OLDHAM
Gas Monitoring Solutions

CPS_CPS10 SYSTEM

Installation, Operation and Maintenance Guide

OLDHAM
An Industrial Scientific Company

The Fixed Gas Detection People

ATMOSPHÈRES EXPLOSIVES 94/9/CE SAQ Approuvé INERIS 94/9/EC QAS Approved EXPLOSIVE ATMOSPHERES

AFAQ ISO 9001 VERSION 2000

CE

Made in France

Ex

Reference : **NP CPS GB**
Révision : **G**

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An Industrial Scientific Company

The Fixed Gas Detection People

GAS DETECTION

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G U A R A N T E E

2 years guarantee in normal conditions of use on parts and technical labour, return in our workshops, excluding consumables (sensors, filters, etc.)

First edition, English version.

The information contained within this manual is true and correct to the best of our knowledge. Due to ongoing research and development, the specifications of this product may be changed at any time without notice.

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General Information

Please read the following notice carefully before installation and start-up, paying particular attention to the end-user material safety instructions. This user's guide should be distributed to every individual involved in the installation, operation, maintenance or repair of the CPS system.

The information contained in this manual, the data and technical drawings are correct as of the date of publication. Should questions arise, please contact Industrial Scientific for additional information.

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i *This icon indicates that there is additional useful information for a particular topic.*

Safety Warnings

Pictogram labels have been placed on the central controller to call attention to general use safety precautions. These labels are an integral component of the central controller. Replace any label that has peeled off or become illegible. The meanings of these labels are explained below.


Ground terminal


Safety ground terminal


Risk of electric shock


Caution (see accompanying documentation)

WARNING

The installation of this product and all electrical connections should be performed by a qualified professional, in accordance with the manufacturer's specifications and with the standards of authorities in the field.

Failure to observe these warnings may result in serious injury. Exercise great caution, particularly when working with electricity during installation (couplings, network connections).


European Union (and EEA) only. This icon indicates that in accordance with Directive DEEE (2002/96/CE) and with the regulations specific to your country, this product may not be disposed of with household waste.

Dispose of this product at a collection site intended for electrical waste, for example an official EEE (electrical and electronic equipment) collection site with a recycling or take-back program for authorized products which are available to consumers whose purchases are intended to replace old EEE products with new equivalents.

Failure to comply with regulations for the disposal of this type of waste can be harmful to the environment and to public health, as EEE products typically contain substances that may be dangerous. Your complete cooperation with the disposal of this product will help to ensure a more efficient use of natural resources.

Important Information

The modification of any piece of equipment or the use of any third party parts will automatically void all guarantees.

The central controller is intended to be used for precise applications of a technical nature. Exceeding the indicated values is strictly prohibited.

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Chapter 1 Overview of the CPS System

The system consists of:

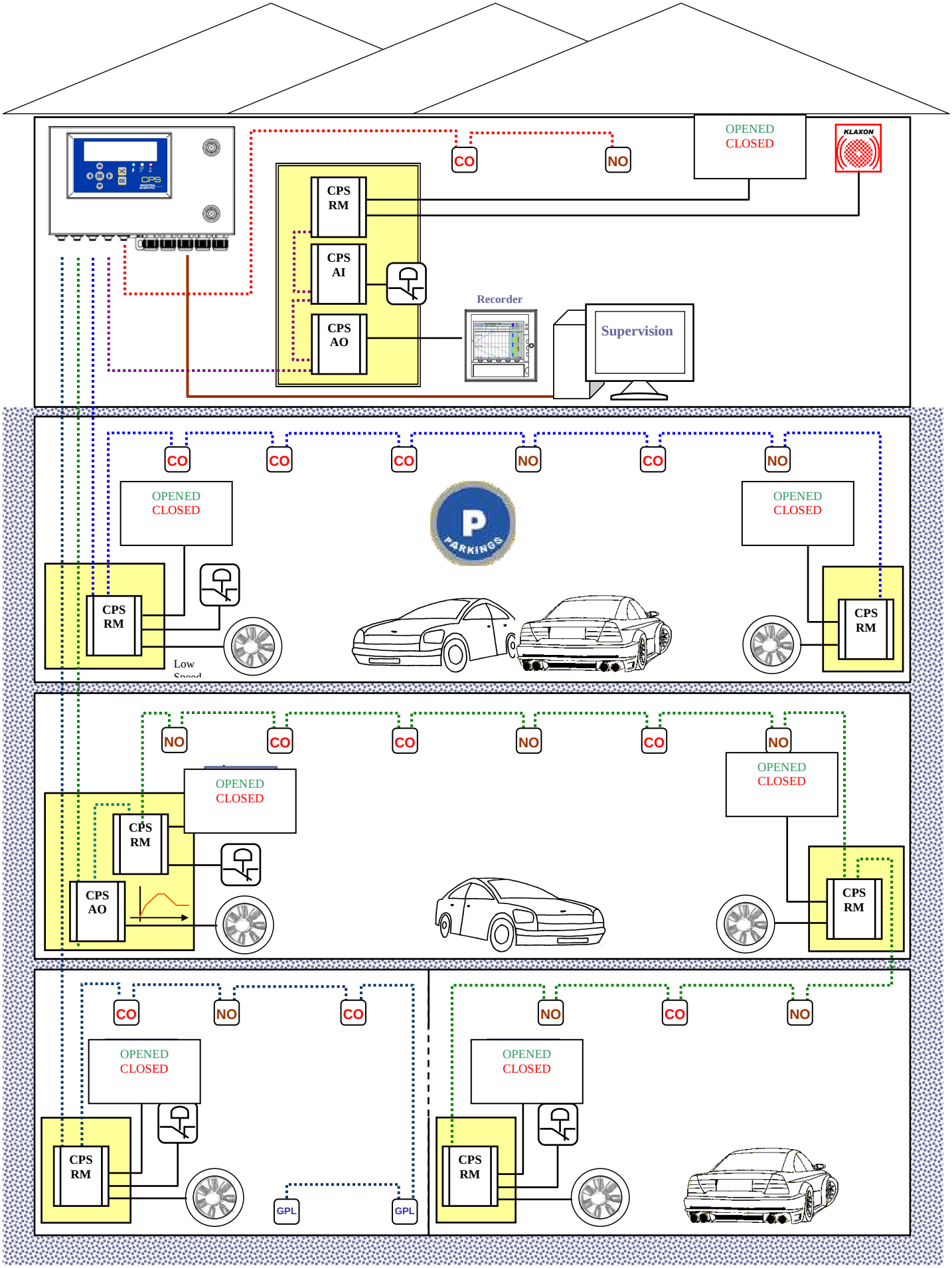
- a central controller for collecting readings and managing alarms;
- various addressable digital modules (sensor modules, relay modules, analog output modules, logic input modules);
- instruments and accessories to process alarms and actions

The CPS system can manage the detection of **10 different gases,** and all detectors are clearly localized and identified.

Data from each sensor is collected in the central controller in less than one second. If gas levels exceed the programmed limits, an audiovisual alarm is triggered and can activate the ventilation system in the affected area of the parking facility.

Use the ***COM*_CPS software** to program the central controller.

The system status can be quickly verified with semi-automatic calibration for various sensors.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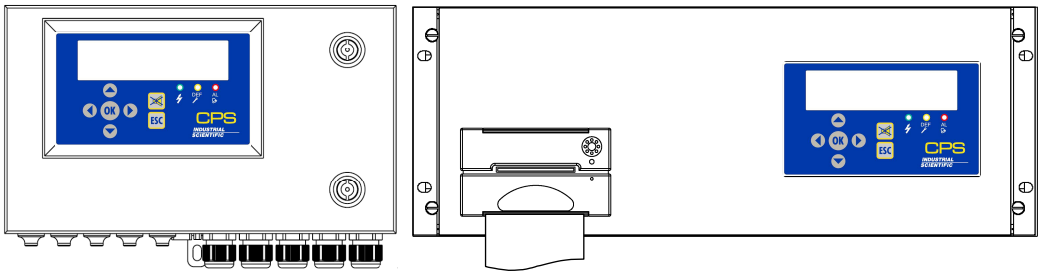
The CPS central controller

CPS : Wall mounted version *CPS : Rack mounted 19'' 4U*



The central controller is available in a 19" 4U (rack-mount) version or in a wall-mount version. It is designed to control:

- **256 digital modules distributed over 8 lines, with a maximum of 32 modules per line**;
- **256 addressable relays** max. distributed across all relay modules;
- **224 logic inputs** max. distributed across all logic input modules and relay modules.
- **256 analog outputs** max. distributed across 4 analog outputs modules.

Modules are connected through a digital RS-485 network using JBUS/MODBUS protocol.

The central controller connects to 256 toxic sensors, and **runs on only 24 Watts**.

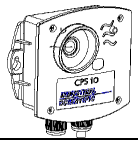
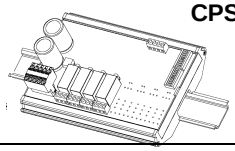
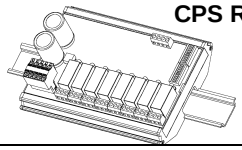
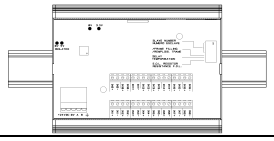
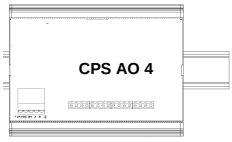
The central controller can be connected to a supervision system via an RS-485 output interface using ModBus protocol.

Optional features include:

- **a battery back-up**, ensuring continual operation in case of a power outage (approx. 1 hour for 50 TOX-type sensors);
- **an integrated printer** (rack-mounted version only) for recording alarms and events;
- **an external printer** (for both rack- and wall-mounted versions).

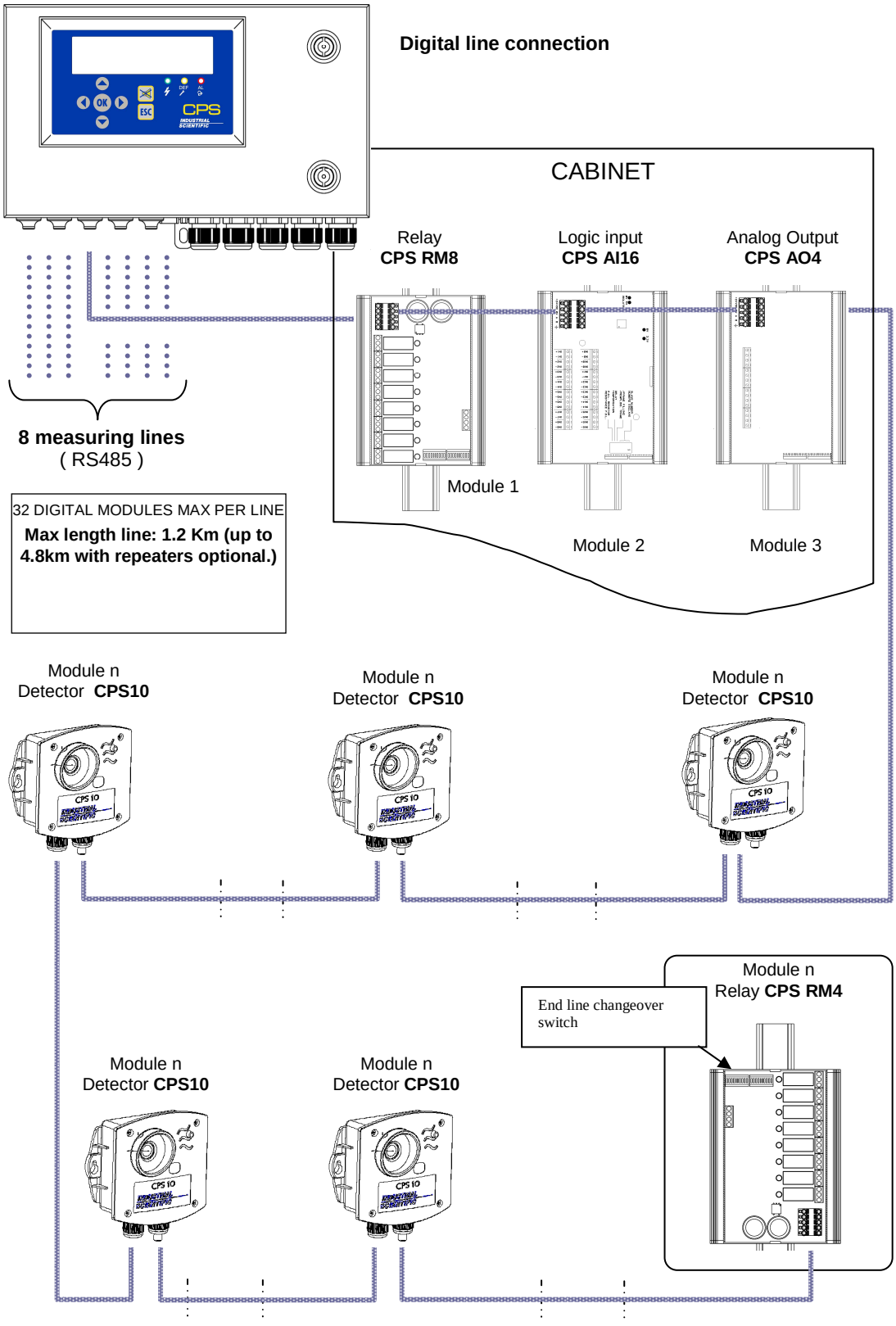
Digital addressable modules

Various digital addressable modules can be positioned on the same line.

	**CPS 10**	SENSOR MODULE CO, NO, NO2, CH4, LPG, …
CPS RM4  **CPS RM8** 		RELAY MODULE 4 relays + 2 LI* 8 relays + 2 LI* (*): LI = Logic Input
	**CPS AI16**	LOGIC INPUT MODULE 16 Logic Inputs
	**CPS AO4**	ANALOG OUTPUT MODULE 4 opto-isolated 4-20 mA outputs + 2 LI*

Digital linking

Modules are linked in-line via an MPI 22 or equivalent RS-485 double twisted pair cable, at least 0.22 mm² in diameter. One pair supplies power to the module, the second pair is used for the digital RS-485 link.
ISC – personnel should verify that the correct cable has been used in terms of type and capacity.



The *COM*_CPS software application

The ***COM*_CPS** software application is designed to help configure the CPS central measuring controller on a PC. *COM*_CPS software operations are addressed in a separate manual.

System and Hardware Requirements:

*COM*_CPS must be installed on a PC running Windows 2000 or Windows XP.

The minimum requirements to install *COM*_CPS are:

- Windows 98 SE, Windows NT, Windows 2000, Windows XP with 256 MB RAM, Windows VISTA.
- A CD-ROM drive
- At least 10 MB of free hard drive space
- A USB connection (cable not included) or a free RS-232 port (specific cable provided) to link the CPS central measuring controller to the PC.

Refer to the *COM*_CPS software instructions before installing or using the software, and before programming the central controller.

The *COM*_CPS software allows you to:

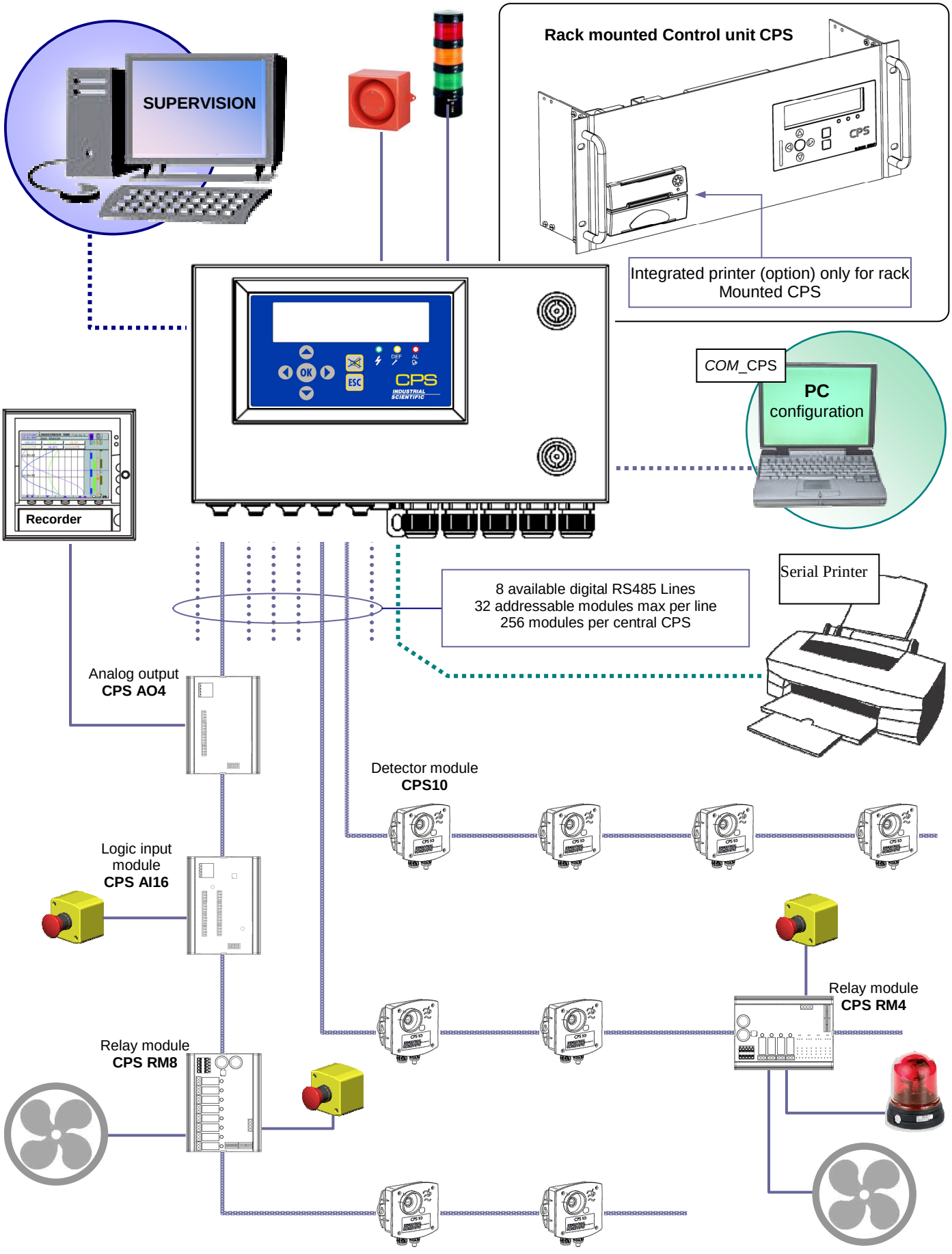
- configure one or more central controller(s) via PC;
- save settings and upload them later to the CPS central controller(s).
- view or modify central controller configuration data within the application.

The *COM*_CPS software can be used to modify the following main configuration settings:

- STEL and TWA calculations
- Predefined status tables printing times
- Conditions that would activate an internal buzzer
- Communication speed for the RS-485 series connection with a master device
- Settings for various sensors and alarm values
- Personalized sensor add-on options
- Delay settings
- Rising edge or falling edge triggers
- Average alarm integration time
- Verification of explosive gasses
- Creation of installation architecture: sensors/relays

***COM*_CPS** Whenever this sign appears in front of a chapter, the functions described in that chapter are configured with the *COM*_CPS software.

System Architecture



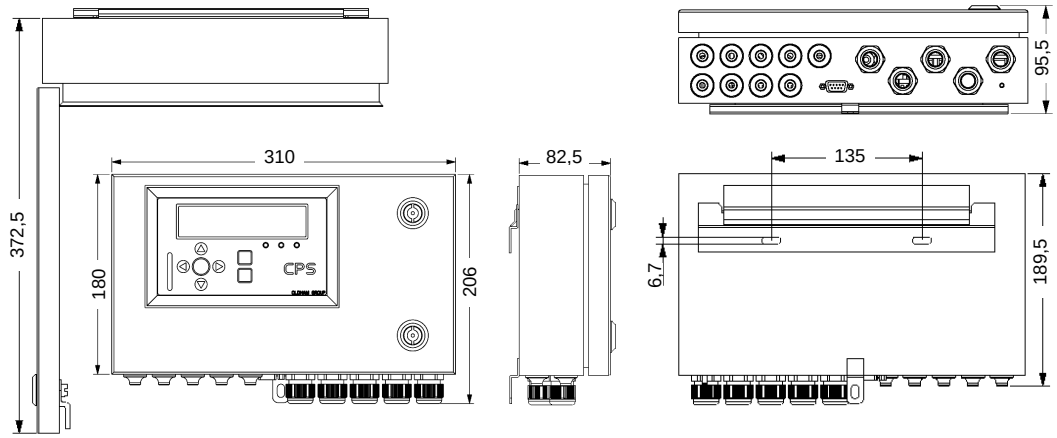
Chapter 2 Assembly / Installation

Installation of the CPS central controller

The CPS central controller should be installed in a dry, climate-controlled area protected from explosive gases and dust. Ideally, the station should be located in a secure, accessible location under surveillance (security office, control room, equipment room ...).

Mounting the metal wall casing

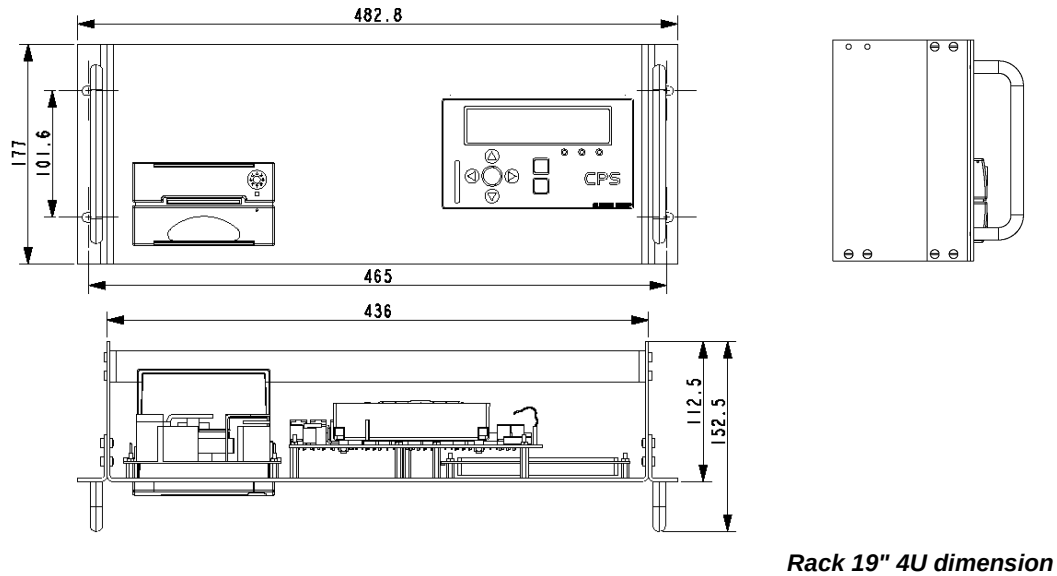
For the wall-mounted CPS in a metal case: *The central controller cover opens at a 90° angle to the left. Make sure to leave adequate space to completely open the cover once the central controller is mounted.*



Metal wall casing dimension

Mounting the 19" 4U rack

The 19" 4U rack version CPS can be integrated into a rack or a 19" cabinet:
Mount the display at eye level for optimal viewing. Leave at least ½ U (22 mm) on all sides of the central controller to ensure proper ventilation.



Rack 19" 4U dimension

Installing digital modules

Mounting the CPS 10 sensor module

Mount the sensor modules on a flat surface using two screws (Fig. 1).

The modules should be placed in an accessible area, so that maintenance and inspection operations can be conducted as easily and as safely as possible. Nothing in the area should prevent the sensors from obtaining measurements of the ambient environment.

When mounting the sensor module on a vertical surface, position the cable glands on the underside of the module to ensure proper calibration.

Mounting the other modules

The other modules (relay, logic input, analog output) should be mounted on a DIN rail inside of a cabinet or an electric box. (Fig. 2).

Fig.1 **DETECTOR MODULE CPS 10**

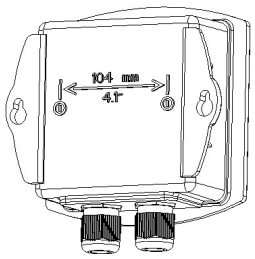
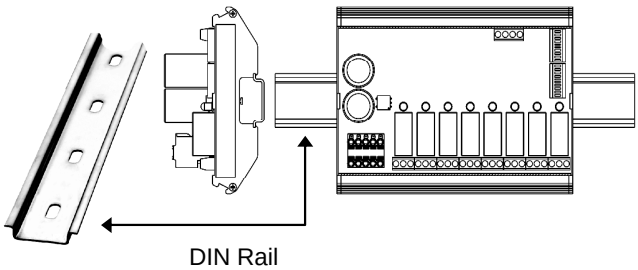
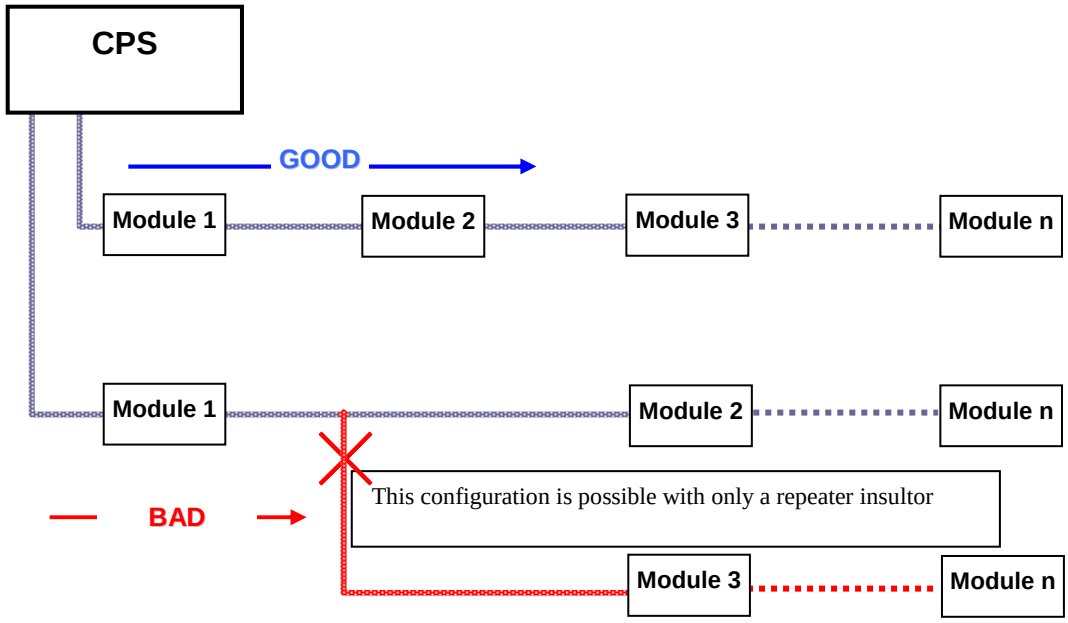


Fig. 2 : **ADDRESSABLE DIGITAL MODULE**



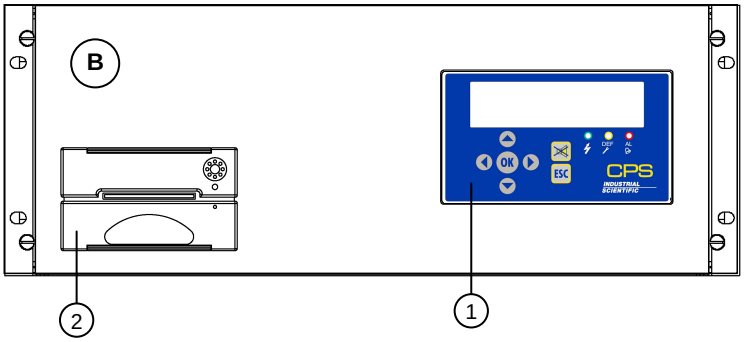
Connection of modules in a line

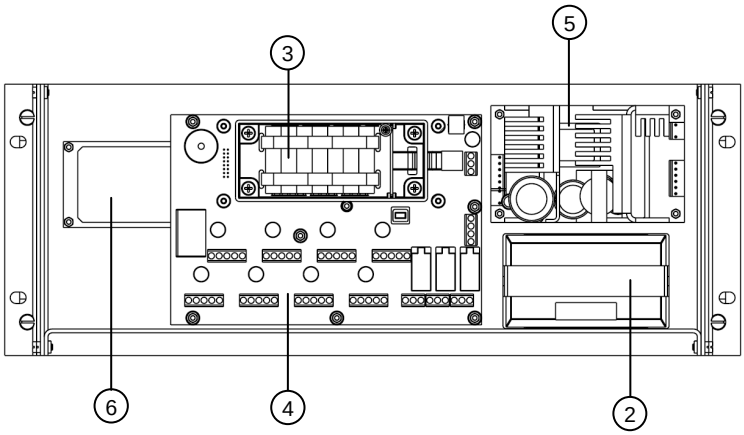
i **IMPORTANT**: *All modules in a line should be wired in-line from the central controller, not in a hub and spoke model.*

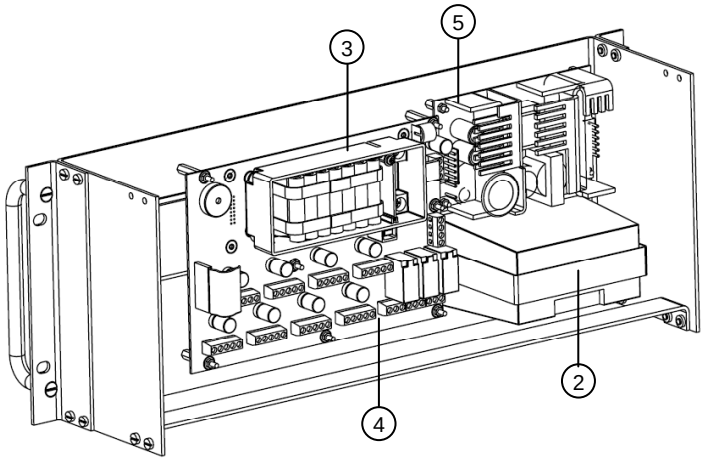


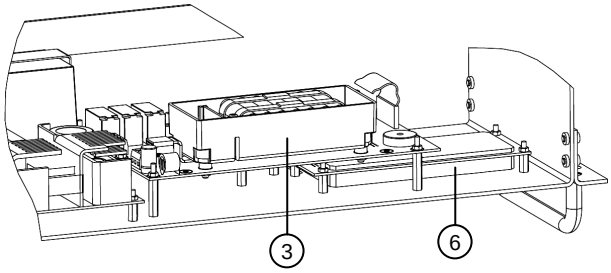
Chapter 3 The CPS Central Measuring Controller

View of rack–mounted CPS

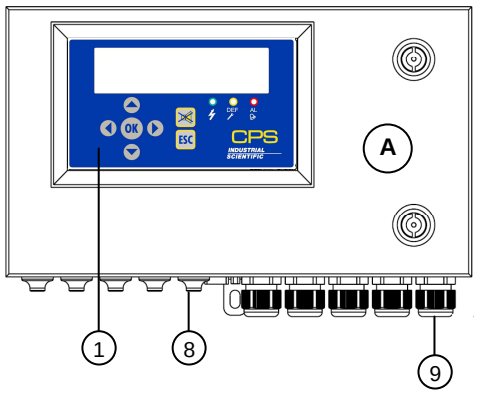


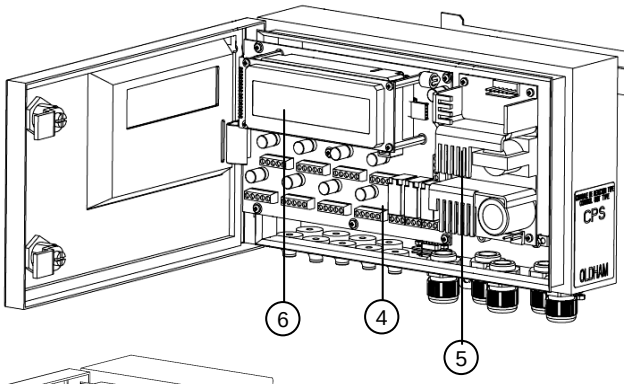


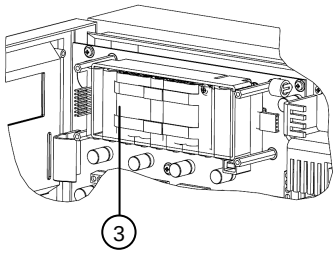


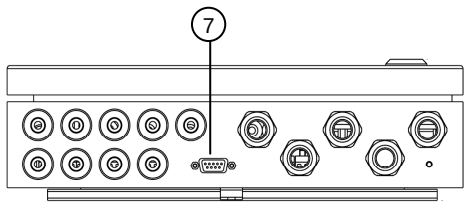


View of wall-mounted CPS









PART	DESCRIPTION	PART NUMBER
A	CPS WALL CASING	6 514 868
B	CPS RACK 19" 4U	6 514 869
1	CPS FRONT PANEL	6 122 477
2	AP1200 PRINTER	6 114 632
3	BATTERY PACK (OPTIONAL)	6 311 098
4	CPS MOTHERBOARD	6 451 596
5	24V 60W POWER SUPPLY BOARD	6 111 308
6	CPS CENTRAL CONTROLLER DISPLAY	6 133 707
7	RS232 SUB D9 CONNECTOR	6 116 263
8	M16 GROMMET: D5 to D7mm	6 131 166
9	M20 CABLE GLANDS : D6 to D12 mm M20 PE PLASTIC SCREW	6 143 504 6 143 529

Central controller electrical connections

Electrical connections are wired through the central controller MOTHERBOARD and the power supply 24V. For the CPS central controller (wall-mounted version), you must open the casing door to access the electrical panel.

Electrical connections must be done by a qualified professional. Observe all current Directives, notably the European Low Voltage Directive. Customers in France must observe standard NF C 15-100.

WARNING
Contact with voltage may result in serious injury or death.
Install all equipment and complete all wiring work before turning on the power.

WARNING
Improper installation can result in incorrect gas level readings or system failure.
Carefully follow all instructions to ensure proper system operation.

Main power supply

Test the current and voltage running through a network before making any connections. Never connect the device without first disconnecting the power supply. The central controller does not have an on/off switch.

Protect the central controller from upstream current with a 4A bipolar differential circuit breaker with a type D response curve. This circuit breaker must be included in the electrical installation of the building and must be placed near of the device and must be available for the operator. On the circuit breaker will be indicated that it is the circuit breaker of the device.

Main power supply 100-240VCA: connector terminals L, N, and PE of the power supply 24V (Fig 3) for wall-mounted version or see connector picture 4 for rack version..

Pre-cabled wires are used to connect to the 24 VDC power supply module. The transformer output connector is also hardwired to link to the 24 VDC central controller connector and to the (optional) integrated printer for the rack-mounted version.

Grounding the central controller

The central controller is intended for use in areas that meet the Class II requirements for overvoltage and degree of pollution as per EN IEC 60947-1. In order to comply with the standard, the internal ground terminal *must* be grounded (Fig 3).

Digital lines

The various digital modules are connected with “Bus” connectors (Fig. 5). Recommended cable:
RS-485: 2 shielded twisted pairs, 120 Ω.
One pair is used to power the module, and the other is used for communication. The cable shield or tress should be connected to the terminal: ⏚

i *Data wires and the schield wires should be cut as short as possible.*

Internal relay dry contacts

The RCT dry contacts for the 3 internal relays R1, R2, and R3 are available on the CPS central controller motherboard on connectors J23, J24, and J25 (Fig. 7).
Working load: 2 A at 250 VAC, 24 VCC.

Associated alarm type: R1 (alarm/fault), R2 (alarm), R3 (alarm).

RS-485 serial link out

Recommended cable:
RS-485 cable: 1 shielded twisted pair, 120 Ω. (Fig. 6).

MOTHERBOARD FOR RACK-VERSION CPS

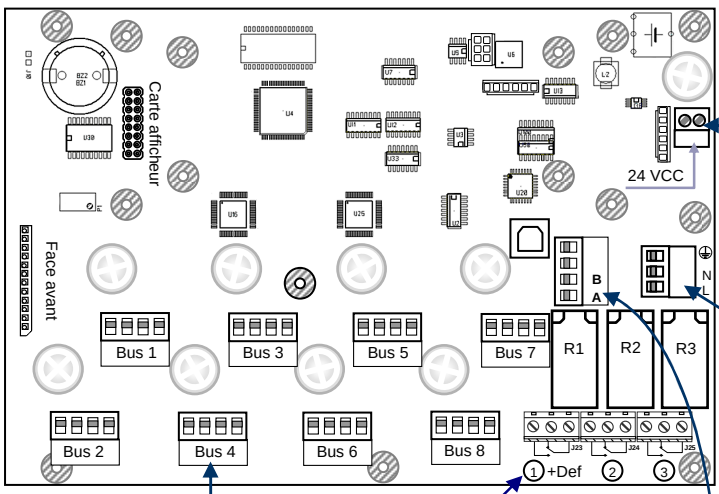


Fig. 3 : POWER SUPPLY **24 VDC**

0V +24 VDC

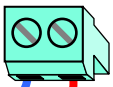


Fig. 4 : **power supply** 110-240VCA

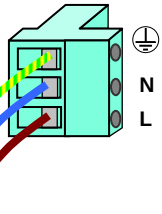
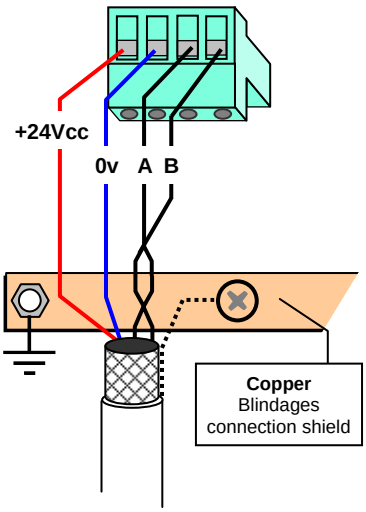
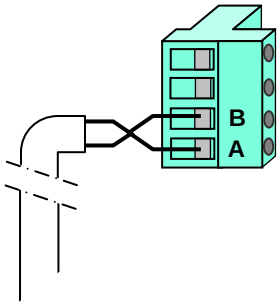


Fig. 5 : **BUS 1 to 8**
DIGITAL MODULE LIAISON
CPS10 - CPSRM4/8 - CPSAI16 - CPSAO4



Bus RS485, Recommended cable:
2 shielded twisted pair cable, 120 Ω
[1 pair for module power supply, 1 pair for RS485 communication]

Fig. 6 : **DIGITAL LIAISON RS485**
SUPERVISION SYSTEM



Cable RS485 : 1shielded twisedt cable, 120 Ω

110-240VCA

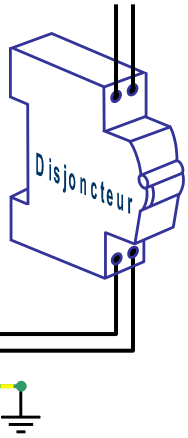
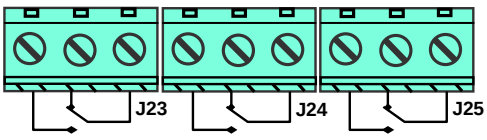


Fig. 7 : **RCT contacts**



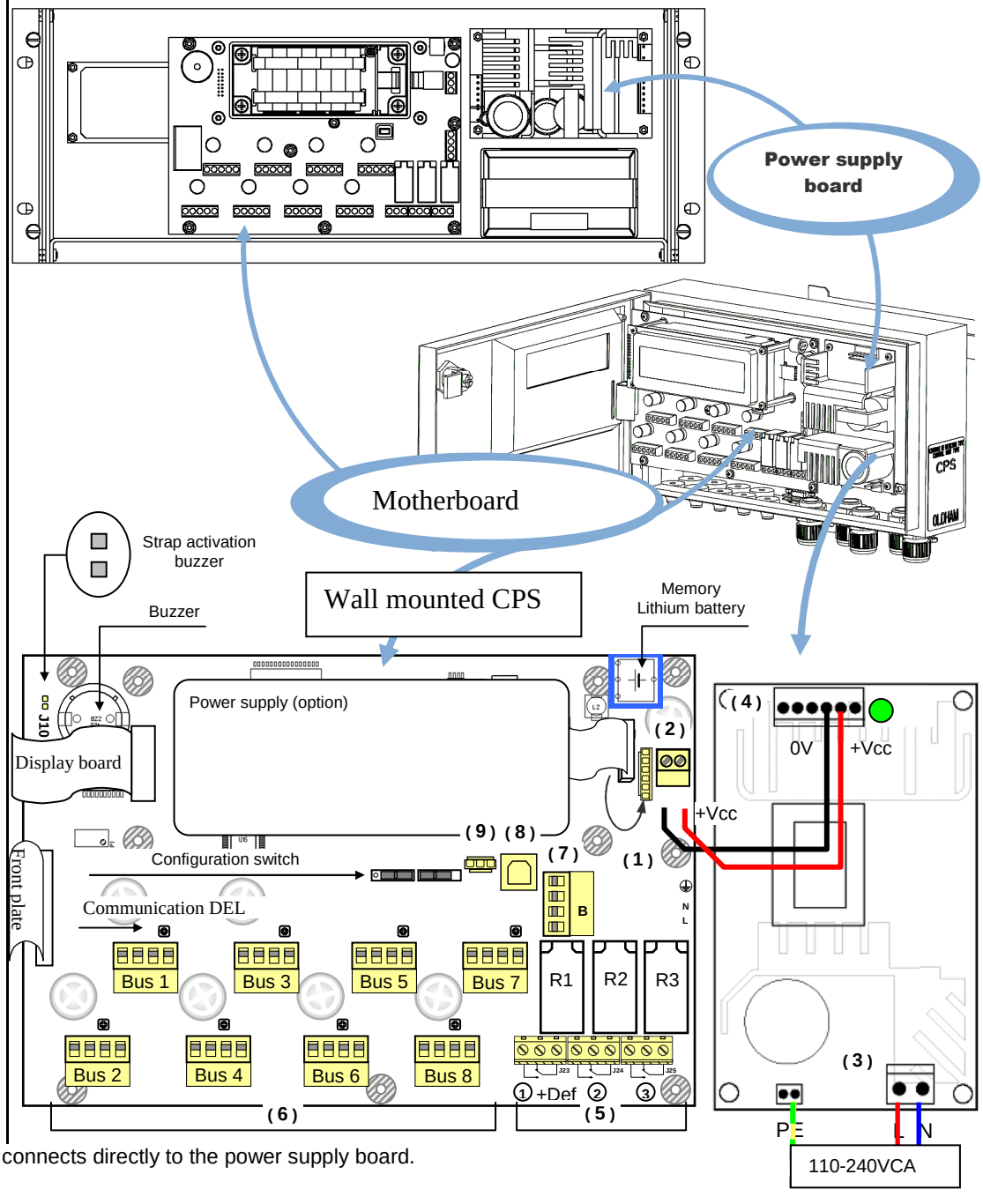
AL1 + DEF AL2 AL3

Minimum charge for RCT contact (resistive load) :
2A / 250 VCA - 30 VCC

Overview of the Motherboard

Part	Connector function
(1)	110-240VCA main power supply (rack version)
(2)	24 VDC external power supply connection
(3)	110-240VCA power supply for (wall-mount) power supply module
(4)	24 VDC power supply output for power supply module *motherboard + integrated printer (rack-version option) power*
(5)	Internal contact relay outputs (RTC) *dry contacts, potential free*

Part	Connector function
(6)	Digital addressable modules *8 line connectors for connecting digital modules (CPS10 – CPSRM – CPSDI16 – CPSAO4)*
(7)	RS-485 digital output *links to a supervision system*
(8)	USB serial interface (PC/COM_CPS connection for configuration)
(9)	RS-232 serial interface link *PC/COM_CPS connection for configuration, External serial printer connection*
R1, R2 , R3: central station shared internal relays	

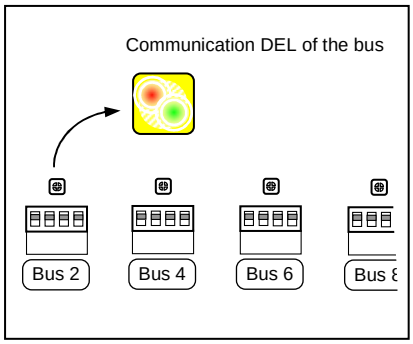


The wall-mounted version connects directly to the power supply board.

Inspecting the digital buses

Bicolor (red/green) LEDs located above each line start, on the motherboard, allows for inspection of the bus links as follows:

LED appearance	Status
Red + Green LEDs lit (LEDs blink rapidly, almost imperceptibly) **Orange** in appearance	**Normal operation.** Red LED→ question Green LED ← response
Red LED blinks once per second (green LED is off) **Red** in appearance	**Communication fault.** Missing or faulting module.
Irregular blinking	Poor communication quality
Both LEDs off.	No active modules

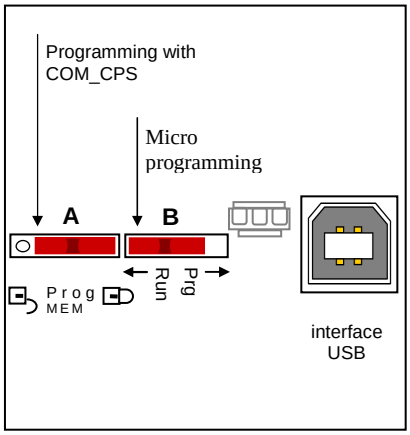


Mini-switches

Mini switch A allows the CPS controller to download and read the user program. When the switch is in the "MEM" position (open padlock), the user program memory is accessible and the message "switch open" is displayed on screen. The CPS central controller waits to download the program from the *COM*_CPS software. The CPS central controller goes into "shut-down" mode when mini switch A is in the "MEM" position.

When the *COM*_CPS software programming is complete, the mini switch should be flipped back to the "Prog" position (closed padlock), and the central controller should be rebooted to initialize all of the newly loaded settings.

Mini switch B only used for the central controller's internal microprocessor. It should always be in the "Run" position.



Internal relay and buzzer

The CPS central controller is equipped with **3** internal **relays [R1, R2, R3]** and a shared **Buzzer**. The operating settings for the relays and the buzzer can be set with the *COM*_CPS software (see table below).

The internal buzzer is activated when a specific program-defined event occurs (fault or alarm). All lines share relays R1, R2, and R3.

The Buzzer's pitch will vary according to the alarm threshold. Alarms 1 and 2 have the same frequency. Alarms 3 and 4 have a different pitch, allowing the operator to distinguish between alarm levels.

The Buzzer can be disconnected by removing the "Buzzer activation strap" (J10) located on the motherboard next to the Buzzer (cf: Overview of the Motherboard).

Function / Component	Relay R1	Relay R2	Relay R3	Buzzer
AL 1	X	X	X	X
AL 2	X	X	X	X
AL 3	X	X	X	X
AL 4	X	X	X	X
Module error	■	X	X	X
System fault*	■	X	X	X
Out of Range and Fault	X	X	X	X
Positive security	■	X	X	■

*: (System fault) alarm is triggered if there is a communication fault betweenmodules, a short-circuit in a power supply line, or a module inversion.

X: Function can be activated or deactivated

■: Default configuration setting, cannot be changed by user.

USB / RS-232 serial connectors

The CPS central controller is equipped with a serial port which are used to:

- download the user software (see *COM*_CPS instructions);
- program the integrated micro application according to the position of mini switches on the board (factory setting).

i The serial port has 2 interfaces: USB and RS-232. Only one can be used at a time.

The settings for the central controller can be modified after the program has been created. (Use either the USB or RS-232 adapter to connect the PC to the CPS central controller.

(See Chapter 7 – Program transfer).

USB Interface (1)

Use a USB cable to connect the PC to the CPS central controller running the *COM*_CPS application.

The USB interface emulates a serial port and is preferable to an RS-232 serial connection.

The corresponding USB driver must be installed before the PC is connected to the central measuring station (see *COM*_CPS instructions).

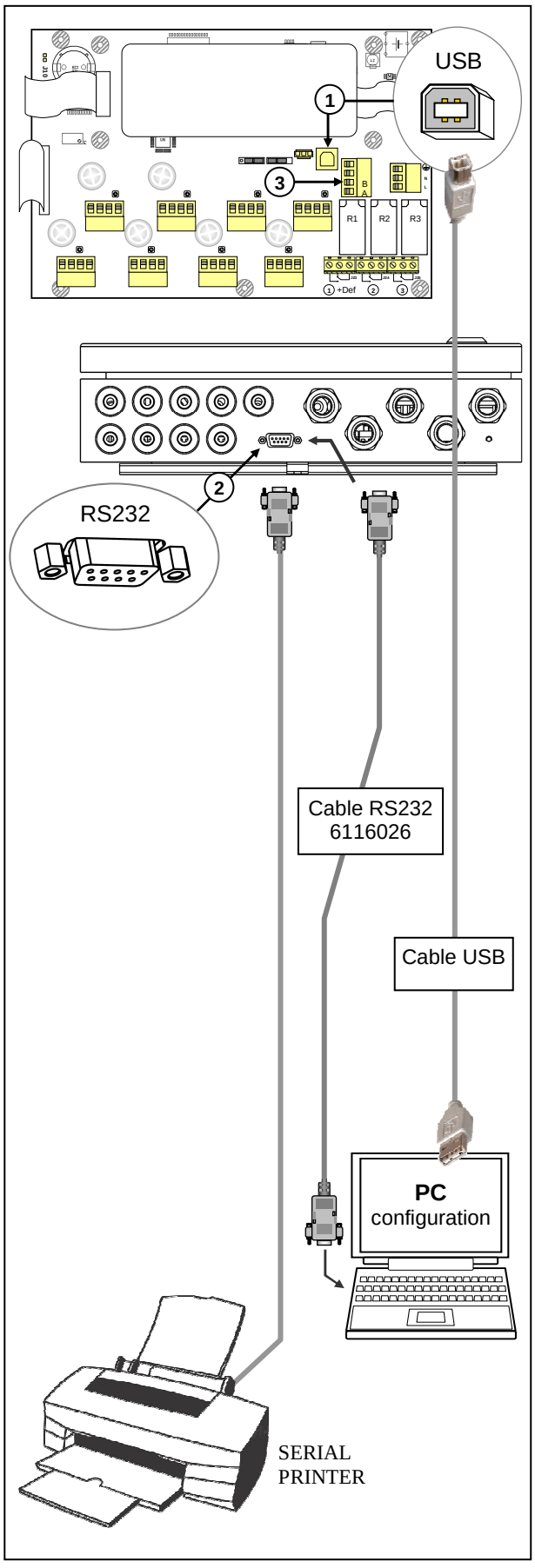
SUB-D 9 RS-232 Interface (2)

Use a cross-over RS-232 serial cable to load the user software.

RS-232 cable series reference number:
6 116 026

A serial printer can be permanently connected.

This would allow you to load the software via the USB interface without disconnecting the printer.



RS-485 serial connection (3)

The RS-485 serial port (3) is reserved for the supervision system and is composed of an RS-485 interface using JBUS/MODBUS protocol.

A table containing all of the important information pertaining to the central controller can be found in the **corresponding annex of Chapter 8**.

Printer (Optional feature)

Connection: Central controller RS-232 interface via an RS-232 serial cable.

Communication settings: 19200 Bd, 8 bit, no parity.

Event printing "on the fly."

Status table printing (choice of four printing schedules). *For example: average readings over 20 minutes, 1 hour, or 8 hours, summary of alarm and relay statuses.*

"Out of paper" functionality: no data is lost when the printer runs out of paper. Once more paper has been loaded, printing will resume where it left off.

Data flow is managed as follows: XON/XOFF Protocol

The printer is ON

The central controller sends data to the printer on start-up. If the printer's power supply fails or if the RS-232 cable is disconnected, data sent from the central controller will be lost.

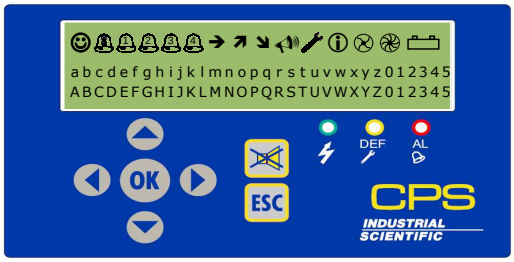
In the event that the RS-232 cable becomes disconnected, it may be necessary to turn the printer off and on again to reinitiate data transfer.

The printer is OFF

No data is delivered to the printer. The central controller stops sending data when the printer signals the CPS central controller that it is no longer available (Buffer is full, out of paper, or printing stopped with the ON/OFF button).

The central controller will reinitiate data transfer once the printer signals that it is available (empty buffer, or signal through the printer's ON/OFF button or online button).

The front panel circuit



The central controller front panel circuit is equipped with:

1 LCD display: backlit, 2 lines by 32 characters and a pictogram line for viewing sensor readings and the zone in question, various test point data, settings, events, etc.

3 lights on the front panel of the central controller (green for power, yellow for errors, and red for exceeding thresholds) serve as constant system status indicators.

7 keys to select on-screen information and/or validate certain operations via menus. The menus are available in English, French, German, Spanish and Dutch.

Display Screen

	No alarms or errors
	Icon associated with one or more alarm icons indicates (by blinking) that the associated alarm is an averaged alarm.
1	SOLID = instantaneous alarm 1 BLINKING = averaged alarm 1 (takes priority over solid state)
2	SOLID = instantaneous alarm 2 BLINKING = averaged alarm 2 (takes priority over solid state)
3	SOLID = instantaneous alarm 3 BLINKING = averaged alarm 3 (takes priority over solid state)
4	SOLID = instantaneous alarm 4 BLINKING = averaged alarm 4 (takes priority over solid state)
	SOLID = stable signal in hysteresis interval (calculated over 1 minute)
	SOLID = signal increased in relation to the minute before BLINKING = Exceeding the scale (takes priority over solid state)
	SOLID = signal decreased in relation to the minute before BLINKING = Negative fault (takes priority over solid state)
	SOLID = buzzer on
	SOLID = calibration underway
	SOLID = LS (low speed) relay control active
	SOLID = HS (high speed) relay control active
	SOLID = Error
	SOLID = mains power supply OK BLINKING = battery or mains power supply problem

Keys

	Keys primarily used to modify values (ex: line number)
	Keys primarily used to navigate menus or to change variable current (ex: go from line number to sensor number)
OK	Key used to validate a menu or an input that would alter system operation. (ex: activation of a relay)
ESC	Key used to return to a previous menu screen or to cancel a selected value before it has been validated.
	Key used to acknowledge a locked alarm (programmed for manual acknowledgement) or to dismiss a buzzer relay after its holding time, even if an alarm is still active.

Lights

Green LED: power supply status indicator
SOLID = OK
BLINKING = power supply problem (no power to main or problem with the battery pack)

Orange LED : indicates the presence of one or more faults.

Red LED: signals the presence of one or more alarms.

COM_CPS Alarm thresholds

Six alarm thresholds can be programmed and adjusted for each sensor:

Alarm 1, Alarm 2, Alarm 3, Alarm 4, Out of Range and Fault.

Alarms 1 – 4 can be:

- **Instantaneous;**
- **delayed** (0 to 3,600 seconds);
- **averaged** (period of 1 to 480 minutes).

  This makes it possible to **calculate STEL and TWA values**.

  So, for example, you could choose to activate Alarm 1 if the average calculated levels over a period of *8 consecutive hours* exceeded *50 ppm*, and Alarm 2 if average levels over a period of *10 minutes* exceeded *100 ppm*, and Alarm 3 if the *instantaneous reading* exceeded *200 ppm*.

  Averaged alarms are only triggered at the end of a complete time interval.

  If the line or the detector module stops, average value calculations are halted and will only begin again once the line or the detector module has been reactivated.

Both the instantaneous and averaged alarms can be set to trigger on an increasing value (rising edge) or on a decreasing value (falling edge).

- **Rising edge**: alarm is activated when levels increase. Use this option for sensors measuring Explo, CO, H_2S, etc.
- **Falling edge**: alarm is activated when levels decrease. Use this option for O_2 sensors, for example.

Out of Range alarm: can activate an alarm, a relay, or an LED.

"Verification" option: this option is activated for explosive gases. When a "verification" alarm occurs, the level displayed will be frozen at the maximum value until it is acknowledged (manually or automatically) and on the condition that the gas levels have fallen under the alarm threshold.

Example of ventilator command functionality for CO/NO detection

Alarm threshold	CO (ppm)	NO (ppm)	RESPONSE
Alarm 1	50	25	Ventilators start on low speed
Alarm 2	100	50	Ventilators go to high speed
Alarm 3	150	75	Max speed ventilation + alarm lights in the surveillance area
Alarm 4	200	100	Visual & audible alarms + restricted area access + evacuation orders for individuals in the area

COM_CPS Alarm acknowledgement

Alarms can be rearmed in two ways:

Manual acknowledgement: the audible alarm can only be dismissed after the "Acknowledge" button on the CPS central measuring controller has been pushed; or

Automatic acknowledgement: the audible alarm will be automatically dismissed once the alarm condition has ended.

If an alarm is triggered, a corresponding message will appear on the screen, an audible alarm (BUZZER) is activated, and the red LED on the front panel is illuminated.

Touching the "Acknowledge" button once will remove the message from the screen and will turn off the BUZZER.

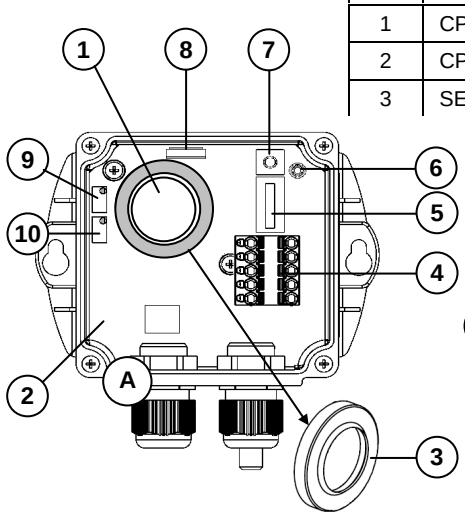
Touching the "Acknowledge" button a second time will re-arm the programmed alarms. These alarms will not turn off until the concentration of gas falls below the threshold.

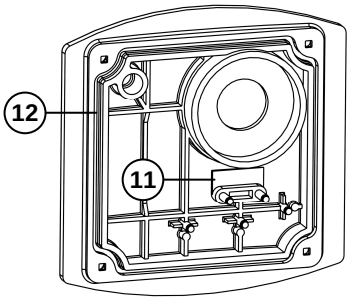
Chapter 4 Digital Modules

View of Digital Modules

SENSOR MODULE CPS10

PART	DESIGNATION	CO	NO	NO2	O2	EXPLO
A	CPS10 SENSOR MODULE	6 513 591	6 513 592	6 513 593	6 513 598	6 513 594
1	CPS10 SENSOR	6 313 970	6 113 331	6 113 332	6 313 982	
2	CPS 10 BOARD	6 451 597	6 451 598	6 451 599	6 451 600	6 451 600
3	SENSOR WASHER	6 136 243	6 136 243	6 136 243	6 336 049	

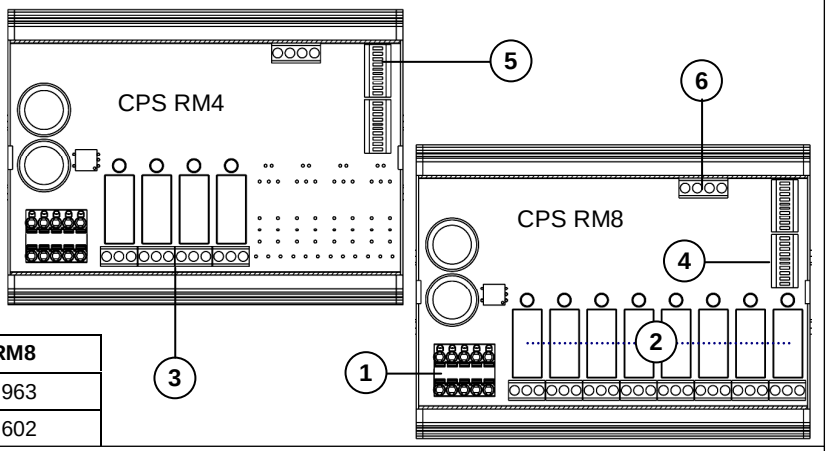




Part	DESIGNATION	
4	Power supply & network connector	
5	Configuration switches (Adresses)	
6	Calibraton LED	
7	Button [sensor replacement]	
8	Measurement connector [sensor replacement]	
9	Sensitivity adjustment [sensor replacement]	
10	Zero adjustment [sensor replacement]	
11	6 153 046	CPS10 Magnetic switch
12	6 136 052	D2 line washer (0.316)

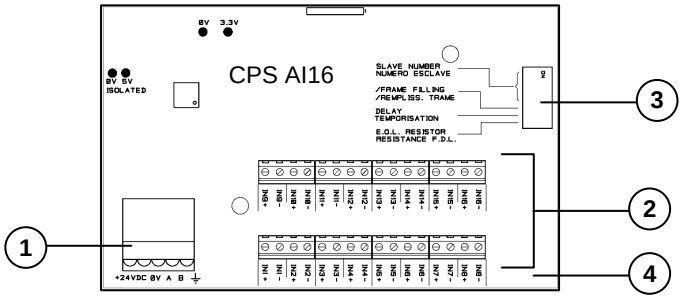
RELAY MODULES CPSRM4-CPSRM8

Part	DESIGNATION
1	Power supply & network connector
2	Programmable relays (8 or 4)
3	potential free RTC output contact
4	Safety switch + or - relays
5	Configuration switches (Adresses)
6	Logic Input terminals (2 Inputs)



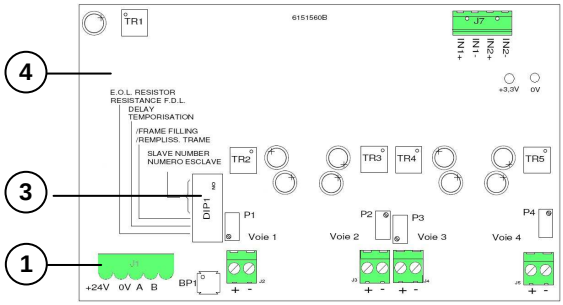
DESIGNATION	CPS RM4	CPS RM8
RELAY MODULE	6 313 962	6 313 963
RELAY MODULE BOARD	6 451 601	6 451 602

LOGIC INPUT MODULE CPS AI16



Part	DESIGNATION
1	Power supply & network connector
2	Logic input terminal (16 Inputs)
3	Configuration switches (Adresses)
4	Module board

ANALOG OUTPUT MODULE CPS AO4



DESIGNATION	CPS AI16	CPS AO4
MODULE	6 313 964	6 313 980
MODULE BOARD	6 451 603	6 451 614

Connecting Digital Modules

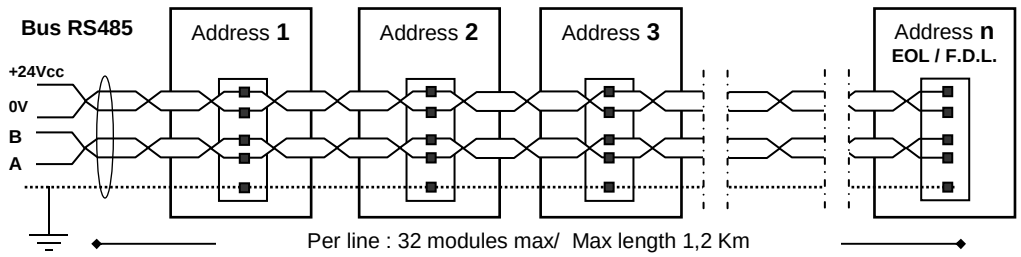
General topology of the RS-485 network

Modules are connected in “parallel” in the RS-485 network, comprised of a 1 twisted pair cable for signals, 1 or more pairs to supply power to the modules, and 1 shield wire.

A 120 Ω end of line resistor (**EOL RESISTOR)** should be placed at the last module in the line, at the end of the bus (see Chapter 6 - End of Line Resistor).

The modules are equipped with a double connector, which can be split to easily connect conductors and also allows you to isolate the module while maintaining line continuity.

Fig. 8 : **NETWORK RS485**



Wiring the digital network

The sensor module has two cable glands. One connects to the input wire, and the other connects to the output wire which is routed to the next module.

The modules should be wired with RS-485 shielded twisted pair cable, with a normal resistance of 120 Ω, of at least 0.22mm² in diameter. +24VDC, 0V A and B terminals are linked to +24VDC, OV terminals A and B in other modules in the line, and then linked to the connector corresponding to the central controller. The cable shield should be connected to a ground terminal marked with the following symbol: (Fig.9).

WARNING

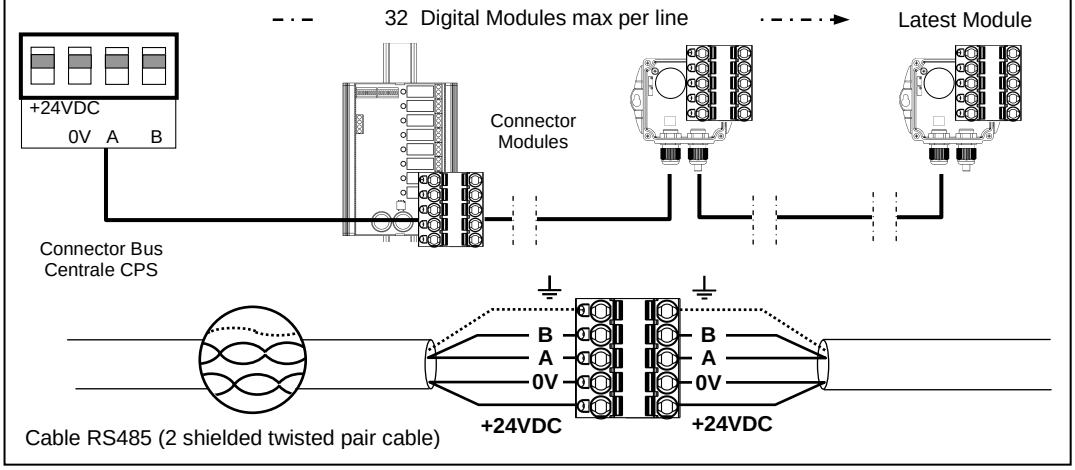
An improper installation can cause incorrect gas level readings or system failure.

Do not run cable near equipment such as motors, transformers, or any lines generating a large magnetic field.

Always check to ensure that the cables are completely separated from other circuits.

i *Do not leave any stripped wire ends exposed. To guard against electromagnetic disturbances, the data cables and the screen (tress) cables should be cut as short as possible*

Fig.9 : **DIGITAL LINE WIRING**



Configuring the communication settings

Slave address

All modules in a line should be identified with a unique slave number. Switches 1-5 on the **Configuration Switches** unit (Fig. 10) contained in each module, allow you to set a binary numerical address (1…32).

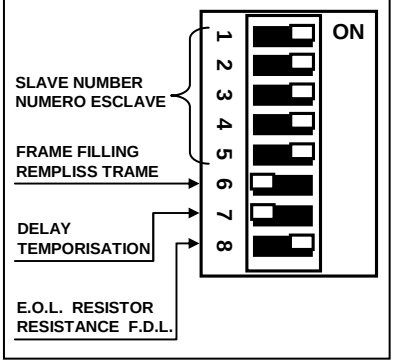
Possible combinations are listed in the address table below.

Notes: The physical address of a module (1…32) should be identical to the address recorded in the central controller configuration program with *COM*_CPS.

When replacing a module, set the configuration switches in the new module to the same position as those of the module being replaced.

i *Switches 6 (FRAME FILLING) and 7 (DELAY) should be in the OFF position (unused options).*

Fig. 10 : **CONFIGURATION SWITCH**



End of line resistor

The last module in each line should be equipped with an end of line resistor.).

i *This switch should be in the OFF position for all other modules in the line.*

Address Table

Slave Address	SWITCHES ON = 1 ; OFF = 0				
	1	2	3	4	5
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	1	1	0
13	1	0	1	1	0
14	0	1	1	1	0
15	1	1	1	1	0
16	0	0	0	0	1

Slave ADdress	SWITCHES ON = 1 ; OFF = 0				
	1	2	3	4	5
17	1	0	0	0	1
18	0	1	0	0	1
19	1	1	0	0	1
20	0	0	1	0	1
21	1	0	1	0	1
22	0	1	1	0	1
23	1	1	1	0	1
24	0	0	0	1	1
25	1	0	0	1	1
26	0	1	0	1	1
27	1	1	0	1	1
28	0	0	1	1	1
29	1	0	1	1	1
30	0	1	1	1	1
31	1	1	1	1	1
32	0	0	0	0	0

CPS 10 Detector Module

The CPS central controller accepts 10 types (or 10 different configurations) of sensors. The type of sensor used in the module depends on the gas being monitored. Electrochemical sensors are used to measure CO, NO, NO_2, for example, while catalytic sensors measure gases such as GPL, CH_4, and H_2).

Available Detector Types

Sensor		Measurement		Sensor life expectancy
Carbon monoxide	CO	: 0 … 300	ppm	36 months
Nitric oxide	NO	: 0 … 100	ppm	24 months
Nitrogen dioxide	NO_2	: 0 … 30.0	ppm	24 months
Methane	CH_4	: 0 … 100	% LEL	48 months
Liquefied petroleum	LPG	: 0 … 100	% LEL	48 months
Hydrogen	H_2	: 0 ... 100	% LEL	48 months
Oxygen	O_2	: 0 … 30.0	% v/v	12 months

Sensor module fault

In the event of a sensor module fault, gas levels are no longer taken into account, and all alarms are cancelled, except for the negative threshold (or fault) which is activated. Average values are no longer taken into consideration and the calculation of average values is paused.

If a sensor faults, it can be replaced while the central controller is still running (hot swap) without replacing the detector.

Detector settings

The following settings apply to each type of detector:

- **The abbreviated name to be displayed on the central controller:** NO, CO, CO_2…
- **The name of the gas:** Carbon monoxide, Nitric oxide, Oxygen, Methane …
- **Unit:** ppm, LEL, %v/v …
- **Range** with display format: 100, 10.0, 1.00, …
- **Actionable thresholds:**
  - 4 instantaneous thresholds: 0-100% measuring range,
  - 4 averaged thresholds : 0-100% measuring range, (time interval programmable from 1 to 480 minutes).

If the operating time is inferior to the averaging time interval, the averaging time interval is ignored.

An instantaneous threshold is associated with an averaged threshold to generate an alarm. These two thresholds can be set to trigger on the rising edge (increasing alarm) or the falling edge (decreasing alarm).

- **Alarm delays (0s to 60 min):**

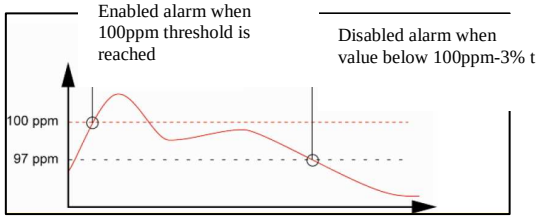
Each of the 4 alarm thresholds can be delayed. If gas levels are in excess of an alarm threshold for an amount of time inferior to the programmed delay, the alarm will not activate.

The alarms can be acknowledged automatically once the alarm is turned off, or manually when the gas levels are once again under the threshold.

- **Fault thresholds:**
  - "**underscale**" negative signal (exceeding the lower threshold): -10% of the range.
  - **"SUP"** out of range (exceeding the upper threshold): +120% of the range.
  - **"Verification"** for all explosive gas sensors, in case an LEL threshold is passed, the SUP alarm remains on even after levels fall under the threshold. The fault alarm is also triggered.
- **Hysteresis:**

Max. 1% of range. Default value = 0%.

Example (see opposite page):
Measurement range = 300 ppm; Alarm = 100 ppm;
Hysteresis (1% of range) = 3 ppm
Level at which alarm can be dismissed = 97



External relay module

The relay module is available in two versions: CPS RM4 (with 4 relays) and CPS RM8 (with 8 relays). It also has two logic inputs (LI) which can be activated.

In maximum configuration, the CPS can manage 256 relays (ex: 32 modules with 8 relays each). For more information about the logic inputs: see: Logic inputs module.

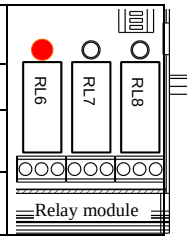
The relays are individually programmable. The operation of each relay depends on its configuration and its function.

Each of the 6 sensor alarms [AL1 - AL2 - AL3 - AL4 - Out of Range - Fault] can control one or more of the 256 relays. Several events can be linked to one relay.

In case of a module relay fault, all relays of this module are restarted.
The CPS central controller will change the relay status unless they belong to a different module type. Restarting will resolve the problem.

Relay status lights

Each relay has a red LED to indicate its status	
Red LED appearance	**Status**
DEL lit	Activated relay (alarm condition exists)
DEL off	Non-activated relay (no alarm condition)

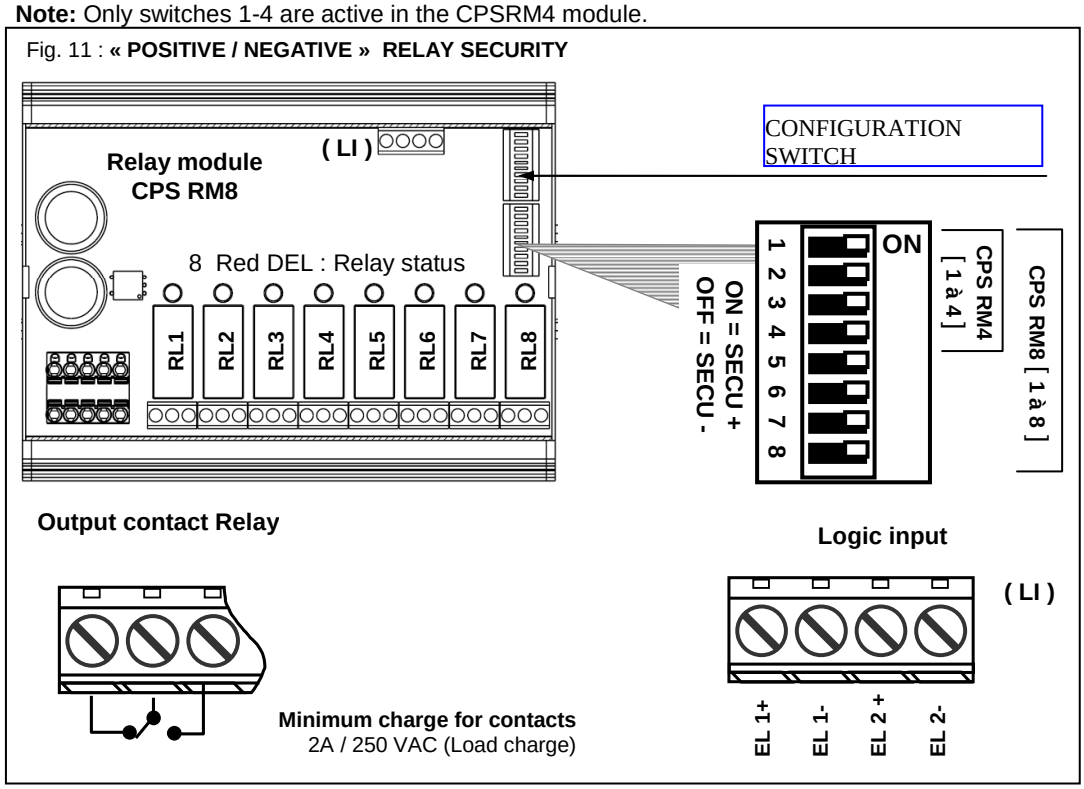


"Positive/negative" relay security

In addition to switches of CONFIGURATION, RELAY MODULES INCLUD SWITHCHES OF POISITVE AND NEGATIVE SECURITY CONFIGURATION. Flip the switch to **ON (positive security)** or **OFF (negative security)** as desired. Each switch acts on its corresponding relay (switch 1 → relay RL1, switch 2 → relay RL2, etc.). (Fig. 11).

Note: Only switches 1-4 are active in the CPSRM4 module.

Fig. 11 : **« POSITIVE / NEGATIVE » RELAY SECURITY**



*COM*_CPS

Relay configuration

"Normal" relays

The relay is activated when an alarm occurs and is deactivated when the alarm condition ends.

The variables acting on a relay in alarm status are:

- Alarm delay
- Automatic / Manual acknowledgement
- Forced state change via the CPS menu
- Forced state change via a logic input command

"Buzzer" relays

The "Buzzer" relay is used to control an audible alarm.

It can be re-armed with the [Acknowledge] key on the central controller, even if the alarm condition has not changed.

The occurrence of a new alarm will reactivate the relay and reset the delays.

The "Buzzer" relay can be automatically dismissed before the end of the alarm with a 15 to 900 second delay (standard setting for "Buzzer" relays) or manually, even if the alarm condition has not changed. It can be configured with a minimum operating time of 1 sec. to 5 min.

The variables acting on a relay after an alarm has occurred are:

- Alarm delay
- Automatic / Manual acknowledgement
- Forced state change via the CPS menu
- Forced state change via a logic input command

Alarm and/or "Buzzer" relay delays

Alarm delays		**Relay delays**
Instantaneous Alarms	Averaged Alarms	**"Buzzer modes"** Min. activation time: 0 … 300 seconds
1 … 3600 seconds	1 … 480 minutes	Acknowledgement time: 15 … 900 seconds
Standard settings for each sensor type		Standard settings for all "Buzzer relays"

"LS/HS" Relays

Low speed (**LS**) relays and high speed (**HS**) relays are always used together, allowing you to control a parking facility ventilation system at two speeds.

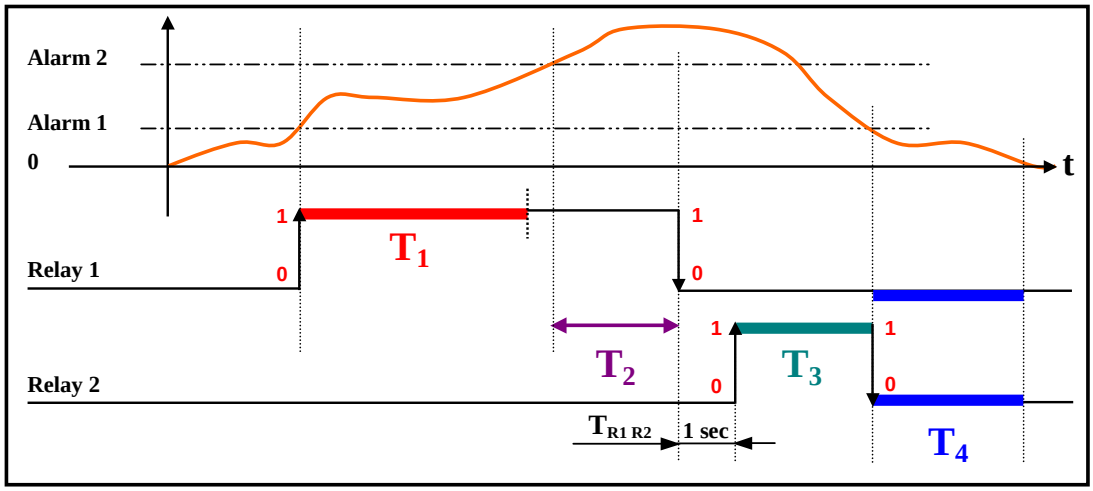
LS (low speed): The relays are designed to control slow ventilator speed (star-triangle configuration for a two-speed ventilator).

HS (high speed): The relays are designed to control high speed ventilator speed (star-triangle configuration for a two-speed ventilator).

The working logic of the relays defined hereafter, takes into consideration the start-up and shut-down intervals during which very high levels of current may occur, capable of damaging motor windings if phases occur in the incorrect sequence.

"LS / HS" Operation

Requirements: Alarm level 1 < Alarm level 2
The LS relay is activated by Alarm 1
The HS relay is activated by Alarm 2



Phases		Action operation	Default Delay*
T_1	**Min. duration LS operation** Adjustment(s): [1 … 32767]	Minimum duration, in seconds, during which the ventilator operates at low speed	5 min.
T_2	**HS operation delay** Adjustment(s): [2 … 32767]	Minimum duration for Alarm 2, after which the ventilator switches to high speed	15 min.
$T_{R1\ R2}$	**LS/HS transition time 1 second (cannot be changed)**	Transition time between Relay 1 and Relay 2 is 1 second (standardized throughout the central controller)	1 sec.
T_3	**Min. duration HS operation** Adjustment(s): [1 … 32767]	Minimum duration, in seconds, for the ventilator to operate at high speed. HS relay deactivated if Alarm 1 condition ends	10 min.
T_4	**LS-HS stop delay** Adjustment(s): [1 … 32767]	Duration, in seconds, after low or high speed ventilator operation has been stopped, before the ventilator can be restarted at low speed.	10 min.

Time values T_1, T_2, T_3 and T_4 can be modified. When the "**Sensor simulation**" menu is used (see the chapter on the maintenance menu/simulation on page 43) the times are decreased, by default, to 12 seconds, 24 seconds, 36 seconds, and 24 seconds, respectively.

Note: An underscale alarm (= fault) activating a LS or HS relay will force the relay into HS position (with respect to the defined time).

"Forced ventilation" function

This is a forced relay state change via the CPS menu. This function allows you to block or release the HS (high speed) command at specified times.

Forced relay state change via a logic input command
In both cases the response is immediate and priority safety settings are maintained: HS takes precedence over LS, and both relays are shut-down if there are contradicting signals.

Logic Input Module

*COM*_CPS

This module contains 16 logic inputs, linking priority commands, such as fire extinguishers directly to the central controller.

A maximum of 224 total logic inputs across all modules can be activated.

Example 1: 112 modules having 8 relays each, with activated inputs.
Example 2: 7 modules with 16 logic inputs with activated inputs.

Each input can override all other commands to activate or block up to 256 relays.

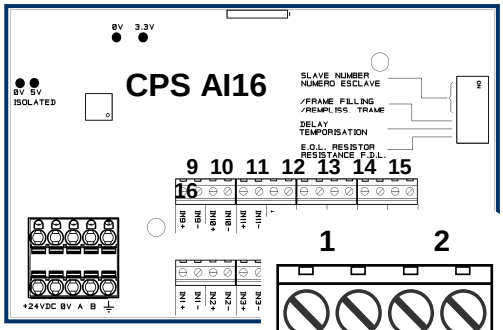
Priority inputs.

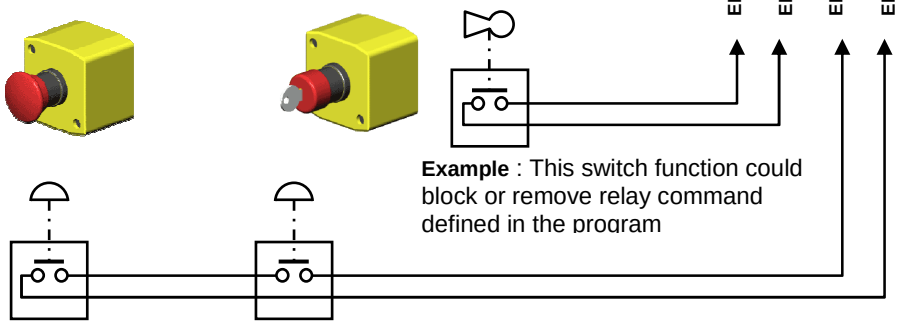
Two levels of input priority can be managed on each module with the *COM*_CPS software.

Priority inputs have control of the other inputs (all of the non-priority inputs are “blocked” when a priority input is activated).

In the event that two different inputs of the same priority level send contradicting orders, the relay is shut-down.

In the event of a fault, the inputs are set to zero.





Example : This switch function could block or remove relay command defined in the program

*COM*_CPS

Analog Outputs Module

This module is comprised of 4 opto-isolated 4-20 mA analog outputs which can be individually activated or deactivated.

Activated: the output analog signal (4-20 mA) varies, according to the input

Deactivated: the analog output signal will be frozen at 0mA, regardless of the input signal.

Several events can be linked to one output. In this case, the largest analog value will be recopied onto the analog output.

The output module also has two logic inputs (LI), identical to those on the “Logic input” module.

A “slave address” for the module can be set with the “DIP” switch (DIP1).

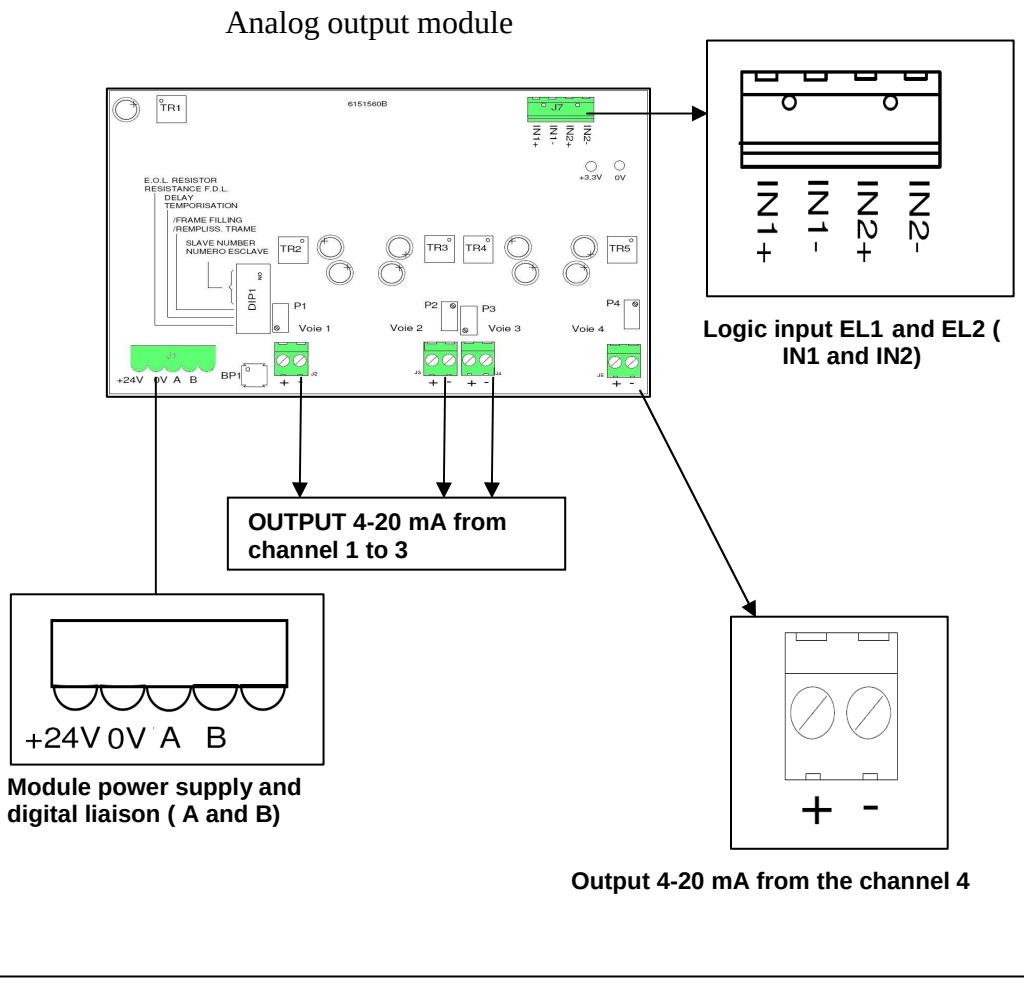
An analog output OFF command from the central controller corresponds to 4 mA.

An analog output ON command from the central controller corresponds to 20 mA.

Connections:

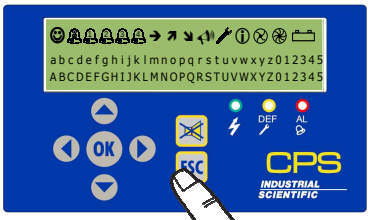
Analog output module

Example of use with analog output module



Chapter 5 Detailed Menus

Menu Tree



Start Display

Events

Starting

ESC

If a button is not pushed during 10 min, the display mode, determined by fault in the menu < System > < Start Config > is automatically used

Control

OK

ESC

Scan& Display

Sensor Display

Events

Relay status

Status 4-20mA

Print

OK

ESC

Cyclique

Événements

Event Print

ON/OFF printer

Module status

All module status of line

Printing System status

OK

ESC

System

OK

ESC

Activation Line, Module, relay

[XXXX acces]

(Activate : Line - module - relays - 4-20mA output)

Date and Hour

Start config

Maintenance

OK

ESC

Simulation

Module Control

Bus default

Maintenance reset

OK

[XXXX acces]

ESC

4-20mA output

Relay status

One sensor

OK

ESC

Version COM_CPSF Micro Free time

OK

ESC

[XXXX acces]

Installation CPS Reset for calibration calculation and overscale

OK

ESC

Infos Modules Status fault Measures Temperature ……

OK

ESC

…… POWER SUPPLY CRC DAY NUMBER SINCE LATEST CALIBRATIONT

OK

ESC

…… Ref. Module Rate of overscale

OK

ESC

…… Visualisation retry ……

OK

ESC

…… [xxxx acces] Reset retry module

Start-up Phase

No faults or alarms are processed during the first minute after start-up. During this phase, the central controller runs a Checksum test (1), a RAM test (2), a line start-up (3) and a module mapping test with a program stored in its memory.

Voltage builds progressively in the lines. Progress bars show the overall progress for line power-up.

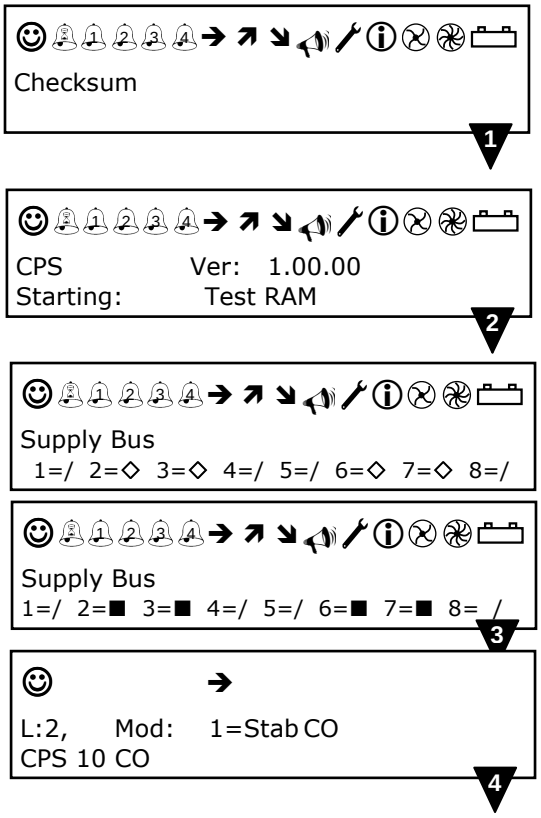
Only the power-up of activated lines is shown (identified by a diamond " ◇ " during the initial power-up phase, and by a black square " ■ " at the end.)

An exclamation point " ! " indicates a short-circuit line fault. The line can be reactivated through the menu system.

Next, a sensor stabilization phase occurs (4) during which time, the alarms are deactivated.

An inspection phase immediately follows in order to verify that the configuration program set with the ***COM*_CPS** software correctly maps to the modules installed and activated.

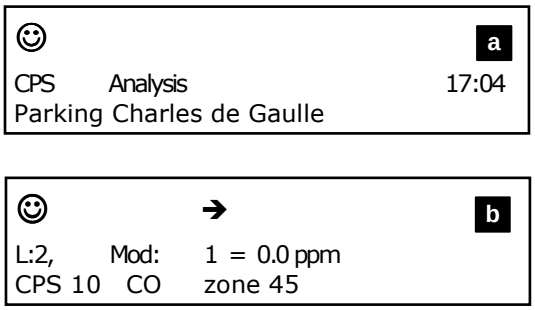
If no errors are found, the program runs normally. If errors are detected, the modules in question will be flagged as faulting.



After the start-up phase, the screen will display information pertaining to the selected mode: **events (a)** or **cyclic (b)**. The central controller begins to process data coming in from the various modules.

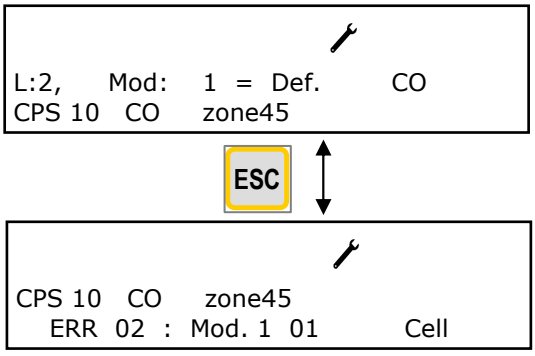
In cyclic display mode, when no alarms are triggered the levels from each sensor are displayed on the first line of the display screen.

In case of a power outage, the program configuration will be saved. When the controller is turned on, the last program installed by *COM*_CPS will be loaded.



If a sensor faults, the message "Def" will replace the reading value. If the power supply is interrupted within a line, the two points in front of that line will blink. Identify the problem by touching the [ESC] key to display the error message.

If the gas level exceeds a high or low threshold, "Ovs" will appear on the display screen where the value for that sensor would normally appear. This message will display simultaneously with a blinking arrow (pointing up or down, depending on the situation).



Control Menu

Normal Display

Alarm pictograms will appear and disappear in along with the alarm conditions detected by a given sensor. The display shows gas level readings, which may not always be identical to the status of a relay. Under normal conditions, alarm pictograms reflect relay status.

Example: LS and HS relays are configured to run on a delayed trigger. Pictograms do not take this delay interval into consideration. So it is possible that the LS or HS relay is on, while the alarm pictogram does not display on screen, due to the alarm delay.

Cyclical display

This menu allows you to view all of the activated sensors on screen, at a display rate of one sensor every two seconds.

Event display

This menu allows you to view the status of all sensors in alarm mode, faulting, or in calibration, at a rate of one sensor every two seconds.

Sensor Display

This menu allows you to freeze the display on a specific sensor by selecting the line and the module number (The program automatically selects active sensor modules).

Touching the [**OK**] key once will bring up the sensor name, the abbreviated gas name, the gas level and unit of measure (ppm, % LEL, $v/v).

If the sensor is faulting, “Def” will display in place of the level reading.

Select the line or the sensor (if appliable) using the [◀] [▶] (horizontal) keys.

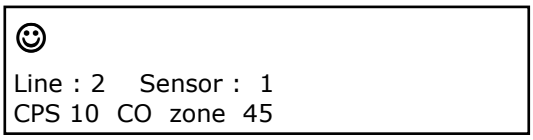
Select the line number or the sensor number (if appliable) using the [▲] [▼] (vertical) keys.

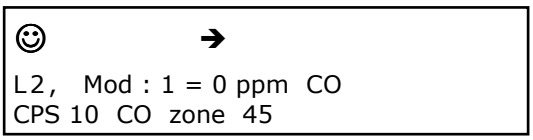
Press [OK] to select the sensor.

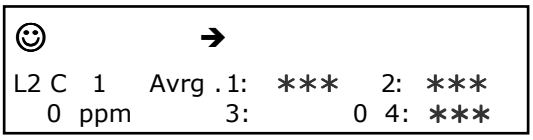
Press [OK] a second time to display both the gas reading level and the 4 averaged readings if average readings were activated. If averaging was not activated, < ✱✱✱ > will display on screen.

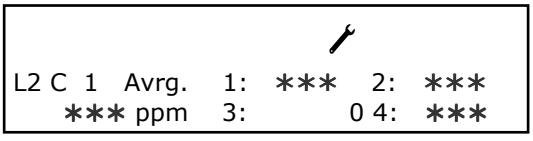
If a communication fault occurs, the value will be replaced by < ✱✱✱ > and the averages will stop on the last calculated value.

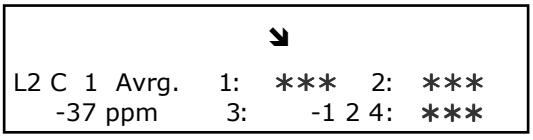
For all other faults, the gas level will be displayed in order to help the user identify the problem.











Events

This menu can be used to search through a history of the most recent 1,200 events. A record of these events can be printed. State changes are recorded in the history.

If Alarm 1 ends and Alarm 2 is triggered, AL2 ON will be recorded.

Examples:
(a) The shut-down of a line causes the shut-down of alarms and relays for that line.
(b) The "fault" alarm is triggered for module 3, line 1.

Other examples:

Module 2, line 8 turned on

30/06/06 (day/month/year) 14:40:36 L:8, Mod:02
Module ON

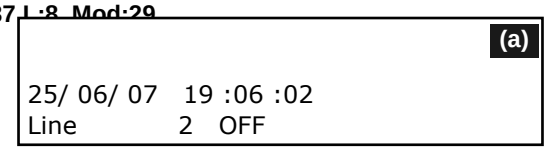
Alarm 2 triggered

30/06/06 14:49:37 L:8, Mod:02
Alarm 2, OFF ⇒ ON

State change for Relay 2 (command relay)

30/06/06 14:49:37 L:8, Mod:29

Relay 2 Normal ON

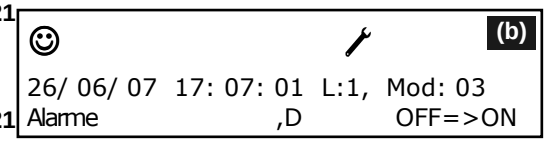


Conditions for Alarm 2 end
30/06/06 14:51:03 L:8, Mod:02
Alarm 2, ON ⇒ OFF

Acknowledgement action

30/06/06 14:55:21

ACKNOWL



State change for Relay 2 (relay shut-down)

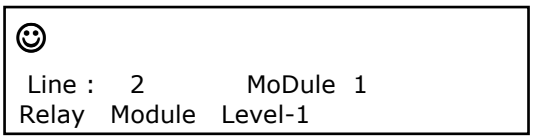
30/06/06 14:55:21

Relay 2 Normal OFF

Relay Status

This menu displays the status of a relay in a given module. Increments for the preceding and following modules in the line are automatically calculated.

Display the status for the selected relay by pressing the [OK] button. This screen will show the module, its mode of operation (Normal, Buzzer, LS, HS,...) and its status (ON, OFF).

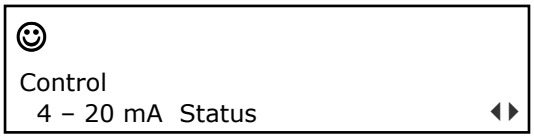


(a): (LS / HS) - Delays
(a): (Buzzer Relay) – Acknowledgement time
(b): (Buzzer Relay) – Min. activation

4-20 mA Output Status

This menu displays the outputs for the selected module. The value is displayed in mA.

Multiple inputs can be linked to one output. In this case, the largest analog value will be recopied onto the analog output.



Activated analog output: the 4-20 mA output signal varies according to the input.

Deactivated analog output: the 4-20 mA output signal will be frozen at 0mA, regardless of the input signal. The output current for each channel will vary between 0 and 24.5 mA.

Printing

"System status" Report

This menu is used to initiate the printing of system status reports. The second part indicates the fault status for all of the modules in each line. Each hexadecimal number corresponds to a module, with Module 1 being on the left, and Module 32 on the right.

0 = OK
1 = Communication error
2 = Module recognition error
4 = Fault triggered by a module fault word.
X = (no programmed module)

If the system detects an abnormality in either the name or the range of a gas, the letter N will blink on the screen

"Status for all line modules" Report

Sensor module: the printed reports will contain both the reading and the averages if averages are activated.
Relay module: the printed reports will contain the status of each relay and of each relay's logic inputs.
Logic inputs module: the printed reports will contain the status of all logic inputs.

"Module status" Report

Prints the status of every module in the selected line. See previous paragraph.

"Printer On/Off" Report

Use the [▲] , [▼] keys to activate or deactivate the printer.
When the printer is activated, the ***COM***_**CPS** cannot be used to for reading or configuration. The configuration mini-switch (A) must be placed in the open padlock position to enable communication between the serial port and the ***COM***_**CPS** software (cf "Programming mini-switches").

"Event" Report

This feature allows you to print all of the most recent events stored in memory (up to 1,200).

Calibration Report: The calibration data for a sensor is only printed at the end of the calibration process. The record will consist of a title, the line number and module number and 6 readings if a complete calibration has take place:

Calibration1
Sensor 4 01 CO

Xo1 = 00004	*Zero value before starting procedure*
Xo2 = 00000	*Zero value*
Xo3 = 00000	*Zero value after procedure*
Xf1 = 00095	*Value of the concentration of calibration gas*
Xf2 = 00100	*Value of the response to the gas*
Xf3 = 00100	*Value of the reading at the end of the procedure*

Acces code

An access code is required to access certain menus. The access code is made up of 4 hexadecimal numbers. If the wrong code is entered three consecutive times, the code will be deactivated until all menus have been exited or until after 10 minutes of inactivity. The ***COM***_**CPS** software can be used to modify the access code.

The default access code is: **1 0 0 0**

System Menu

Line, Module, Relay Action

Enter the access code by using the [▲] [▼] and [◀] [▶] keys.

Line activation

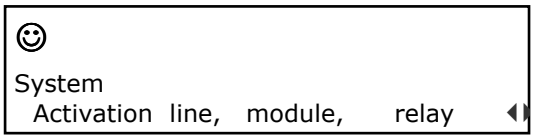
The selected line is displayed along with its number and name.

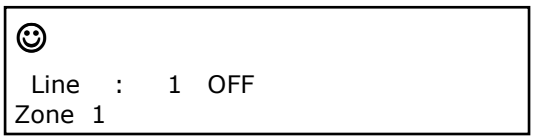
To go to a different line, use the [▲] [▼]. Change the status by pressing the [**OK**] key, and then pressing the [◀] [▶] keys, followed by [**OK**].
If the line is shut-down, the line number will flash intermittently with a cross sign. If the module does not correspond with the CPS central controller *COM*_CPS-created program, its status is reported as faulting.

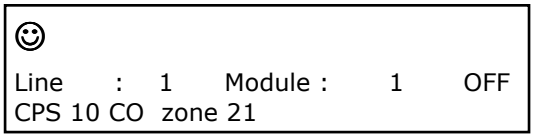
Notes: *If the line is shut down by the COM*_CPS *software, it is impossible to turn it on.*

A line is fully activated approximately 5 seconds after start-up.

A thermal fuse protects the line's power supply from short-circuits. Should a short-circuit occur, a fault word will appear in the menu and an error message will be recorded in the event log. After the short-circuit, the line must be reactivated via the menu.







Relay activation

Use the same "Relay Status" menu to select a relay. After pressing [**OK**] to select the relay, you have three options:

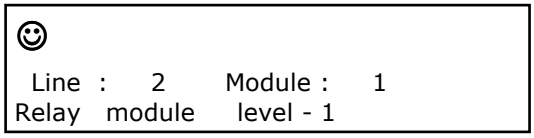
< Normal > = Relay functions normally (triggered by alarms)
< ON > = Relay in forced operation (can only be shut-down by a logic input)
< ON > = Relay in forced shut-down (can only be turned on by a logic input)

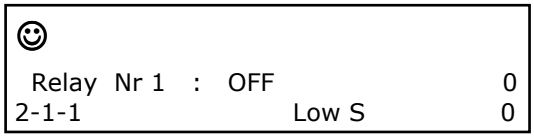
Special case: LS and HS relays

For safety reasons, deactivating a LS or HS relay via the CPS central controller shuts down of the two relays and restarts their timing devices.

If a logic input or a command from the CPS central controller activates a LS or HS relay, the relay will be activated. The relay's activation time is set to the maximum value. In other words, the forced relay shut down ends when logic inputs no longer command the relay or after the end of an alarm condition which could control the relay.

Similarly, if an alarm triggers a HS relay, a LS relay cannot be activated.



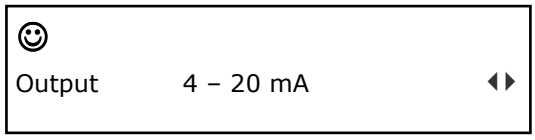


The forced activation of a HS relay takes priority over scheduled HS freezes.

Activating analog outputs

Choose the 4-20 mA output for the selected module. Pressing [OK] will force a start-up or shut-down for the 4-20 mA output.

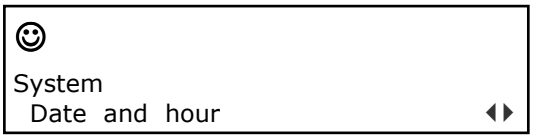
- The shut-down freezes the output at 4 mA.
- The start-up freezes the output at 20 mA.

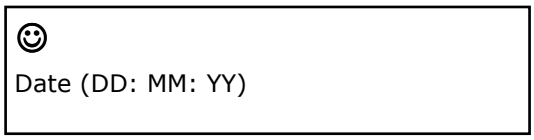


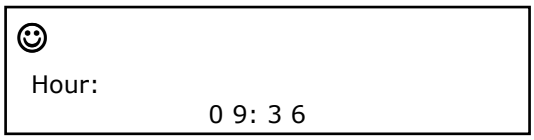
Date and Time

△ Changing the time settings will reinitialize LS and HS delays!

Example: *If the HS relay is activated and the time is changed, the HS relay will stop so that the LS relay can operate according to the predetermined delays.*





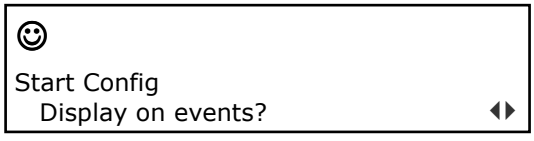


Start-up Configuration

This menu is used to select which menu will display by default upon start-up and after 10 minutes of keyboard inactivity.

The two menu options are:

Cyclical Display and Event Display.



Maintenance Menu

Simulation

This menu is used to simulate the alarms for a particular sensor module or to temporarily activate one or more relays (or outputs). After exiting the simulation menu, the sensors and relays (excluding LS and HS relays) revert to their prior state.

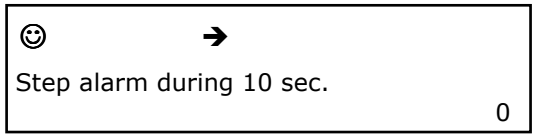
Enter the access code by using the [▲] [▼] and [◀] [▶] keys.

Sensor simulation

Select the sensor module you wish to test. Next, select the delay between each of the alarms to be activated (1-59 sec.). Validate your selections by pressing [**OK**].

The central controller will increase reading levels until they exceed the thresholds for all activated alarms in ascending order +/- hysteresis. During the simulation, the theoretical values are displayed on screen.

During this phase, the other sensors are shut down. However, forced-state lines, modules and relays remain active.



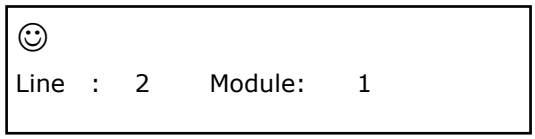
Relay Status Simulation

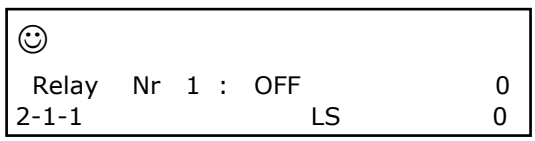
Select the relay module for the relay you wish to test, then the relay you wish to activate.

Use the same “Relay Status” menu to select a relay. After pressing
[**OK**] to select the relay, you have three options:

< Normal > = Relay functions normally (triggered by alarms)
< ON > = Relay in forced operation (can only be shut down by a logic input)
< OFF > = Relay in forced shut-down (can only be shut down by a logic input)

After exiting this menu, the relay will revert to its original state.

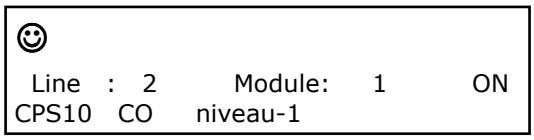




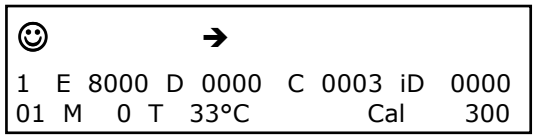
Analog Output Simulation

Module Verification

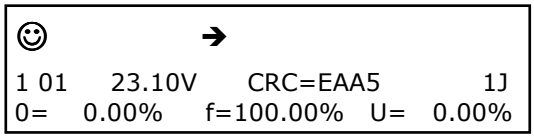
Inspection of all of the parameters relating to a module with a *communication fault***.**

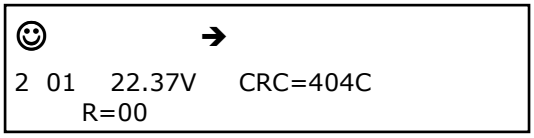


E = Status word
D = Fault word
C = Start-up config. word
M = Level for sensor modules or State for logic inputs
T = Temperature
Cal (Value) = Concentration of gas used for calibration
ID = Module fault

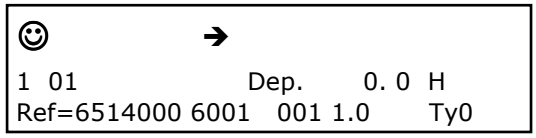


Displays useful variables and operating time according to the module type:
(**Value**) = line voltage
R = Relay status (hexadecimal)
(**Value**) **J** = Number of days since last calibration.
0 = X0 for sensor modules.
f = Xf for sensor modules.
U = Wear rate for sensor modules.
CRC = *(Cyclic Redundancy Check)*
Software version for the module program.





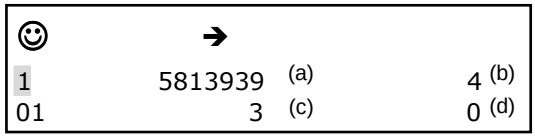
Dep. (**value**) H = Time (in hours) during which the sensor exceeded the scale.
Ref: (**Value**) = Sensor reference.

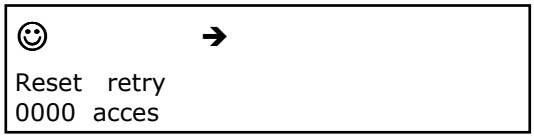


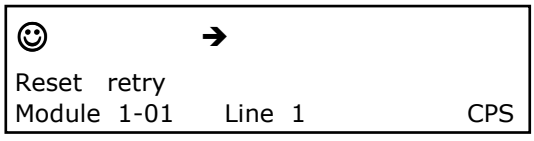
Retry: (plural form, *retries*) – attempt(s) at retransmission. Used to control the quality of communication with the modules.
(a): represents successful transmission attempts. This number increases continually and should be as large as possible.

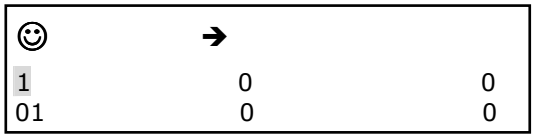
(b), (c), (d): represents next 3 successive retransmission attempts, if necessary, following a failed attempt. In the event that the 1st attempt (1) fails, a 2nd attempt (b) will occur, then a 3rd (c), and 4th (d). The number and the level of saved attempts is indicative of the transmission quality. A large number, on level 3 or 4 is due to poor transmission.

Reinitialize "retries" by selecting the "Reset retry" menu.



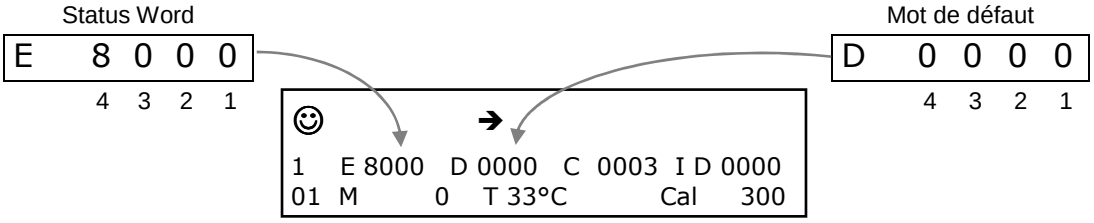






Any module fault generates an event, which is identified by a number (hexadecimal coding) corresponding to the fault type. The number at the end of the second line displays the module error.

The [◀] [▶] keys can be used to change the scroll mode: in normal mode, all events saved to memory are displayed; in default mode, only the faults saved to memory are displayed.



Fault word

4	3	2	1
1 = Def Flash	1 = Def Temp. Min	1 = Def Zero calibration	1 = Def ROM main memory
2 = Def sensor	2 = Def Temp. Max	2 = Def Sens. calibration	2 = Def RAM
4 = Low line power	4 = Def Meas. Min	4 = Def Zero Sensor replacement	4 = Def Battery
8 = high line power	8 = Def Meas. Max	8 = Def Sensitivity. Sensor replacement	8 = module parameter does not correspond to the module card

Sample fault word: **00A0** = Def Sens. calibration + Déf Sensitivity. Sensor replacement (A = 10 in hexadecimal = 8 + 2)

Status word

4	3	2 *	1
1 = BitEtatLiss	1 = BitEtatChg	1 = BitEtat0	1 = BitMod0
2 = BitJbFill	2 = BitEtatPar	2 = BitEtat1	2 = BitMod1
4 = BitJbDelay	4 = BitJbWait	4 = BitEtat2	4 = BitMod2
8 = BitEtatCell **	8 = BitJbCar	8 = BitEtat3	8 = BitMod3

**: only for sensor module (indicates presence of a sensor)

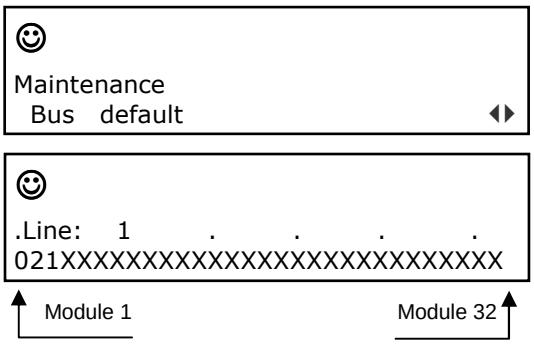
2 *	Status
0 (EtatMes)	Normal measure
BitEtat0 (EtatStab)	Stabilization
BitEtat1(EtatZInit)	Zero init
BitEtat0 + BitEtat1 (EtatStab)	Zero Stabilization
BitEtat2 (EtatZVal)	Zero validation
BitEtat0 + BitEtat2 (EtatSWait)	Sensitivity waiting
BitEtat1 + BitEtat2 (EtatSInit)	Sensitivity init
BitEtat0 + BitEtat1 + BitEtat3 (EtatSStab)	Sensitivity stabilization
BitEtat3 (EtatSVal)	Sensitivity validation
BitEtat0 + BitEtat3 (EtatChg)	Button replace pushed

Module Designation		Type
1	Sensor CO	0
2	sensorNO	1
3	Sensor NO_2	2
4	Sensor EXPLO	3
5	Sensor O_2	4
6	Free	5
7	Free	6
8	Other	7
9	4 relay mod	8
10	8 relay module	9
11	Free	A
12	Free	B
13	4ana output mod	C
14	16 log input mod	D
15	Analog input mod	E
16	Free	F

Bus Faults

This menu displays the faults from all modules in a line. Each hexadecimal number corresponds to a module, with Module 1 being on the left, and Module 32 on the right.

0 = OK
1 = Communication error
2 = Module recognition error
4 = Fault triggered by a module fault word.
X = module missing or unrecognized due to a conflict with another module



Line: 1 Module: 1 = OK
Line: 1 Module: 2 = module recognition error
Line: 1 Module: 3 = communication error

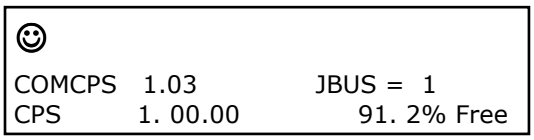
Reset maintenance

i Reserved for ISC- maintenance personnel only.

CPS / COM_CPS Version – Available memory level

Displays the CPS central controller version as well as the COM_CPS programming software version.

Displays the microcontroller availability (time) rate (in %). This value will vary somewhat in relation to the program but can detect if a microprocessor is being overtaxed.

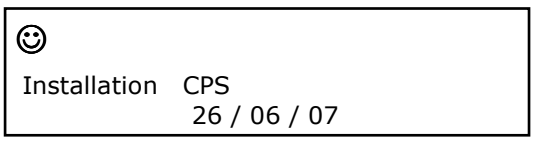


Enter the access code by using the [▲] [▼] and [◀] [▶] keys.

Next, press the [OK] key to reinitialize all counters to zero and to refresh the date.

CPS Installation

This menu is used to zero the following two settings across all modules: Last zero date



Operating Time
Each module logs its operation time in days. For the sensors, this time is equal to the time since the last calibration or the last zero.

Exceeding the scale
Each sensor logs the amount of time that levels exceed the scale in seconds. Go to the “Module Verification” menu to see this time.

Chapter 6 Maintenance

Program transfer

This chapter describes the transfer of data from the *COM*_CPS application to the CPS, and vice versa (see the *COM*_CPS user's guide). After launching the software, you will see a welcome window.

PC → CPS transfer

Once the program has been created, the central controller should receive new settings..

Step 1: establish a physical connection

1) Use either the USB or RS-232 adapter to connect the PC to the CPS central measuring controller.
2) Ensure that the CPS central measuring controller is connected to a power source.
3) **On the central controller**: flip the programming switch to the "MEM" position. The message "Switch open – Program…" will appear on the display screen. Communication with the central controller is authorized during this phase..

Step 2: link configuration

1) In the menu bar, select [Communication > Port].
2) Select the port [COM x] to use on the PC.

Note: communication speed is selected automatically.

Step 3: data transfer

1) In the menu bar, select [Transfer > from PC to CPS].The message "Flip switch to MEM position in order to reprogram the central controller" refers to the <MEM> position on the CPS central controller commutator before starting the transfer procedClick [OK] once verification has ended.
2) During the transfer, a progress bar will indicate transfer progress.
3) Once the transfer is complete, the message "Operation complete" will appear on screen. Click [OK]. The configuration program has been transferred from the PC to the CPS central controller.
4) **On the central controller**: The message "Switch open – Complete" will appear on the display screen. Flip the programming switch to the "Prog" position.
5) The central controller will perform a "Start-up" procedure.

CPS → PC transfer

Step 1: establish a connection

1) Use either the USB or RS-232 adapter to connect the PC to the CPS central controller.
2) Ensure that the CPS central measuring controller is connected to a power source.
4) **On the central controller**: flip the programming switch to the "MEM" position. The message "Switch open – Program…" will appear on the display screen. Communication with the central controller is authorized during this phase.
   Or, use the "Control" menu to set the printer to "OFF."

Step 2: link configuration

1) In the menu bar, select [Communication > Port].
2) Select the port [COM x] to use on the PC.

Note: communication speed is selected automatically.

Step 3: data transfer

1) In the menu bar, select [Transfer > from CPS to PC].
2) The message, "Do you want to read the CPS central controller configuration?" will appear onscreen. Click [OK]. If the message, "Check port configuration and ensure printer set to OFF position and try again" appears, verify that the CPS printer is in the OFF position.
3) Select the folder where you want to download the file, and create a file name (a default name is suggested).
4) During the transfer, a progress bar will indicate transfer progress.
5) Once the transfer is complete, the message "Operation complete" will appear on screen**.** Click [OK]. The data has been transferred from the CPS central controller to the PC.
6) **On the central controller**: The message "Switch open – Complete" will appear on the display screen. Flip the programming switch to the "Prog" position.
7) The central controller will perform a "Start-up" procedure.

Error messages

Error messages will appear in the following scenarios:

ERR 01: Module fault relating to the program.

The test runs systematically on start-up and periodically when a module is activated by the menu if the module does not correspond to the loaded program. The error remains until the problem is corrected or until the module is shut down.

ERR 02: Fault word reading for a module. Name displayed on the 1st line of the screen.

ERR 04: Power line error.

ERR 08: 12C (real-time clock) or EEPROM error.

ERR 10: Module communication error.

ERR 20: Problem originating at printer. Printer shut-down or lack of paper.

Checksum error

When the central controller starts up, checksum values appear briefly on screen after the display test. The value calculated by the central controller is displayed on the first line, and the checksum calculated by the PC with the *COM*_CPS software is displayed on the 2nd line.

If these two values are different, this screen will remain on the display screen, indicating that there is a problem (example: depleted battery.) The user program protection switch must be flipped, and a new *COM*_CPS program must be transferred.

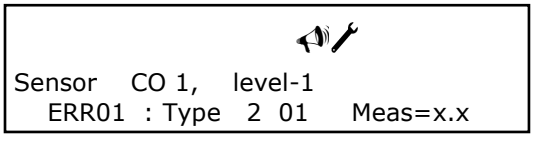
Flip the switch back into the "closed padlock" position before restarting the central controller.

Example of an error

Operation before event	☺ CPS Analysis 21:04 Parking Charles de Gaulle
Technical alarm triggered (fault). Buzzer engaged (if activated), Front panel yellow LED illuminated. Two pictograms appear: the blinking "maintenance key" and the "siren."	 CPS Analysis 21:04 Parking Charles de Gaulle
Action on the front panel "acknowl" button. Audible alarm (Buzzer) is off. "Siren" pictogram disappears. "Maintenance key" pictogram remains on screen. Front panel yellow LED illuminated.	 CPS Analysis 21:07 Parking Charles de Gaulle
Action on the "acknowl" button. Direct access to the "ERRORS" data page. ERR 11 = ERR 10 + ERR 1 **Communication fault** for Module 1, Line 2. Check the line and/or the module. The fault will disappear when the problem is resolved.	 Relay module level-1 ERR11 : Com. 2 01

If multiple errors occur, all of the error codes will be displayed one after another. The faulting modules for each error will be displayed one at a time by their line number and module number.

For all faults except for communication faults, the gas level will be displayed in order to help the user identify the problem.



Testing and calibration of stable installations

Warning :The setting of this section are reserved for authorized persons formed because they might call into question the reliability of detection.

The site responsible is required to establish security procedures on its site. Industrial Scientific may be not responsible for their implementation.

Gas detectors are above all safety instruments. In consideration of this, ***Industrial Scientific Corporation*** recommends regular planned testing of fixed gas detection installations.

A functional test involves injecting a sufficient concentration of gas at the sensor level to trigger pre-set alarms. This test does not replace a full sensor calibration under any circumstances.

Industrial Scientific also recommends fully calibrating detectors with a known and certified concentration of gas every 3 months.* The frequency of calibrations will depend on the application for which the detector is used (exposure to high concentrations of gas, frequent exposure to concentrations of gas, the type of technology used in the sensor, environmental conditions…).

If a gas detector does not respond correctly to a gas test, full calibration with a known gas is mandatory. These recommendations are consistent with applicable industry safety protocols and with the standards and directives relative to the safety of industrial sites. Furthermore, ***Industrial Scientific*** is not responsible for any procedures implemented at a site.

. **Gas concentration which must be used during manual or semi automatic calibration**

- CPS10 **explo** = 2,5% CH4/air
- CPS10 **CO** = 100ppm
- CPS10 **NO** = 50ppm
- CPS10 **NO_2** = 10ppm

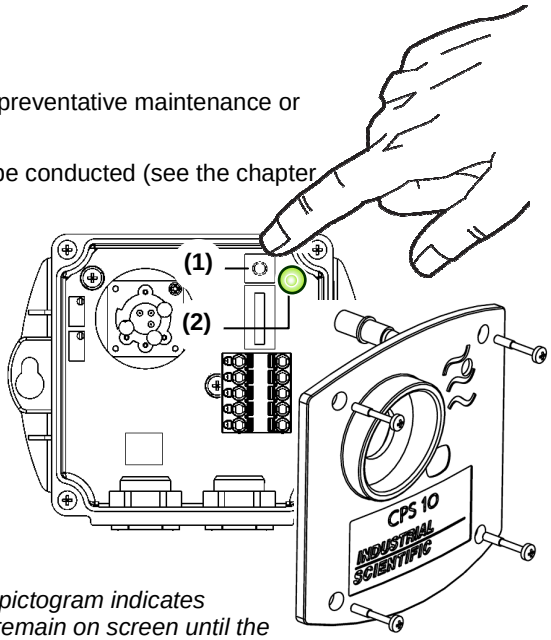
Sensor replacement

Sensors should be replaced as a part of regular preventative maintenance or following a failed calibration test.

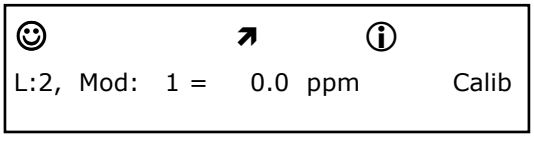
After replacing a sensor, a calibration test must be conducted (see the chapter on semi-automatic calibration).

To replace a sensor:

- Remove the sensor cover.
- Hold down the sensor replacement button (**1**) for **5 seconds**, until the solid green LED (**2**) is on.
- Release the button.
- Replace the sensor and conduct a calibration test (mandatory) according to the semi-automatic procedure.



On the central controller, the "maintenance key" pictogram indicates that the sensor has been replaced. The key will remain on screen until the sensor has been calibrated or until the sensor's power supply fails.
The wear settings for the sensor are initialized upon calibration



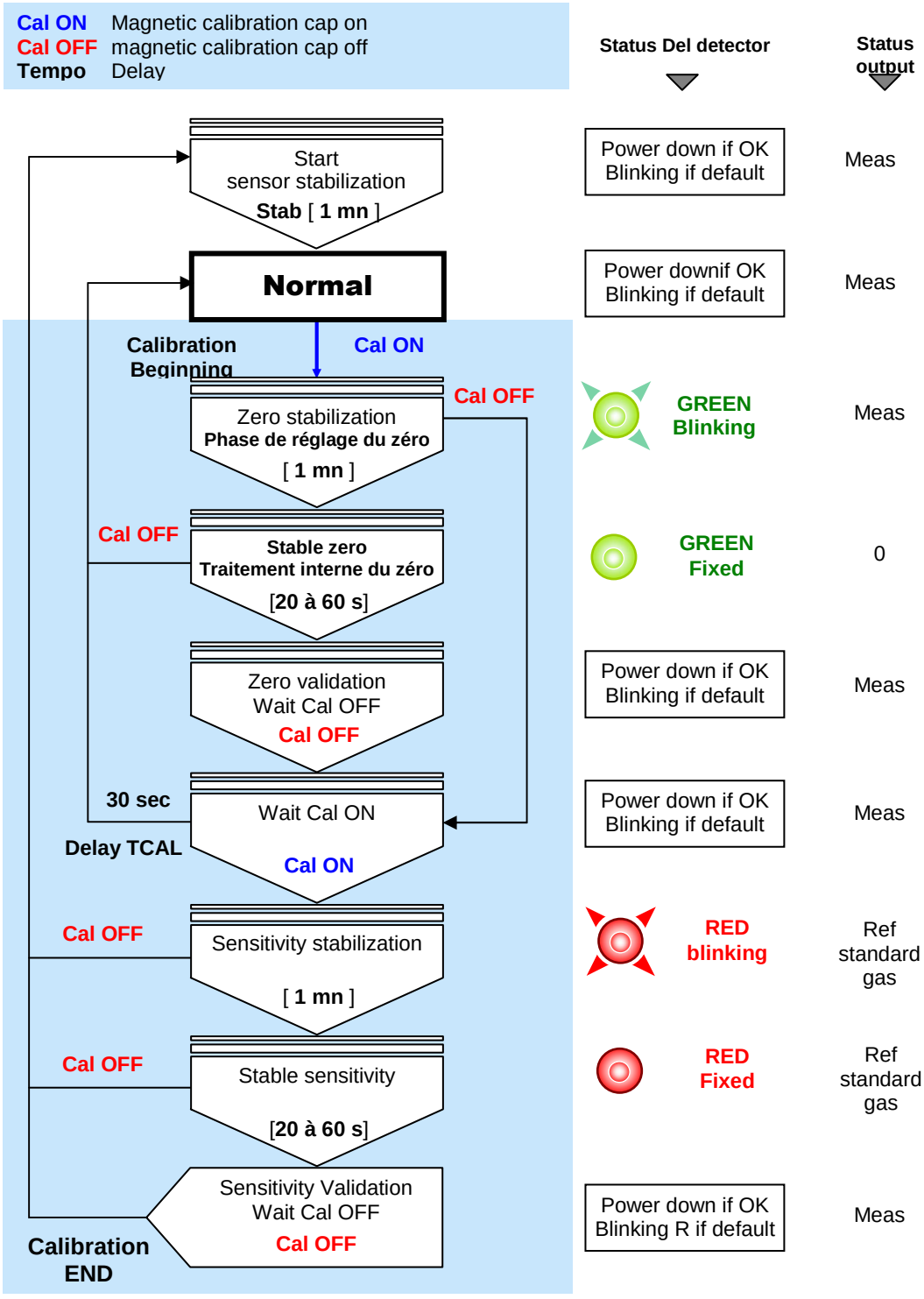
Semi-automatic calibration

During a sensor module calibration, the central controller blocks the alarms from the module in question and displays a maintenance key on the screen. Up to 10 sensors can be calibrated at the same time. The concentration level for the calibration gas is stored in the sensor's memory.

Each calibration start and stop is logged as an event.

The printer records a state after the calibration of each sensor (cf: Printing).

If the calibration is failed, the sensor is listed as faulting and an event is logged with a fault code (0010 – calibration zero fault, 0020 = calibration sensitivity fault) .



Manual calibration

The calibration kit provided by ISC must be used (Ref. 6 116 291) female connector / wires / voltmeter connection files).

- Remove the sensor cover.
- Connect the cable (strand) to the circuit's male connector.

Zero adjustment

Ensure that the sensor is in clean air. If not, inject air into the sensor at a flow rate of 60 l/h, then wait for voltmeter levels to stabilize (use the gas injection device: bottle of synthetic air, calibration pipe, tube).

- Adjust the zero with the potentiometer's "**ZERO**" until the voltmeter reads **0 mV.**

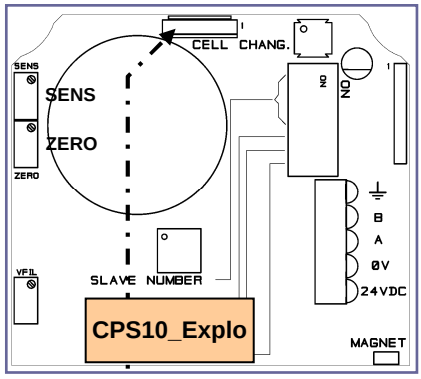
Sensitivity adjustments

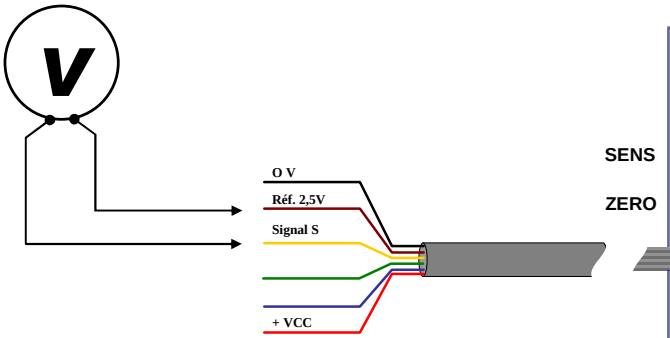
- Now inject the known gas (60 l/h) into the sensor, and wait for the voltmeter signal to stabilize.
- Adjust the sensitivity if necessary with the potentiometer "**SENS**" until the signal value (in mV) corresponds to the amount of reference gas used. **Use the following formula to calculate the correct value for the signal.**
- Stop injecting gas (remove the calibration pipe from the sensor).
- Wait for the voltmeter to "return to zero."

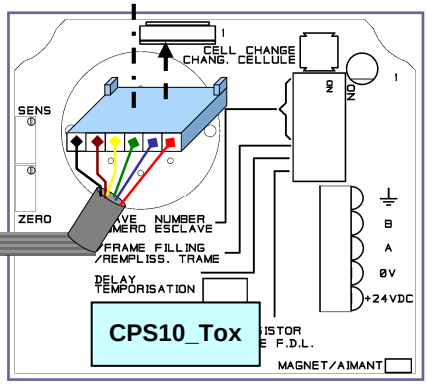
Version CPS 10 for explosive gas

The CPS central controller has a "**verification**" function: if the sensor measures a concentration of gas higher than 100% LEL, the signal will be dismissed by disconnecting its power supply.

$$U_{(mV)} = \frac{1600 \times \text{Reference gas value}}{\text{Measuring scale}}$$







Toron OLCT 10 – CPS 10 6pts / Réf. 6 116 291

MAINTENANCE WIRES:

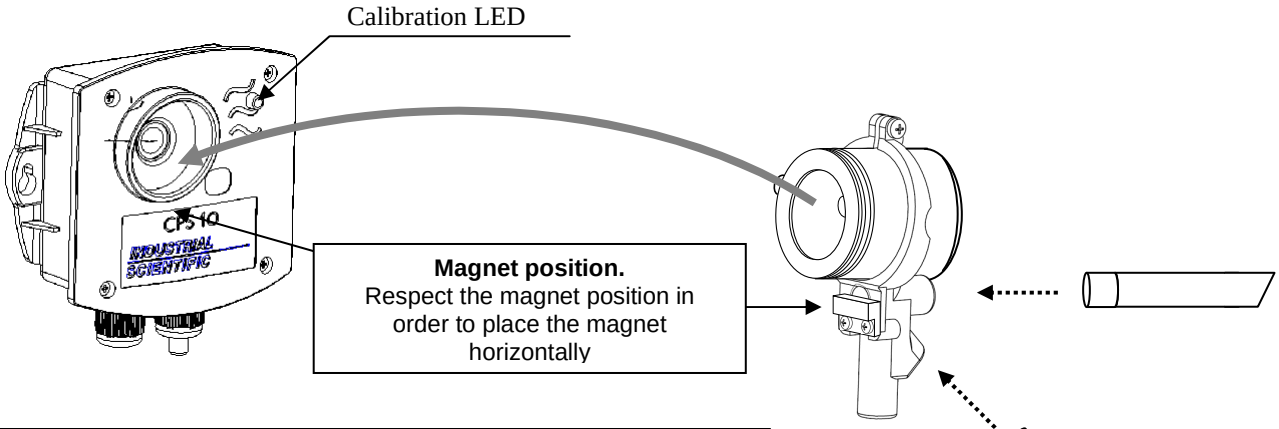
+VCC (**red**) = + power supply

Signal S (**yellow**) = signal from 0 mV to 1600 mV for zero and sensitivity measure
Ref 2,5V (**brown**) = zero reference for signal reading from 0 mV to1600 mV

GND (**black**) = electronic circuit ground.

V

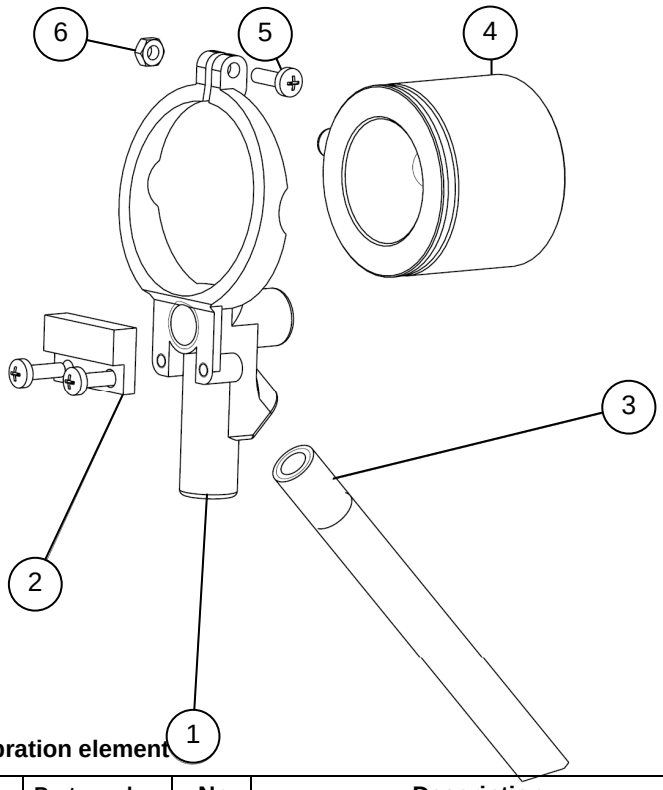
Semi-automatic calibration device



Semi-automatic calibration

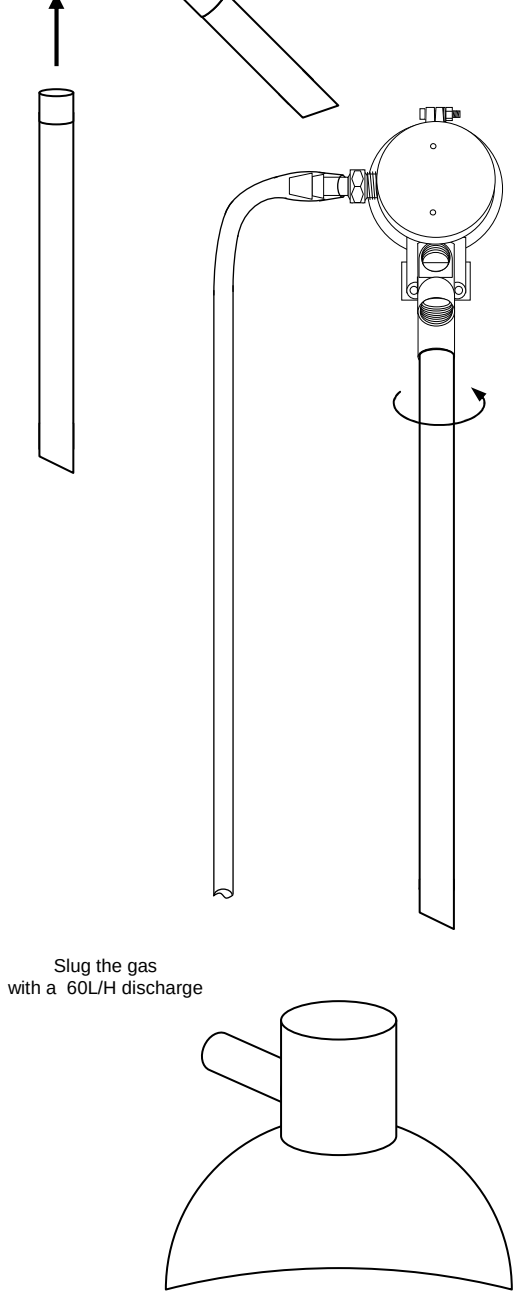
The magnetic calibration allows for one-man and non-intrusive calibration to **save considerable time.**

Manual calibration with zero and span potentiometers is possible by opening the CPS 10



Calibration element

Rep	Part number	Nr	Description
1	6 128 972	1	SUPPORT
2	6 155 771	1	MAGNET MEDER CPS 10
3	6 325 161	1	HANDLE
4	6 331 141	1	CALIBRATION CAP
5	6 902 406	3	SCREW PCL TZ M3*10
6	6 903 305	1	SWIVEL H M3



Central controller maintenance

Do not use alcohol- or ammonia-based liquids to clean the central controller. If necessary, clean the exterior of the central controller with a damp cloth.

Lithium battery

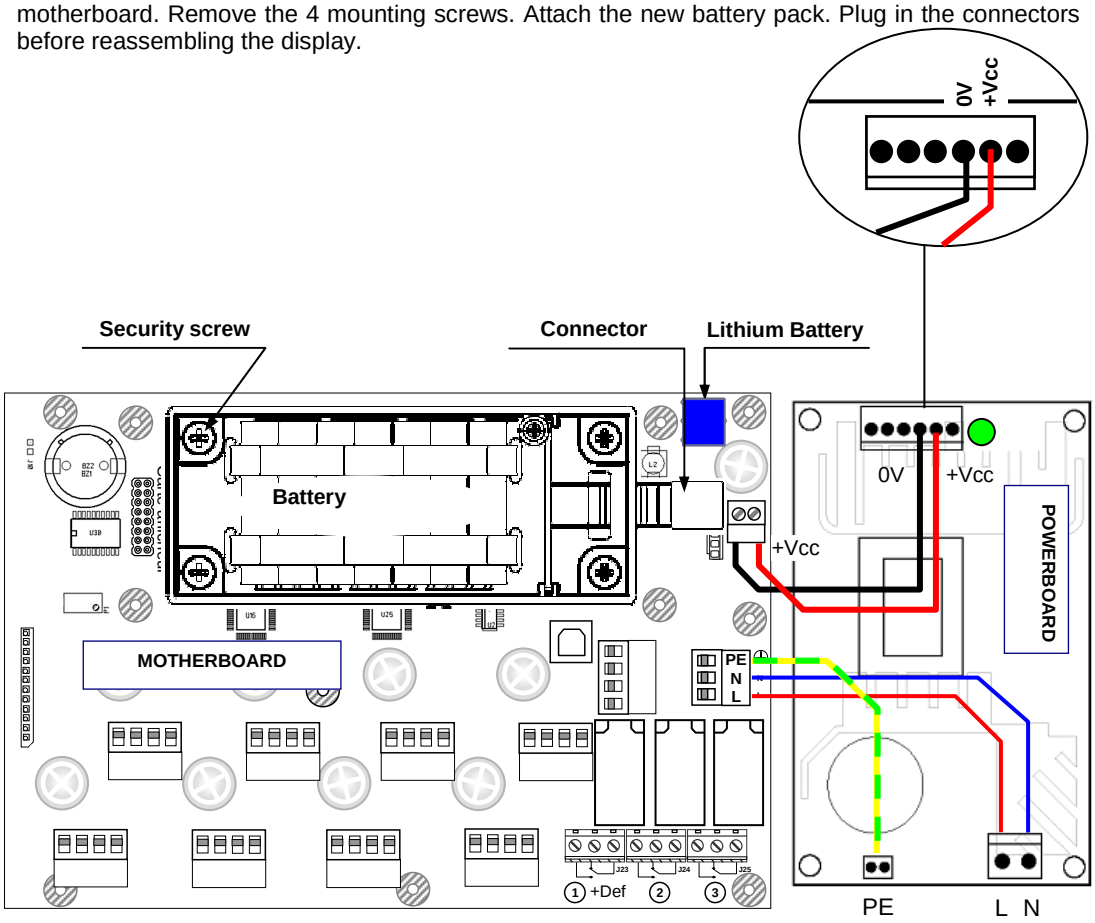
If the central controller configuration settings are lost, the lithium battery soldered to the display card must be replaced. This operation should be performed by a qualified professional.

Lithium battery characteristics: VARTA CR1/3N or equivalent.

Back-up battery pack

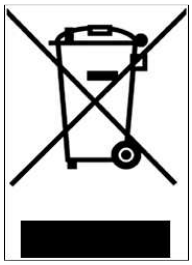
When the back-up battery power drops, the battery should be replaced. This operation should only be performed by a qualified professional.

The battery pack is located underneath the display screen on the wall-mounted version. Take off the display screen to access the battery pack. Unplug the connector linking the battery pack to the motherboard. Remove the 4 mounting screws. Attach the new battery pack. Plug in the connectors before reassembling the display.



Scrapping of CPS System

Concerning the conservation, of the protection and the improvement of the quality of the environment, as well as for the protection of the health of the persons and the careful and rational use of natural resources, CPS system has to be the object of a selective collection for the electronic equipments and cannot be scrapped with the normal domestic waste. The user thus has the obligation to separate the CPS system of the other waste so as to guarantee that it is recycled in a sure way at the environmental level. For more details of the existing sites of collection, contact the local administration or the distributor of this product.



Chapter 7 Technical Specifications

CPS Central Controller

CPS w/ metal wall-mounted casing:	Dimensions (mm): 320 x 180 x 95 Degree of protection: IP 54
Cable entries	5 M20 cable glands Diameter 5-12 mm power / local relays. - 9 PG9 1 D-SUB 9 Pin RS-232 cable
CPS rack version	Dimensions: Length: 19" ; Height: 4 U (176 mm) IP class: IP 31
Operating conditions	
Ambient temperature:	-10°C to 40°C
Storage temperature:	-20°C to 85°C
Humidity:	5 to 95% noncondensing
Power supply	
Mains power supply:	Voltage: 110-240VCA
Battery back-up:	Optional – Capacity: 600 mAh
24 V Consumption:	140 mA + 12 mA per measurement line (240 mA max.)
Measuring lines	
Number:	8 RS-485 digital measuring lines
Line capacity:	32 digital CPS modules (CPS 10,CPS RM, CPS DI16, CPS AO4) ModBus Protocol
Cable type:	2 twisted pairs shielded RS-485 4Xawg22 (diameter 0.67mm) cable, 120Ω
Transmission speed:	9600 Bauds (trial with 0.35 mm²)
Module power supply:	12 to 30 VCC via the CPS central controller and if necessary via a 24VCC external additional power supply
Digital module network:	RS-485 ModBus, addresses 1 to 32, set with mini switches
Isolation:	Power supply / Digital network: 1500 V
Display	Backlit LCD display [2 lines, 32 characters per line - 1 line for pictograms - 3 electroluminescence diodes to indicate operating status: OK, Fault, Alarms]
Keyboard	Membrane keyboard, 7 intuitive keys
Local buzzer	Alarm and fault signaling
Integrated printer	Optional for rack version (no integrated printer option for the metallic wall casing)
Alarms	
Number of alarms:	6 alarms per sensor (AL1, AL2, AL3, AL4, Out of Range, Fault + Validation for Explo gas)
Programmable thresholds:	For instantaneous or averaged values, increasing or decreasing values, or for manual or automatic rearming.
3 Internal local relays	Relay: R1 (alarm/fault) – R2 (alarm) – R3 (alarm). Minimum charge for RCT contacts: 2A / 250 VAC – 30 Vcc (resistive charge) Relays settings are configured with the *COM*_CPS configuration software. Torque : 0.5-0.6 Nm
Centralized supervision system digital output connections.	
RS-485	ModBus Protocol (connection with a centralized supervision device)
RS-232 or USB	USB protocol priority (permanent connection to system configuration)
Approvals:	
Low Voltage Directive:	This device is in compliance with the security requirements of Directive 73/23/EEC, modified by Directive 93/68/EEC, based on standard 61010-1 and its second amendment.
Metrology:	Underground parking facilities: according to VDI 2053
EMC Electromagnetic compatibility:	according to EN 50270

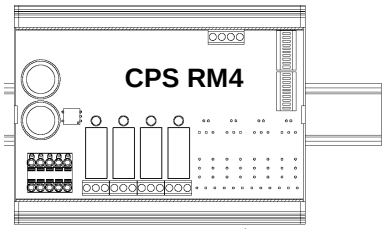
CPS 10 Sensor Module

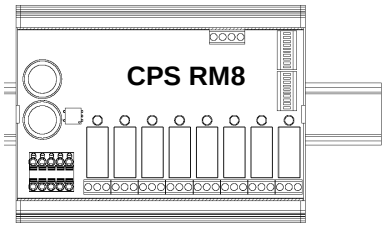
Dimensions (mm):	118 x 110 x 60
Degree of protection:	IP 54
Cable entries:	2 M16 cable glands 4-8 mm diameter
Consumption:	Toxic gas sensor: 2.5 mA in normal operation Explo gas sensor: 50 mA in normal operation
Status indication after calibration	Red/Green electroluminescent diode
Calibration:	Automatic, no need to open the sensor due to a gas introduction device equipped with a magnetic switch, or with a potentiometer inside of the case.
Sensor replacement:	Sensor replacement switch on the interior of the CPS 10 case. Detection of sensor

CPS RM4 or RM8 Relay Module

Dimensions (mm):	125 x 165 x 60
Mounting:	Ratchets into DIN rail
Number of relays:	4 relays (CPS RM4); 8 relays (CPS RM8) Contact type: RCT
Minimum charge for contacts:	2 A / 250 V over resistive charge
Connection:	Screw posts (cable: 2.5 mm² max.) Torque : 0.5-0.6 Nm
Consumption:	3.5 mA in normal operation

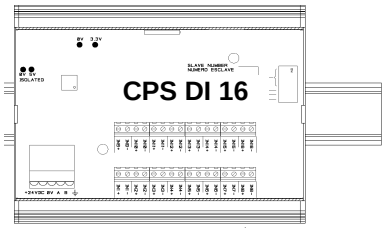
Bistable Relays.
Configuration of positive or negative relay security with mini switches.
Relay modules have 2 logic inputs.
Configuration via the *COM*_CPS configuration software.



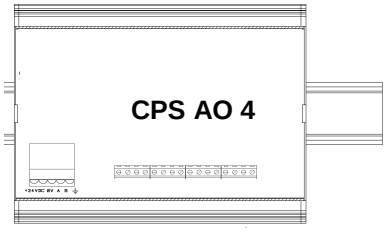


CPS DI16 Logic Inputs Module

Dimensions (mm):	125 x 165 x 60
Mounting:	Ratchets into DIN rail
Number of All or Nothing Inputs:	16
Connection:	Screw posts (cable: 1.5 mm² max.) Torque : 0.5-0.6 Nm
Consumption:	2 mA in normal operation



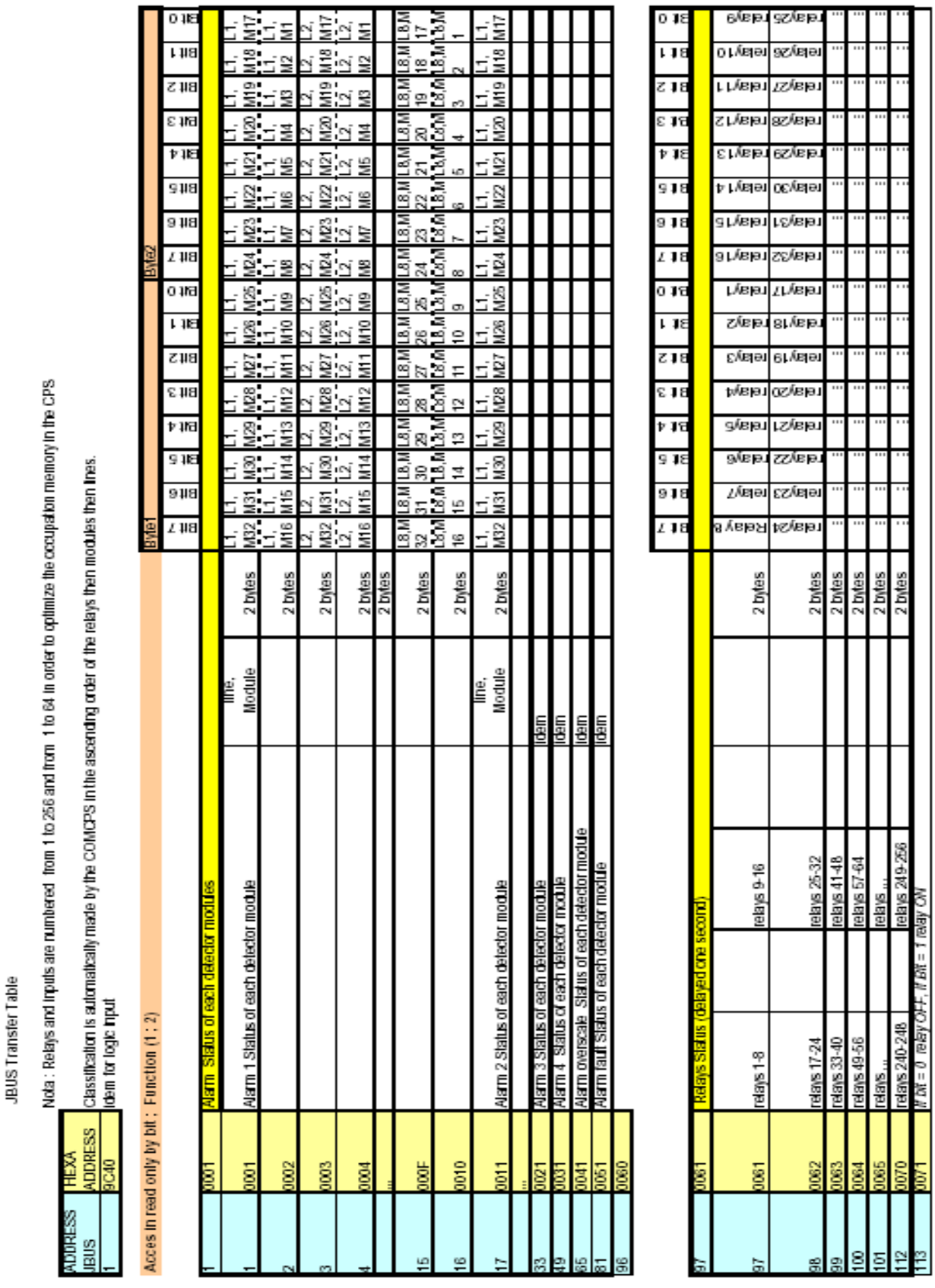
CPS AO4 Analog Output Module



Dimensions (mm):	125 x 165 x 60
Mounting:	Ratchets into DIN rail
Number of analog outputs:	4-20 mA output, max. resistance 500 Ω Isolation galvanique individuelle + 2 entrées logiques
Connection:	Screw posts (cable: 1.5 mm² max.) Torque : 0.5-0.6 Nm
Consumption under 24V at module input	I< 5 mA if the 4 channels are shut down I< 36 mA if only one channel is activated I<130 mA if all 4 channels are activated

Chapter 8 Annexes

JBUS/MODBUS Protocol



JBUS Transfer Table

ADDRESS JBUS	HEXA ADDRESS
1	9C40

Classification is automatically made by the COM3PS in the ascending order of the relays then modules then lines.

Idem for logic input

Note : Relays and inputs are numbered from 1 to 256 and from 1 to 64 in order to optimize the occupation memory in the CPS

Acces in read only by bit ; Function (1 ; 2)

				Byte1								Byte2							
				Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	0001	Alarm Status of each detector modules																	
1	0001	Alarm 1 Status of each detector module	line, Module	2 bytes	L1, M32	L1, M31	L1, M30	L1, M29	L1, M28	L1, M27	L1, M26	L1, M25	L1, M24	L1, M23	L1, M22	L1, M21	L1, M20	L1, M19	L1, M18	L1, M17
					L1, M16	L1, M15	L1, M14	L1, M13	L1, M12	L1, M11	L1, M10	L1, M9	L1, M8	L1, M7	L1, M6	L1, M5	L1, M4	L1, M3	L1, M2	L1, M1
2	0002			2 bytes	L2, M32	L2, M31	L2, M30	L2, M29	L2, M28	L2, M27	L2, M26	L2, M25	L2, M24	L2, M23	L2, M22	L2, M21	L2, M20	L2, M19	L2, M18	L2, M17
3	0003			2 bytes	L2, M16	L2, M15	L2, M14	L2, M13	L2, M12	L2, M11	L2, M10	L2, M9	L2, M8	L2, M7	L2, M6	L2, M5	L2, M4	L2, M3	L2, M2	L2, M1
4	0004			2 bytes																
...																				
15	000F			2 bytes	L8,M32	L8,M31	L8,M30	L8,M29	L8,M28	L8,M27	L8,M26	L8,M25	L8,M24	L8,M23	L8,M22	L8,M21	L8,M20	L8,M19	L8,M18	L8,M17
16	0010			2 bytes	L8,M16	L8,M15	L8,M14	L8,M13	L8,M12	L8,M11	L8,M10	L8,M9	L8,M8	L8,M7	L8,M6	L8,M5	L8,M4	L8,M3	L8,M2	L8,M1
17	0011	Alarm 2 Status of each detector module	line, Module	2 bytes	L1, M32	L1, M31	L1, M30	L1, M29	L1, M28	L1, M27	L1, M26	L1, M25	L1, M24	L1, M23	L1, M22	L1, M21	L1, M20	L1, M19	L1, M18	L1, M17
...																				
33	0021	Alarm 3 Status of each detector module	Idem																	
49	0031	Alarm 4 Status of each detector module	Idem																	
65	0041	Alarm overscale Status of each detector module	Idem																	
81	0051	Alarm fault Status of each detector module	Idem																	
96	0060																			

				Byte3								Byte4							
				Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
97	0061	Relays Status (delayed one second)																	
97	0061	relays 1-8	relays 9-16	2 bytes	Relay 8	relay7	relay6	relay5	relay4	relay3	relay2	relay1	relay16	relay15	relay14	relay13	relay12	relay11	relay10	relay9
98	0062	relays 17-24	relays 25-32	2 bytes	relay24	relay23	relay22	relay21	relay20	relay19	relay18	relay17	relay32	relay31	relay30	relay29	relay28	relay27	relay26	relay25
99	0063	relays 33-40	relays 41-48	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
100	0064	relays 49-56	relays 57-64	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
101	0065	relays ...	relays ...	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
112	0070	relays 240-248	relays 249-256	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
113	0071	If Bit = 0 relay OFF, If Bit = 1 relay ON																		

								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
113	0071	Module Fault																					
113	0071	line fault1	module 1	line fault1	module 2	Fault type for the both modules					Starting line L1, M1	Alim. line L1, M1	Intern module L1, M1	Module type L1, M1	Communication				Starting line L1, M2	Alim. line L1, M2	Intern module L1, M2	Module type L1, M2	Communication
114	0072	line fault1	module 3	line fault1	module 4	idem	2 bytes																
115	0073	line fault1	module 5	line fault1	module 6	idem	2 bytes																
116	0074	line fault1	module 7	line fault1	module 8	idem	2 bytes																
117	0075	line fault1	module 9	line fault1	module 10	idem	2 bytes																
	...		...		...																		
128	0080	line fault1	module 31	line fault1	module 32	idem	2 bytes																
129	0081	line fault2	module 1	line fault2	module 2	idem	2 bytes																
	...		...		...																		
145	0091	line fault3	module 1	line fault3	module 2	idem	2 bytes																
	...		...		...																		
161	00A1	line fault4	module 1	line fault4	module 2	idem	2 bytes																
	...		...		...																		
177	00B1	line fault5	module 1	line fault5	module 2	idem	2 bytes																
	...		...		...																		
193	00C1	line fault6	module 1	line fault6	module 2	idem	2 bytes																
	...		...		...																		
209	00D1	line fault7	module 1	line fault7	module 2	idem	2 bytes																
	...		...		...																		
225	00E1	line fault8	module 1	line fault8	module 2	idem	2 bytes																
	...		...		...																		
240	00F0	line fault8	module 31	line fault8	module 32	idem	2 bytes																
241	00F1	*If bit = 0 relay OFF, If Bit = 1 relay ON*																					

								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
241	00F1	forced operating																					
241	00F1	relay 1-8		relay 9-16			2 bytes	relay8	relay7	relay6	relay5	relay4	relay3	relay2	relay1	relay16	relay15	relay14	relay13	relay12	relay11	relay10	relay9
242	00F2	relay 17-24		relay 25-32			2 bytes	relay24	relay23	relay22	relay21	relay20	relay19	relay18	relay17	relay32	relay31	relay30	relay29	relay28	relay27	relay26	relay25
243	00F3	relay 33-40		relay 41-48			2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
244	00F4	relay 49-56		relay 57-64			2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
245	00F5	relay ...		relay ...			2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
256	0100	relay 240-248		relay 249-256			2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
257	0101	*If bit = 0 relay under normal operating , If Bit = 1 relay in forced operating*																					

					Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
257	0101	Forced stop																		
257	0101	relay 1-8	relay 9-16	2 bytes	relay8	relay7	relay6	relay5	relay4	relay3	relay2	relay1	relay16	relay15	relay14	relay13	relay12	relay11	relay10	relay9
258	0102	relay 17-24	relay 25-32	2 bytes	relay24	relay23	relay22	relay21	relay20	relay19	relay18	relay17	relay32	relay31	relay30	relay29	relay28	relay27	relay26	relay25
259	0103	relay 33-40	relay 41-48	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
260	0104	relay 49-56	relay 57-64	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
261	0105	relay ...	relay ...	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
272	0110	relay 240-248	relay 249-256	2 bytes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
273	0111	*If bit = 0 relay under normal operating , if Bit = 1 relay in forced operating*																		

					Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
273	0111	Logic input status																		
273	0111	logic input 25 to 32	logic input 17 to 24	2 bytes	Input 32	Input 31	Input 30	Input 29	Input 28	Input 27	Input 26	Input 25	Input 24	Input 23	Input 22	Input 21	Input 20	Input 19	Input 18	Input 17
274	0112	logic input 9 to 16	logic input 1 to 8	2 bytes	Input 16	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1
275	0113	logic input 57 to 64	logic input 49 to 56	2 bytes	Input 64	Input 63	Input 62	Input 61	Input 60	Input 59	Input 58	Input 57	Input 56	Input 55	Input 54	Input 53	Input 52	Input 51	Input 50	Input 49
276	0114	logic input 41 to 48	logic input 33 to 40	2 bytes	Input 48	Input 47	Input 46	Input 45	Input 44	Input 43	Input 42	Input 41	Input 40	Input 39	Input 38	Input 37	Input 36	Input 35	Input 34	Input 33
277	0115	*If bit = 0 disabled input, if Bit = 1 enabled input*																		

					Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
277	0115	dc supply lines and errors																		
277	0115	Alimentation line	Alimentation line error	2 bytes	line 8	line 7	line 6	line 5	line 4	line 3	line 2	line 1	line 8	line 7	line 6	line 5	line 4	line 3	line 2	line 1
				If bit = 1 line OFF, otherwise line OK									*If bit = 1 line problem, otherwise line ON*							

				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
278	0116	Fixed Icons (if 1 , fixed Icon ON)	Word	/	Battery/ Alimentation	High Speed	Stable signal	Low speed	Alarm 4	Maintenance	Alarm 3	Fault	Alarm 2	Buzzer	Alarm 1	Decrease	Averaged Alarm	Increase	Ok
279	0117	Blinking Icon (if 1, blinking Icon ON)	Word	IDEM															

Acces read only	Byte1	Byte2

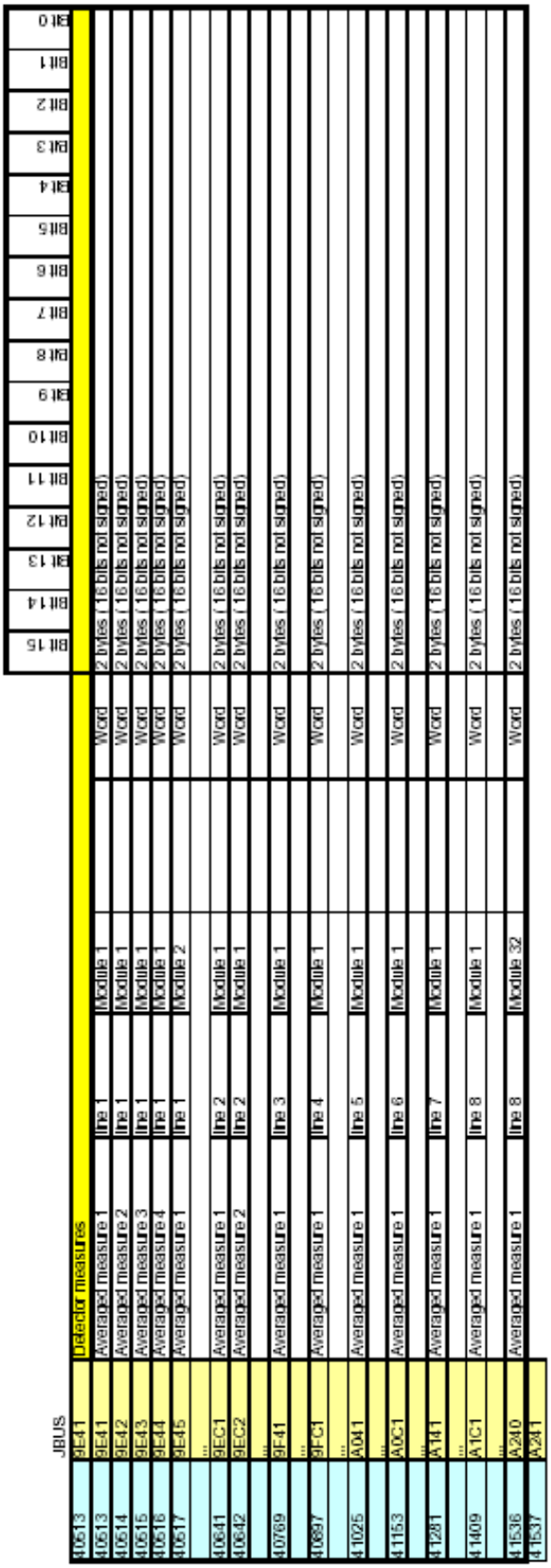
							Bit 15 … Bit 8	Bit 7 … Bit 0
30001	7531	overscale delay						
30001	7531	overscale delay	line 1	Module 1	4 bytes (32 bits not signed)	2 bytes	16 bits de poids fort du long	
30002	7532					2 bytes	16 bits de poids faible du long	
30003	7533	overscale delay	line 1	Module 2		2 bytes	4 bytes (32 bits not signed)	
30005	7535	overscale delay	line 1	Module 3		2 bytes	4 bytes (32 bits not signed)	
30007	7537	overscale delay	line 1	Module 4		2 bytes	4 bytes (32 bits not signed)	
30009	7539	overscale delay	line 1	Module 5		2 bytes	4 bytes (32 bits not signed)	
	...							
30065	7571	overscale delay	line 2	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30129	75B1	overscale delay	line 3	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30193	75F1	overscale delay	line 4	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30257	7631	overscale delay	line 5	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30321	7671	overscale delay	line 6	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30385	76B1	overscale delay	line 7	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30449	76F1	overscale delay	line 8	Module 1		2 bytes	4 bytes (32 bits not signed)	
	...							
30511	772F	overscale delay	line 8	Module 32		2 bytes	4 bytes (32 bits not signed)	
30512	7730							

						Bit 15 … Bit 0
30513	7731	Timer since latest calibration				
30513	7731	latest calibration	line 1	Module 1	Word	2 bytes (16 bits not signed)
30514	7732	latest calibration	line 1	Module 2	Word	2 bytes (16 bits not signed)
30515	7733	latest calibration	line 1	Module 3	Word	2 bytes (16 bits not signed)
30516	7734	latest calibration	line 1	Module 4	Word	2 bytes (16 bits not signed)
30517	7735	latest calibration	line 1	Module 5	Word	2 bytes (16 bits not signed)
	...					
30540	774C	latest calibration	line 1	Module 28	Word	2 bytes (16 bits not signed)
30541	774D	latest calibration	line 1	Module 29	Word	2 bytes (16 bits not signed)
30542	774E	latest calibration	line 1	Module 30	Word	2 bytes (16 bits not signed)
30543	774F	latest calibration	line 1	Module 31	Word	2 bytes (16 bits not signed)
30544	7750	latest calibration	line 1	Module 32	Word	2 bytes (16 bits not signed)
30545	7751	latest calibration	line 2	Module 1	Word	2 bytes (16 bits not signed)
30546	7752	latest calibration	line 2	Module 2	Word	2 bytes (16 bits not signed)
	...					
30577	7771	latest calibration	line 3	Module 1	Word	2 bytes (16 bits not signed)
	...					
30609	7791	latest calibration	line 4	Module 1	Word	2 bytes (16 bits not signed)
	...					
30641	77B1	latest calibration	line 5	Module 1	Word	2 bytes (16 bits not signed)
	...					
30673	77D1	latest calibration	line 6	Module 1	Word	2 bytes (16 bits not signed)
	...					
30705	77F1	latest calibration	line 7	Module 1	Word	2 bytes (16 bits not signed)
	...					
30737	7811	latest calibration	line 8	Module 1	Word	2 bytes (16 bits not signed)
	...					
30768	7830	latest calibration	line 8	Module 32	Word	2 bytes (16 bits not signed)
30769	7831					

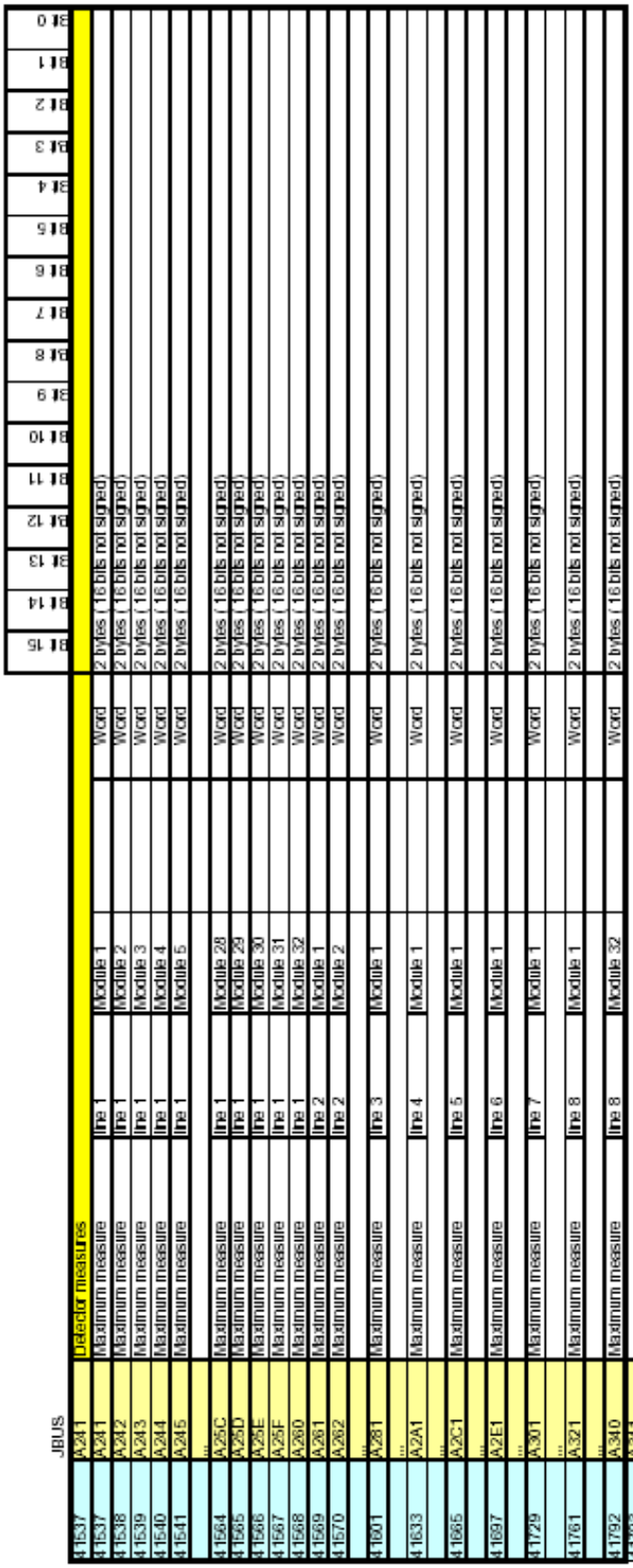
				Bit 15 … Bit 8	Bit 7 … Bit 0
30769	7831	Pointer on next event to be recorded (modulo 1200)	Word	2 bytes (16 bits not signed)	
30770	7832	Pointer on the formest event (-1 if the system doesn't receive its 1200 events)	Word	2 bytes (16 bits not signed)	
30771	7833	Pointer on event to be printed	Word	2 bytes (16 bits not signed)	
30772	7834	EMPTY		Bit 7 … Bit 0	Bit 7 … Bit 0
30809	7859	event			
30809	7859	event N		Day	Month
30810	785A	event N		Year	Hour
30811	785B	event N		Minute	seconde
30812	785C	event N		Module number	event number
30813	785D	event N		Extra Information	Extra Information
30814	785E	event N+1		Day	Month
30815	785F	event N+1		Year	Heure
30816	7860	event N+1		Minute	seconde
30817	7861	event N+1		Module number	Event number
30818	7862	event N+1		Extra Information	Extra Information
...		...			
36807	8FC7	event N+1199		Module number	No event
36808	8FC8	event N+1199		Extra Information	Extra Information
36810	8FCA	Pointer on the last printed text (Modulo 4)	Word		
36811	8FCB	Text M 80 byte text			
36891	901B	Text M + 1 80 byte text			
36971	906B	Text M + 2 80 byte text			
37051	90BB	Text M + 3 80 byte text			

	JBUS						Byte1								Byte2							
							Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
40001	9C41	Detector measures																				
40001	9C41	Instantaneous measure	line 1	Module 1		Word	2 bytes (16 bits not signed)															
40002	9C42	Instantaneous measure	line 1	Module 2		Word	2 bytes (16 bits not signed)															
40003	9C43	Instantaneous measure	line 1	Module 3		Word	2 bytes (16 bits not signed)															
40004	9C44	Instantaneous measure	line 1	Module 4		Word	2 bytes (16 bits not signed)															
40005	9C45	Instantaneous measure	line 1	Module 5		Word	2 bytes (16 bits not signed)															
	...																					
40028	9C5C	Instantaneous measure	line 1	Module 28		Word	2 bytes (16 bits not signed)															
40029	9C5D	Instantaneous measure	line 1	Module 29		Word	2 bytes (16 bits not signed)															
40030	9C5E	Instantaneous measure	line 1	Module 30		Word	2 bytes (16 bits not signed)															
40031	9C5F	Instantaneous measure	line 1	Module 31		Word	2 bytes (16 bits not signed)															
40032	9C60	Instantaneous measure	line 1	Module 32		Word	2 bytes (16 bits not signed)															
40033	9C61	Instantaneous measure	line 2	Module 1		Word	2 bytes (16 bits not signed)															
40034	9C62	Instantaneous measure	line 2	Module 2		Word	2 bytes (16 bits not signed)															
	...																					
40065	9C81	Instantaneous measure	line 3	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40097	9CA1	Instantaneous measure	line 4	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40129	9CC1	Instantaneous measure	line 5	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40161	9CE1	Instantaneous measure	line 6	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40193	9D01	Instantaneous measure	line 7	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40225	9D21	Instantaneous measure	line 8	Module 1		Word	2 bytes (16 bits not signed)															
	...																					
40256	9D40	Instantaneous measure	line 8	Module 32		Word	2 bytes (16 bits not signed)															
40257	9D41																					

							Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
40257	9D41	4-20mA Outputs Value (1000 = 1mA)																				
40257	9D41	Output4-20mA Value	Output1			Word	2 bytes (16 bits not signed)															
40258	9D42	Output4-20mA Value	Output2			Word	2 bytes (16 bits not signed)															
40259	9D43	Output4-20mA Value	output3			Word	2 bytes (16 bits not signed)															
40260	9D44	Output4-20mA Value	output4			Word	2 bytes (16 bits not signed)															
40261	9D45	Output4-20mA Value	output5			Word	2 bytes (16 bits not signed)															
40262	9D46	Output4-20mA Value	output6			Word	2 bytes (16 bits not signed)															
40263	9D47	Output4-20mA Value	output7			Word	2 bytes (16 bits not signed)															
40264	9D48	Output4-20mA Value	output8			Word	2 bytes (16 bits not signed)															
40265	9D49	Output4-20mA Value	output9			Word	2 bytes (16 bits not signed)															
40266	9D4A	Output4-20mA Value	output10			Word	2 bytes (16 bits not signed)															
40267	9D4B	Output4-20mA Value	output11			Word	2 bytes (16 bits not signed)															
40268	9D4C	Output4-20mA Value	output12			Word	2 bytes (16 bits not signed)															
...	...		...																			
40512	9E40	Output4-20mA Value	output256			Word	2 bytes (16 bits not signed)															
40513	9E41																					



JBUS		Detector measures					Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
40513	9E41					Word	2 bytes (16 bits not signed)															
40513	9E41	Averaged measure 1	line 1	Module 1		Word	2 bytes (16 bits not signed)															
40514	9E42	Averaged measure 2	line 1	Module 1		Word	2 bytes (16 bits not signed)															
40515	9E43	Averaged measure 3	line 1	Module 1		Word	2 bytes (16 bits not signed)															
40516	9E44	Averaged measure 4	line 1	Module 1		Word	2 bytes (16 bits not signed)															
40517	9E45	Averaged measure 1	line 1	Module 2		Word	2 bytes (16 bits not signed)															
...																						
40641	9EC1	Averaged measure 1	line 2	Module 1		Word	2 bytes (16 bits not signed)															
40642	9EC2	Averaged measure 2	line 2	Module 1		Word	2 bytes (16 bits not signed)															
...																						
40769	9F41	Averaged measure 1	line 3	Module 1		Word	2 bytes (16 bits not signed)															
...																						
40897	9FC1	Averaged measure 1	line 4	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41025	A041	Averaged measure 1	line 5	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41153	A0C1	Averaged measure 1	line 6	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41281	A141	Averaged measure 1	line 7	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41409	A1C1	Averaged measure 1	line 8	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41536	A240	Averaged measure 1	line 8	Module 32		Word	2 bytes (16 bits not signed)															
41537	A241																					



JBUS		Detector measures					Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
41537	A241					Word	2 bytes (16 bits not signed)															
41537	A241	Maximum measure	line 1	Module 1		Word	2 bytes (16 bits not signed)															
41538	A242	Maximum measure	line 1	Module 2		Word	2 bytes (16 bits not signed)															
41539	A243	Maximum measure	line 1	Module 3		Word	2 bytes (16 bits not signed)															
41540	A244	Maximum measure	line 1	Module 4		Word	2 bytes (16 bits not signed)															
41541	A245	Maximum measure	line 1	Module 5		Word	2 bytes (16 bits not signed)															
...																						
41564	A25C	Maximum measure	line 1	Module 28		Word	2 bytes (16 bits not signed)															
41565	A25D	Maximum measure	line 1	Module 29		Word	2 bytes (16 bits not signed)															
41566	A25E	Maximum measure	line 1	Module 30		Word	2 bytes (16 bits not signed)															
41567	A25F	Maximum measure	line 1	Module 31		Word	2 bytes (16 bits not signed)															
41568	A260	Maximum measure	line 1	Module 32		Word	2 bytes (16 bits not signed)															
41569	A261	Maximum measure	line 2	Module 1		Word	2 bytes (16 bits not signed)															
41570	A262	Maximum measure	line 2	Module 2		Word	2 bytes (16 bits not signed)															
...																						
41601	A281	Maximum measure	line 3	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41633	A2A1	Maximum measure	line 4	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41665	A2C1	Maximum measure	line 5	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41697	A2E1	Maximum measure	line 6	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41729	A301	Maximum measure	line 7	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41761	A321	Maximum measure	line 8	Module 1		Word	2 bytes (16 bits not signed)															
...																						
41792	A340	Maximum measure	line 8	Module 32		Word	2 bytes (16 bits not signed)															
41793	A341																					

	JBUS			Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
41793	A341	Detector measures																	
41793	A341	Sentence1		Byte1								Byte2							
41794	A342	Sentence1		Byte3								Byte4							
41795	A343	Sentence1		Byte5								Byte6							
41796	A344	Sentence1		Byte7								Byte8							
41797	A345	Sentence1		Byte9								Byte10							
41797	A345	Sentence1		Byte11								Byte12							
41798	A346	Sentence1		Byte13								Byte14							
41799	A347	Sentence1		Byte15								Byte16							
41800	A348	Sentence1		Byte17								Byte18							
41801	A349	Sentence1		Byte19								Byte20							
41801	A349	Sentence1		Byte21								Byte22							
41802	A34A	Sentence1		Byte23								Byte24							
41803	A34B	Sentence1		Byte25								Byte26							
41804	A34C	Sentence1		Byte27								Byte28							
41805	A34D	Sentence1		Byte29								Byte30							
41806	A34E	Sentence1		Byte31								Byte32							
41807	A34F	Sentence1		Byte33 / term at the end of the sentence								Byte34 / empty							
41808	A350																		

	JBUS			Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
41808	A350	Detector measures																	
41808	A350	Sentence2		Byte1								Byte2							
41809	A351	Sentence2		Byte3								Byte4							
41810	A352	Sentence2		Byte5								Byte6							
41811	A353	Sentence2		Byte7								Byte8							
41812	A354	Sentence2		Byte9								Byte10							
41812	A354	Sentence2		Byte11								Byte12							
41813	A355	Sentence2		Byte13								Byte14							
41814	A356	Sentence2		Byte15								Byte16							
41815	A357	Sentence2		Byte17								Byte18							
41816	A358	Sentence2		Byte19								Byte20							
41816	A358	Sentence2		Byte21								Byte22							
41817	A359	Sentence2		Byte23								Byte24							
41818	A35A	Sentence2		Byte25								Byte26							
41819	A35B	Sentence2		Byte27								Byte28							
41820	A35C	Sentence2		Byte29								Byte30							
41821	A35D	Sentence2		Byte31								Byte32							
41822	A35E	Sentence2		Byte33 / term at the end of the sentence								Byte34 / empty							
41823	A35F																		

				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
41823	A35F	Remoted keyboard	Word																
41824	A360	Blank 32bytes																	
41855	A37F																		

SETTINGS VIA COMCPS

Address	JBUS	Description		Size	Byte1	Byte2	
					Bit 15 … Bit 8	Bit 7 … Bit 0	
50001	C351	Module list					
50001	C351	Module 1 Name (32byte)			Byte 1 Name	Byte 2 Name	
		...					
50017	C361	Module type (1 byte)	Relay position (1 byte)		Module type (1 byte)	Indice relay (1 byte)	
50018	C362	Input (1 byte)	Config by fault (1 byte)		Input Position (1 byte)	Config by fault (1 byte)	
50019	C363	Module 2 Name (32byte)			Byte 1 name	Byte 2 name	
	0000	...					
50035	C373	Module type (1 byte)	relay position (1 byte)		Module type (1 byte)	Relay position (1 byte)	
50036	C374	Input Position (1 byte)	Config by fault (1 byte)		Input position (1 byte)	Config by fault (1 byte)	
	0000	...					
54591	D53F	Module name 256 (32byte)			Byte 1 name	Byte 2 name	
	0000	...					
54607	D54F	Module type (1 byte)	Relay position (1 byte)		Module type (1 byte)	Relay position (1 byte)	
54608	D550	Input position (1 byte)	Config by fault (1 byte)		Input position (1 byte)	Config by fault (1 byte)	
54609	D551						

Address	JBUS	Description		Size	Byte1	Byte2	
					Bit 15 … Bit 8	Bit 7 … Bit 0	
54609	D551	Relay list					
54609	D551	Module number (1byte) and relay function and position (1b)		2 bytes	Module number (0-255)	Relay function number	Relay number on the module
54610	D552	Relay Name /output 1 (20byte)		2 bytes	Byte1 name	Byte 2 name	
		...					
54620	D55C	HS position / function output4-20mA (1byte)	empty Byte	2 bytes	HS position		
54621	D55D	Module number (1byte) and Relay function and position (1b)		2 bytes	Module number (0-255)	Relay function number	Relay number on the
54622	D55E	Relay Name /output 2 (20byte)		2 bytes	Byte 1 name	Byte 2 name	
		...					
54632	D568	HS Position / function output4-20mA (1byte)	empty Byte	2 bytes	HS Position		
		...					
57669	E145	Module number (1byte) and relay position and function (1b)		2 bytes	Module number (0-255)	Relay function number	Relay number on the
		Relay Name /output256 (20byte)		2 bytes	Byte 1 name	Byte 2 name	
		...					
		HS position / function output4-20mA (1byte)	Empty Byte	2 bytes	HS position		
57681	E151						

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
57681	E151	Input list																		
57681	E151	Module number (1 byte) and input number (1b)		2 bytes	Module number (0-255)								Relay function number				Relay number on the			
57682	E152	Input 1 name (20 byte)		2 bytes	Byte1 Name								Byte 2 Name							
57692	E15C	Module number (1byte) and relay function and position (1b)		2 bytes	Module number (0-255)								Relay function number				Relay number on the			
57693	E15D	Input 2 name (20byte)		2 bytes	Byte1 Name								Byte 2 Name							
		...																		
60431	EC0F	Module number (1 byte) and input number (1b)		2 bytes	Byte1 Name								Byte2 Name							
		Input 1 name (20 byte)	relay position (1 byte)	2 bytes	Module type (1 byte)								Relay position (1 byte)							
60442	EC1A																			

DETAILS AND PARAMETERS OF THE 10 TYPES OF POSSIBLE SENSORS (RESERVE COMCPS)

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60462	EC2E	List units of the modules																		
60462	EC2E	gaz name for type 1 (6 bytes)			Byte1 Name								Byte2 Name							
		...																		
60465	EC31	gaz name for type 2 (6 bytes)			Byte1 Name								Byte2 Name							
		...																		
60489	EC49	gaz name for type 10 (6 bytes)			Byte1 Name								Byte2 Name							
		...																		
60492	EC4C																			

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60492	EC4C	Code of detector gas type																		
60492	EC4C	Gas code for type 1 and 2 (2 bytes)			Code type 1								Code Type 2							
60493		Gas code for type 3 and 4 (2 bytes)			Code type 3								Code Type 4							
		...																		
60496		Gas code for type 9 and 10 (2 bytes)			Code type 9								Code Type 10							
60497	EC51																			

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60497	EC51	Instantaneous alarm threshold																		
60497	EC51	Instantaneous alarm 1 threshold	Type 1	Word	2 bytes (16 bits not signed)															
60498	EC52	Instantaneous alarm 1 threshold	Type 2	Word	2 bytes (16 bits not signed)															
60499	EC53	Instantaneous alarm 1 threshold	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
60506	EC5A	Instantaneous alarm 1 threshold	Type 10	Word	2 bytes (16 bits not signed)															
60507	EC5B	Instantaneous alarm 2 threshold	Type 1	Word	2 bytes (16 bits not signed)															
60508	EC5C	Instantaneous alarm 2 threshold	Type 2	Word	2 bytes (16 bits not signed)															
60509	EC5D	Instantaneous alarm 2 threshold	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
60516	EC64	Instantaneous alarm 2 threshold	Type 10	Word	2 bytes (16 bits not signed)															
		...	...																	
60536	EC78	Instantaneous alarm 4 threshold	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
80537	EC79	Averaged alarm threshold																		
80537	EC79	Averaged alarm 1 threshold	Type 1	Word	2 bytes (16 bits not signed)															
80538	EC7A	Averaged alarm 1 threshold	Type 2	Word	2 bytes (16 bits not signed)															
80539	EC7B	Averaged alarm 1 threshold	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
80546	EC82	Averaged alarm 1 threshold	Type 10	Word	2 bytes (16 bits not signed)															
80547	EC83	Averaged alarm 2 threshold	Type 1	Word	2 bytes (16 bits not signed)															
80548	EC84	Averaged alarm 2 threshold	Type 2	Word	2 bytes (16 bits not signed)															
80549	EC85	Averaged alarm 2 threshold	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
80556	EC8C	Averaged alarm 2 threshold	Type 10	Word	2 bytes (16 bits not signed)															
		...	...																	
80576	ECA0	Averaged alarm 4 threshold	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
80577	ECA1	Fault Alarm Threshold																		
80577	ECA1	Alarm threshold	Type 1	Word	2 bytes (16 bits not signed)															
80578	ECA2	Alarm threshold	Type 2	Word	2 bytes (16 bits not signed)															
80579	ECA3	Alarm threshold	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
80586	ECAA	Alarm threshold	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
80587	ECAB	Overscale Alarm threshold																		
80587	ECAB	alarm value	Type 1	Word	2 bytes (16 bits not signed)															
80588	ECAC	alarm value	Type 2	Word	2 bytes (16 bits not signed)															
80589	ECAD	alarm value	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
80596	ECB4	alarm value	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60597	ECB5	Averaged alarm delay																		
60597	ECB5	averaged alarm 1 Delay	Type 1	Word	2 bytes (16 bits not signed)															
60598	ECB6	averaged alarm 1 Delay	Type 2	Word	2 bytes (16 bits not signed)															
60599	ECB7	averaged alarm 1 Delay	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
60606	ECBE	averaged alarm 1 Delay	Type 10	Word	2 bytes (16 bits not signed)															
60607	ECBF	averaged alarm 2 Delay	Type 1	Word	2 bytes (16 bits not signed)															
60608	ECC0	averaged alarm 2 Delay	Type 2	Word	2 bytes (16 bits not signed)															
60609	ECC1	averaged alarm 2 Delay	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
60616	ECC8	averaged alarm 2 Delay	Type 10	Word	2 bytes (16 bits not signed)															
		...	...																	
60636	ECDC	averaged alarm 4 Delay	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60637	ECDD	Hysteresis Value																		
60637	ECDD	Hysteresis	Type 1	Word	2 bytes (16 bits not signed)															
60638	ECDE	Hysteresis	Type 2	Word	2 bytes (16 bits not signed)															
60639	ECDF	Hysteresis	Type 3	Word	2 bytes (16 bits not signed)															
		...	...																	
60646	ECE6	Hysteresis	Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60647	ECE7	RESERVE COMCPS																		
60647	ECE7		Type 1	Word	2 bytes (16 bits not signed)															
60648	ECE8		Type 2	Word	2 bytes (16 bits not signed)															
60649	ECE9		Type 3	Word	2 bytes (16 bits not signed)															
			...																	
60656	ECF0		Type 10	Word	2 bytes (16 bits not signed)															

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60657	ECF1	Enable or disable Alarms																		
60657	ECF1	Type 1 (1 byte)	Type 2 (1 byte)	2 bytes	AI4 aver On	AI3 aver On	AI2 aver On	AI1 aver On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On
60658	ECF2	Type 3 (1 byte)	Type 4 (1 byte)	2 bytes	AI4 aver On	AI3 aver On	AI2 aver On	AI1 aver On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On
		...																		
60661	ECF5	Type 9 (1 byte)	Type 10 (1 byte)	2 bytes	AI4 aver On	AI3 aver On	AI2 aver On	AI1 aver On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On	AI4 inst On	AI3 inst On	AI2 inst On	AI1 inst On

If bit= 1 enable alarm

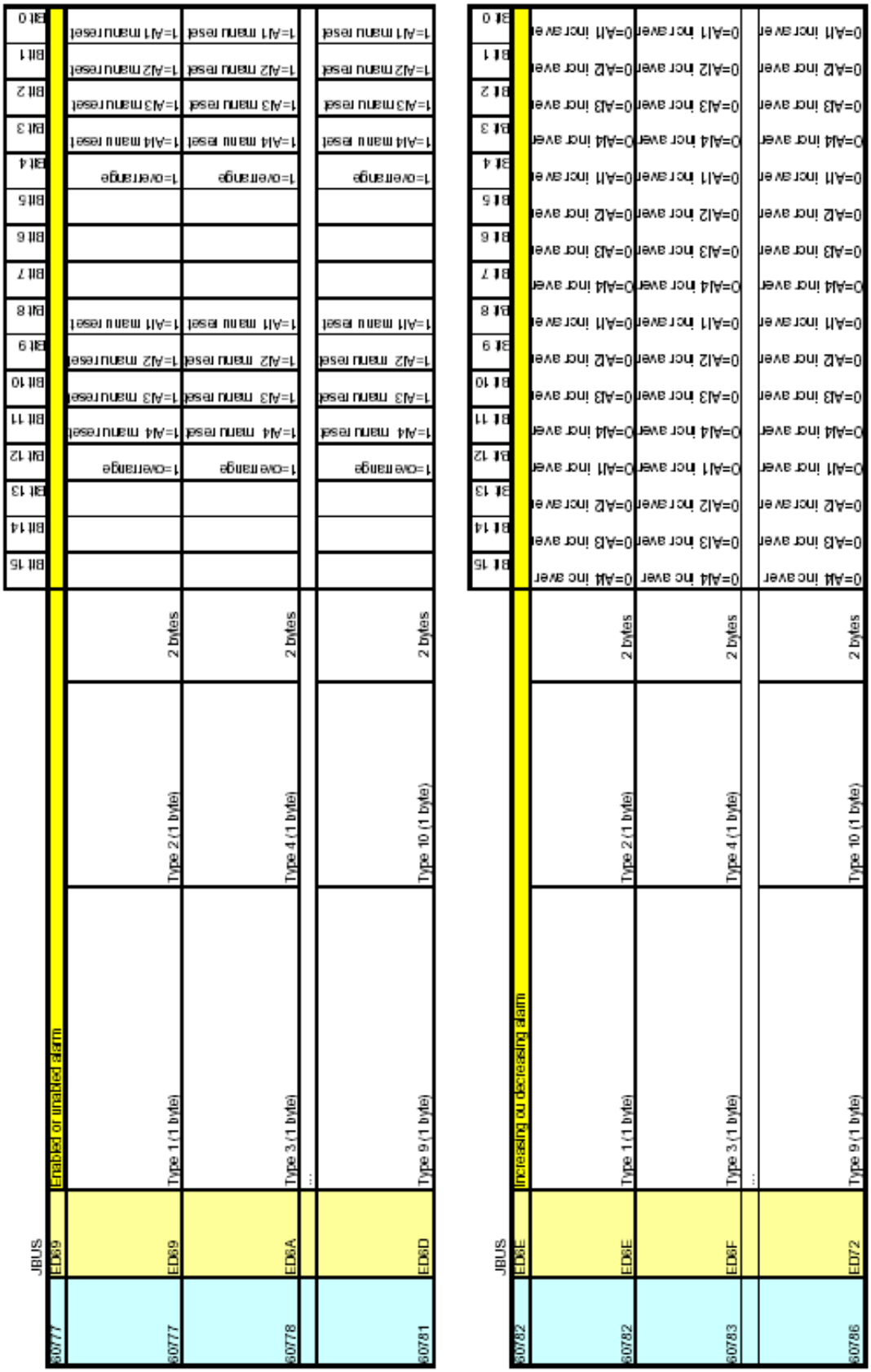
	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60662	ECF6	Checking of the type of connected detector																		
60662	ECF6	Type 1 (1 byte)	Type 2 (1 byte)	2 bytes	Code detector type 1								Code detector type 2							
60663	ECF7	Type 3 (1 byte)	Type 4 (1 byte)	2 bytes	Code detector type 3								Code detector type 4							
		...																		
60666	ECFA	Type 9 (1 byte)	Type 10 (1 byte)	2 bytes	Code detector type 9								Code detector type 10							

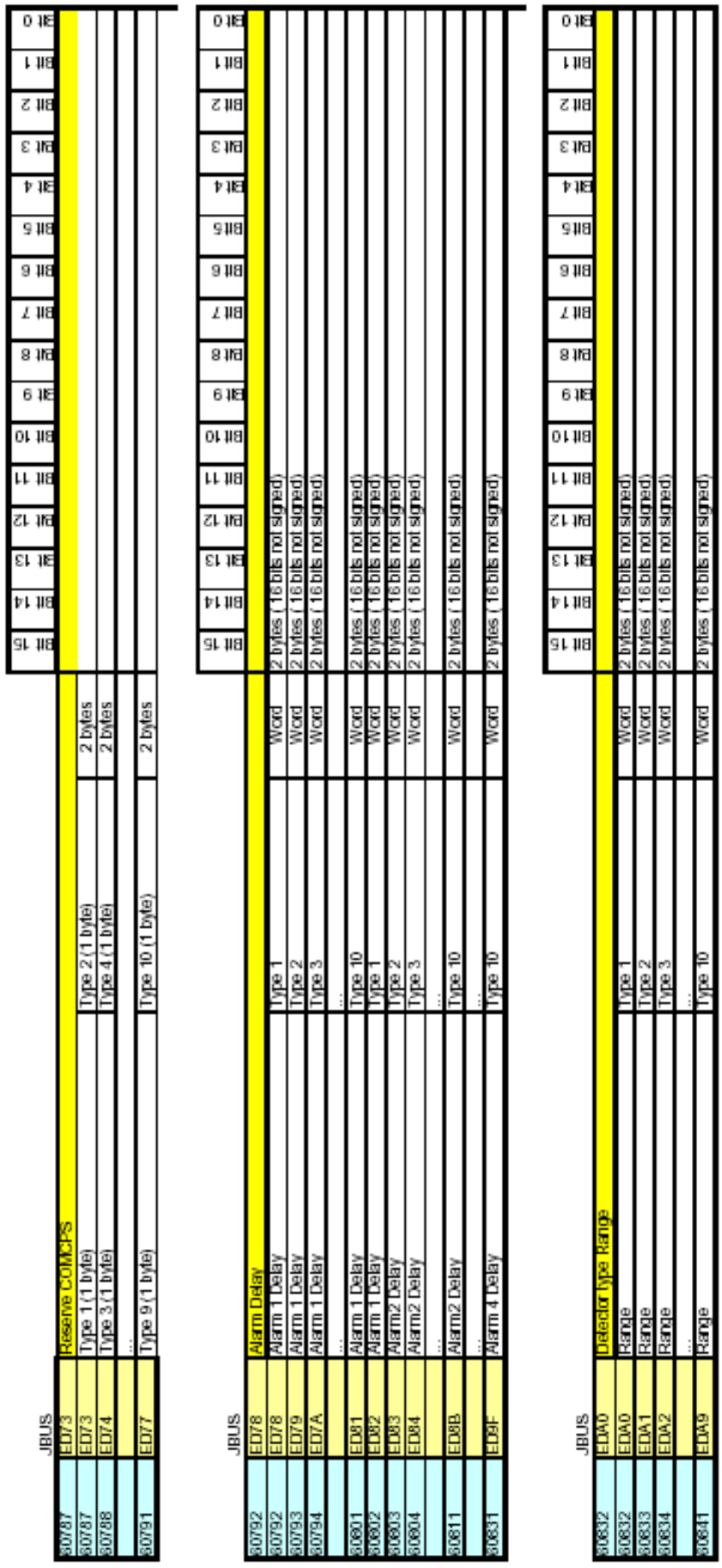
	JBUS			Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60667	ECFB	Gas name																	
60667	ECFB	Gas name for type 1 (5 bytes)		Name 1 Byte 1								Nom 1 Byte 2							
		...																	
60669	ECFD	Gas name for type 1 and 2 (5 bytes)		Nom 1 Byte 5								name 2 Byte 1							
60670	ECFE	Gas name for type 2 (5 bytes)		name 2 Byte 2								name 2 Byte 3							
60671	ECFF	Gas name for type 2 (5 bytes)		name 2 Byte 4								name 2 Byte 5							
		...																	
60691	ED13	Gas name for type 10 (5 bytes)		name 10 Byte 4								Name 10 Byte 5							

	JBUS			Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60692	ED14	Gas shortened name																	
60692	ED14	Gas name for type 1 (16 bytes)		name 1 Byte 1								Name 1 Byte 2							
		...																	
60699	ED1B	Gas name for type 2 (16 bytes)		Name 2 Byte 1								Name 2 Byte 2							
		...																	
60771	ED63	Gas name for type 10 (16 bytes)		Name 10 Byte 15								Name 10 Byte 16							

	JBUS				Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
60772	ED64	Display format																		
60772	ED64	Type 1 (1 byte)	Type 2 (1 byte)	2 bytes	Display format code type 1								Display format code type 2							
60773	ED65	Type 3 (1 byte)	Type 4 (1 byte)	2 bytes	Display format code type 3								Display format code type 4							
		...																		
60776	ED68	Type 9 (1 byte)	Type 10 (1 byte)	2 bytes	Display format code type 9								Display format code type 10							

0 = integer ; 1 = 1digit after the point (0.0) ; 2 = 2 digits after the point (0.00)


JBUS
Enabled or unacked alarm
60777
ED69
Type 1 (1 byte)
Type 2 (1 byte)
2 bytes
Type 3 (1 byte)
Type 4 (1 byte)
2 bytes
Type 9 (1 byte)
Type 10 (1 byte)
2 bytes
60778
ED6A
60781
ED6D
Bit 15
Bit 14
Bit 13
Bit 12
Bit 11
Bit 10
Bit 9
Bit 8
Bit 7
Bit 6
Bit 5
Bit 4
Bit 3
Bit 2
Bit 1
Bit 0
1=A4 manu reset
1=A3 manu reset
1=A2 manu reset
1=A1 manu reset
1=overrange
JBUS
Increasing or decreasing alarm
60782
ED6E
Type 1 (1 byte)
Type 2 (1 byte)
2 bytes
Type 3 (1 byte)
Type 4 (1 byte)
2 bytes
Type 9 (1 byte)
Type 10 (1 byte)
2 bytes
60783
ED6F
60786
ED72
Bit 15
Bit 14
Bit 13
Bit 12
Bit 11
Bit 10
Bit 9
Bit 8
Bit 7
Bit 6
Bit 5
Bit 4
Bit 3
Bit 2
Bit 1
Bit 0
0=A4 incr alarm
0=A3 incr alarm
0=A2 incr alarm
0=A1 incr alarm


JBUS
Bit 15
Bit 14
Bit 13
Bit 12
Bit 11
Bit 10
Bit 9
Bit 8
Bit 7
Bit 6
Bit 5
Bit 4
Bit 3
Bit 2
Bit 1
Bit 0
30787 ED73 Reserve COMOPS
30787 ED73 Type 1 (1 byte) Type 2 (1 byte) 2 bytes
30788 ED74 Type 3 (1 byte) Type 4 (1 byte) 2 bytes
... ...
30791 ED77 Type 9 (1 byte) Type 10 (1 byte) 2 bytes
JBUS
Bit 15
Bit 14
Bit 13
Bit 12
Bit 11
Bit 10
Bit 9
Bit 8
Bit 7
Bit 6
Bit 5
Bit 4
Bit 3
Bit 2
Bit 1
Bit 0
30792 ED78 Alarm Delay
30792 ED78 Alarm 1 Delay Type 1 Word 2 bytes (16 bits not signed)
30793 ED79 Alarm 1 Delay Type 2 Word 2 bytes (16 bits not signed)
30794 ED7A Alarm 1 Delay Type 3 Word 2 bytes (16 bits not signed)
... ...
30801 ED81 Alarm 1 Delay Type 10 Word 2 bytes (16 bits not signed)
30802 ED82 Alarm 1 Delay Type 1 Word 2 bytes (16 bits not signed)
30803 ED83 Alarm2 Delay Type 2 Word 2 bytes (16 bits not signed)
30804 ED84 Alarm2 Delay Type 3 Word 2 bytes (16 bits not signed)
... ...
30811 ED8B Alarm2 Delay Type 10 Word 2 bytes (16 bits not signed)
... ...
30831 ED9F Alarm 4 Delay Type 10 Word 2 bytes (16 bits not signed)
JBUS
Bit 15
Bit 14
Bit 13
Bit 12
Bit 11
Bit 10
Bit 9
Bit 8
Bit 7
Bit 6
Bit 5
Bit 4
Bit 3
Bit 2
Bit 1
Bit 0
30832 EDA0 Detector type Range
30832 EDA0 Range Type 1 Word 2 bytes (16 bits not signed)
30833 EDA1 Range Type 2 Word 2 bytes (16 bits not signed)
30834 EDA2 Range Type 3 Word 2 bytes (16 bits not signed)
... ...
30841 EDA9 Range Type 10 Word 2 bytes (16 bits not signed)

INDUSTRIAL SCIENTIFIC
OLDHAM

DECLARATION DE CONFORMITE CONSTRUCTEUR
Manufacturer Declaration of conformity

CE

La **Société Industrial Scientific Oldham**, ZI Est 62000 Arras France, atteste que le matériel neuf :
*(The **Company** **Industrial Scientific Oldham**, ZI Est 62000 Arras France, declares that the new material)*

Système de Mesure CPS - Monitoring system CPS

Incluant la centrale de mesure, les détecteurs de gaz, les modules E/S et Relais
(Including the control unit, the Gas detectors, the Relays and I/O modules)

est conforme aux exigences de:
(comply with the requirement of:)

I) Directive Européenne CEM 89/336/CEE du 3/05/89 : Compatibilité Electromagnétique
The European Directive EMC 89/336/CEE of 3/05/89: Electromagnetic compatibility

Normes harmonisées appliquées : **EN 50270** (type 1 & 2)
(Harmonised applied Standards)

II) Directive Européenne Basse Tension DBT 2006/95/CE du 27/12/06
The Low Voltage European Directive LVD 2006/95/CE 27/12/2006

Normes harmonisées appliquées : **EN 61010-1**
(Harmonised applied Standards)

III) Norme de performance métrologique
(Metrology performance standard)

Normes appliquées : **VDI 2053 Annex2,** Mesure du CO (CO measurement)
(Applied Standards)

Organisme certificateur : TÜVRheinland® Precisely Right. (Köln, Germany)
(Certification body)

Rapport d'essai: **S274 2007 T1**
(Test Report)

CE/CEM-DBT-104

Arras, le 05/11/08

Lionel Witrant

Directeur Technique
Engineering Director

AFAQ ISO 9001 VERSION 2000

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Garanty

1 Plus Points

To respond quickly and efficiently to your consultancy needs or order tracking throughout the world via our customer service department.
To respond as rapidly as possible to all questions of a technical nature.

2 Quality

To assure you of the best quality of our products and service in conformity with the international standards and directives in force.

3 Inspection and Reliability

To provide you with reliable equipment. The quality of our production is an essential condition for this reliability. This is guaranteed by virtue of very strict checks that are carried out when raw materials come in, both during the course of and at the end of manufacture (all equipment that is sent out is configured to your individual requirements).

4 Commissioning

If required, to commission your equipment by our Ism-ATEX qualified specialists.

5 Training

To provide detailed training programs.

6 Project department

Our team will investigate all gas and flame detection projects via on-site investigations or from drawings. We can suggest pre-project studies, design, installation and maintenance of safety systems in ATEX or non-ATEX zones with full respect of all standards in force.

7 Maintenance contract

To suggest rolling maintenance contracts tailored to your needs in order to guarantee you maximum safety:

- One or more annual visits, including consumables
- Renewable by agreement
- Including adjustment of fixed or portable gas detectors, and inspection of control systems.

8 On-site repair

To rapidly send our Service Technicians to you. This is possible on account of our hubs in France and abroad.

9 Factory repair

To deal with any problem that cannot be resolved on-site by dispatching the equipment back to the factory. Teams of technicians will work on repairing your equipment as quickly as possible, thereby reducing the time spent out of commission to a minimum. Cost efficient replacement solutions are available if equipment is deemed not repairable.
For all After Sales Service in France, contact us by email at servicecenter@oldhamgas.com
Or by telephone at + 33 (0)3 21 60 80 80. For locations near you, please visit us at indsci.com and click on the Oldham Division.

OUR MISSION

Preserving human life on, above and below the earth
Delivering highest quality, best customer service...
every transaction, every time.

OLDHAM
An Industrial Scientific Company

The Fixed Gas Detection People

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