **Po:** maximum possible power output (limited by equipment associated with the apparatus internal intrinsically safe)
- **Co:** maximum allowable output capacity, differentiated by gas group (IIA, IIB, IIC) and by group of powders (IIIA, IIIB, IIIC).
- **Lo:** maximum allowable output inductance, differentiated by gas group (IIA, IIB, IIC) and by powders group (IIIA, IIIB, IIIC).
- **Lo/Ro:** maximum permissible output inductance / resistance ratio, differentiated by gas group (IIA, IIB, IIC) and by group of powders (IIIA, IIIB, IIIC).

Identification of the internal terminals of the board acting as a device associated with intrinsic safety.

- **-10°C ≤ Tamb ≤ +40°C:** permissible ambient temperature range



PAVONESISTEMI

PAVONE SISTEMI S.R.L.

Via Tiberio Bianchi, 11/13/15, 20863 Concorezzo (MB)

T 039 9162656 F 039 9162675 W www.pavonesistemi.it

Sistemi di Pesatura Elettronica Industriale dal 1963t

