User manual

CPS_CPS 10 System

OLDHAM

The Fixed Gas Detection Experts

We are delighted that you have chosen an **OLDHAM** instrument and would like to thank you for your choice.

We have taken all the necessary measures to ensure that your instrument provides total satisfaction.

Now it is important to read this document carefully.

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* **The CPS model is not intended to be used as Life Safety Equipment**

GUARANTEE

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

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 OLDHAM for additional information.

This manual is designed to provide users with simple and precise information. OLDHAM shall is not responsible or liable for any misinterpretation that may result from the reading of this manual. Although every effort is made to ensure accuracy, this manual may contain unintentional technical inaccuracies.

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This manual is a translation of the French original. In case of discrepancy between the French version and any translated version, the French version shall take precedence and shall prevail in all matters pertaining to any relationship between the parties.

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.

The use of the unit has been projected for the applications specified in the technical characteristics. Exceeding the indicated values cannot in any case be authorized.

Catalytic sensors are susceptible to poisoning by traces of several substances. This leads to an inhibition which can be permanent or temporary depending on the contaminant, the concentration of the contaminant, the duration of exposure to the contaminant.

Poisoning may result from exposure to substances as:

- silicones (e.g. waterproofing, adhesives, release agents, special oils and greases, certain medical products, commercial cleaning agents)

- tetraethyl lead (e.g. leaded petrol, particularly aviation petrol 'Avgas')

- sulfur compounds (sulfur dioxide, hydrogen sulfide)

- halogenated compounds (R134a, HFO, etc.)

- organo-phosphorus compounds (e.g. herbicides, insecticides, and phosphate esters in fireproof hydraulic fluids

Oldham recommends regular testing of fixed gas detection installations (read Chapter 6).

Table of Contents

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.

OPENED
CLOSED

KLAXON

CO   NO

CPS
RM

CPS
AI

CPS
AO

Recorder

Supervision

CO   CO   CO   NO   CO   NO

OPENED
CLOSED

OPENED
CLOSED

P
PARKINGS

CPS
RM

Low
Speed

CPS
RM

NO   CO   CO   NO   CO   NO

OPENED
CLOSED

OPENED
CLOSED

CPS
RM

CPS
AO

CPS
RM

CO   NO   CO   NO   CO   NO

OPENED
CLOSED

OPENED
CLOSED

CPS
RM

CPS
RM

GPL   GPL
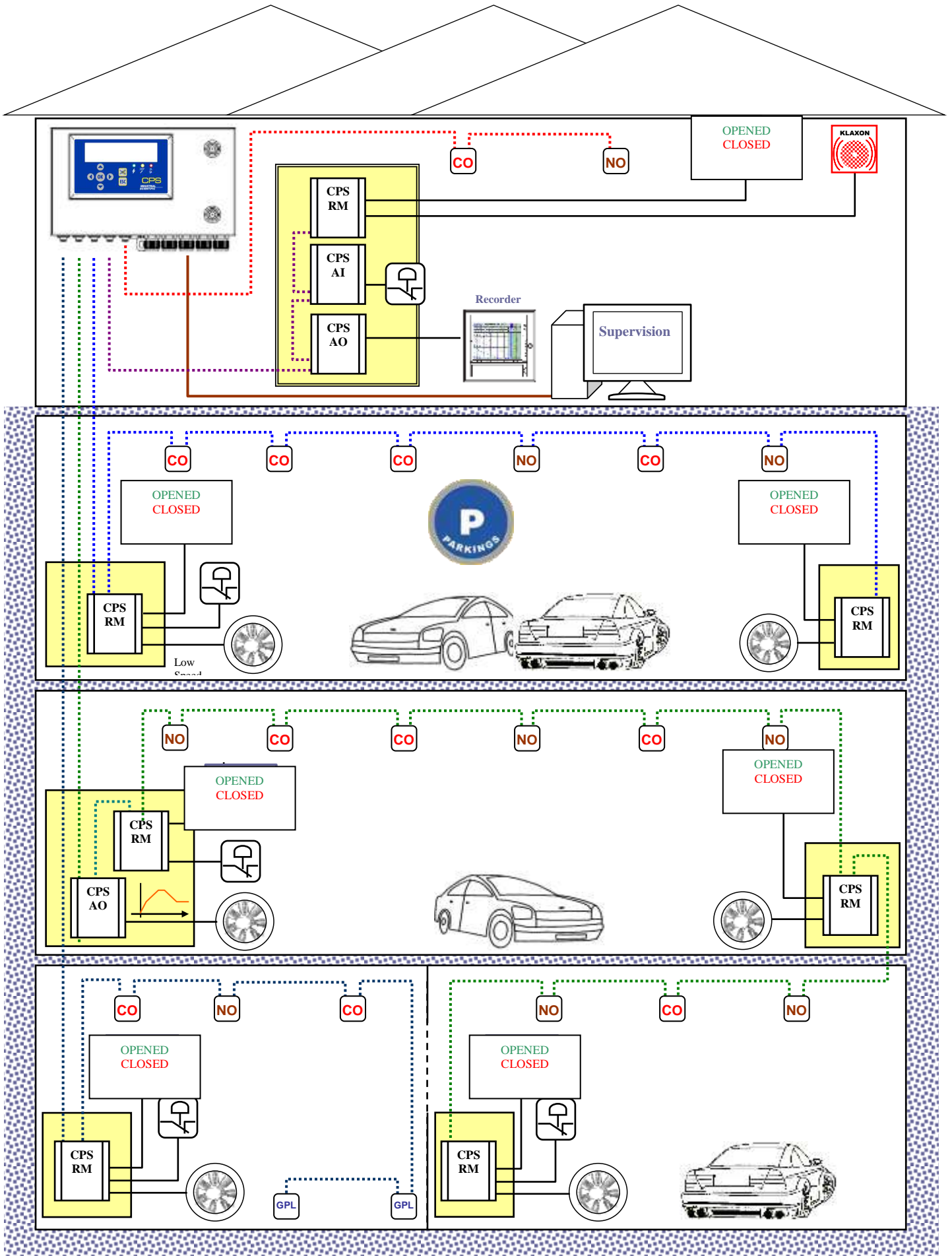
The CPS central controller

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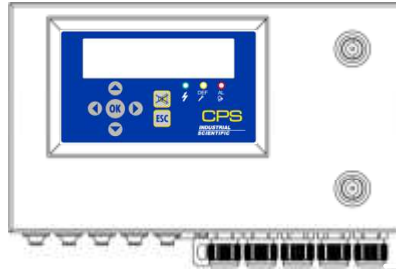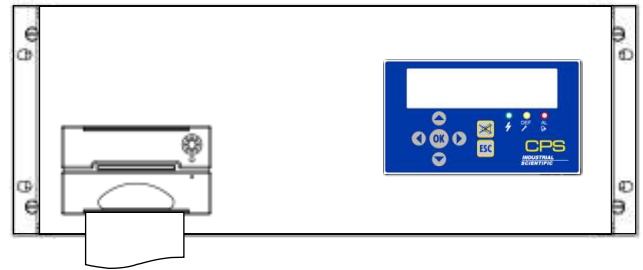
The central controller is available in a 19" 4U (rack-mount) version or in a wall-mount version. It is designed to control:

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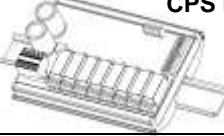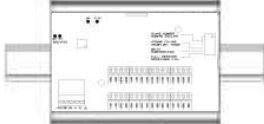
The central controller can be connected to a supervision system via an RS-485 output interface using ModBus protocol.

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 AO 4　**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.

Digital line connection

CABINET

Relay **CPS RM8**

Logic input **CPS AI16**

Analog Output **CPS AO4**

Module 1

Module 2

Module 3

8 measuring lines
(RS485)

32 DIGITAL MODULES MAX PER LINE
Max length line: 1.2 Km (up to 4.8km with repeaters optional.)

Module n
Detector **CPS 10**

Module n
Detector **CPS 10**

Module n
Detector **CPS 10**

Module n
Relay **CPS RM4**

End line changeover switch

Module n
Detector **CPS 10**

Module n
Detector **CPS 10**

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

SUPERVISION

Rack mounted Control unit CPS

Integrated printer (option) only for rack Mounted CPS

*COM*_CPS

PC configuration

Recorder

8 available digital RS485 Lines
32 addressable modules max per line
256 modules per central CPS

Serial Printer

Analog output
CPS AO4

Detector module
CPS 10

Logic input module
CPS AI16

Relay module
CPS RM4

Relay module
CPS RM8
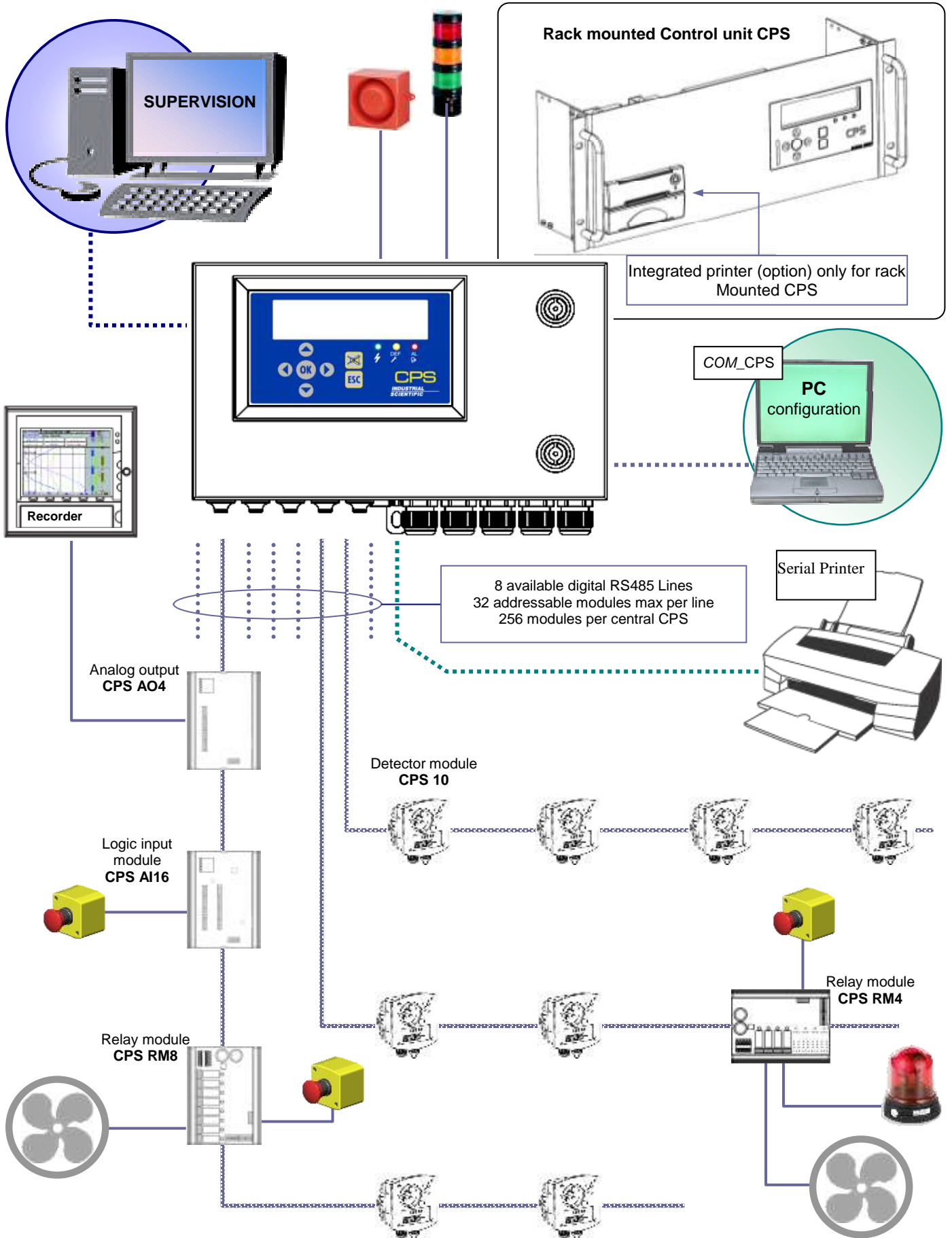
Chapter 2 Assembly / Installation

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
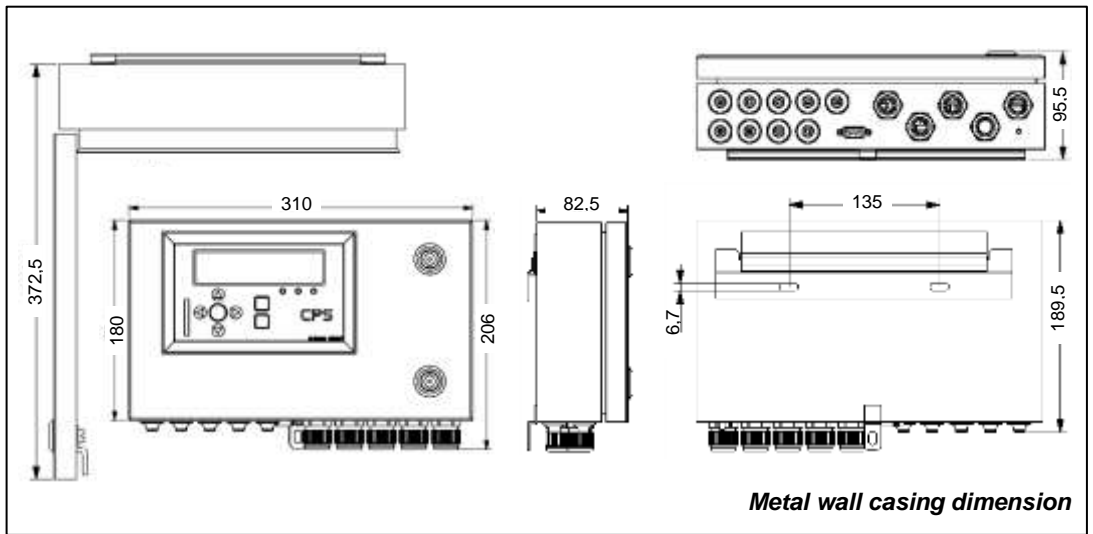
Mounting the 19" 4U rack

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
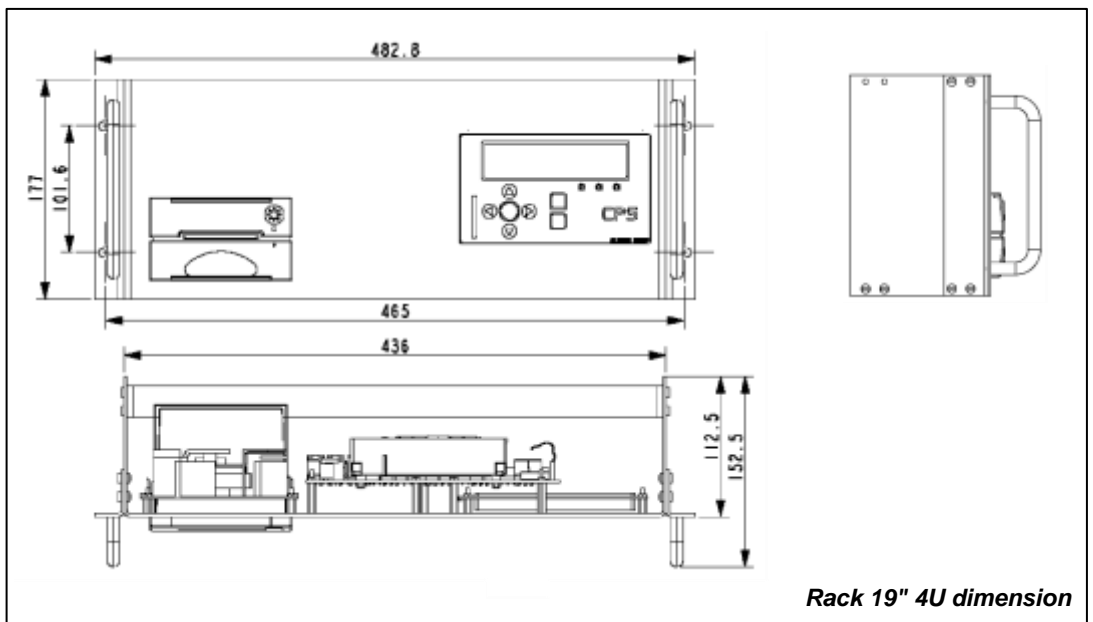
Installing digital modules

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**

DIN Rail
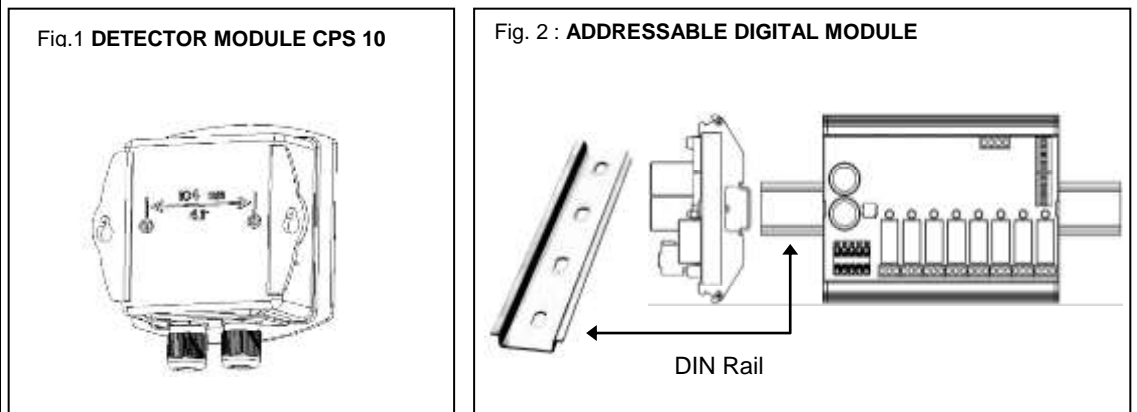
Connection of modules in a line

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

CPS

GOOD

| Module 1 | Module 2 | Module 3 | Module n |

BAD

| Module 1 | | Module 2 | Module n |

This configuration is possible with only a repeater insultor

| Module 3 | Module n |
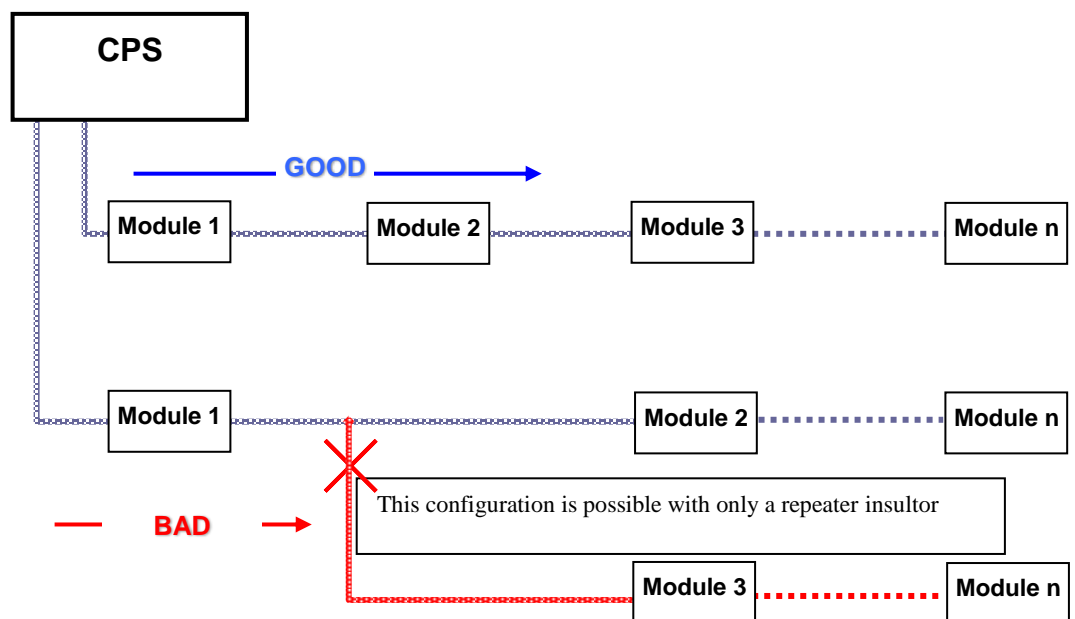
Chapter 3   The CPS Central Measuring Controller

View of rack–mounted CPS
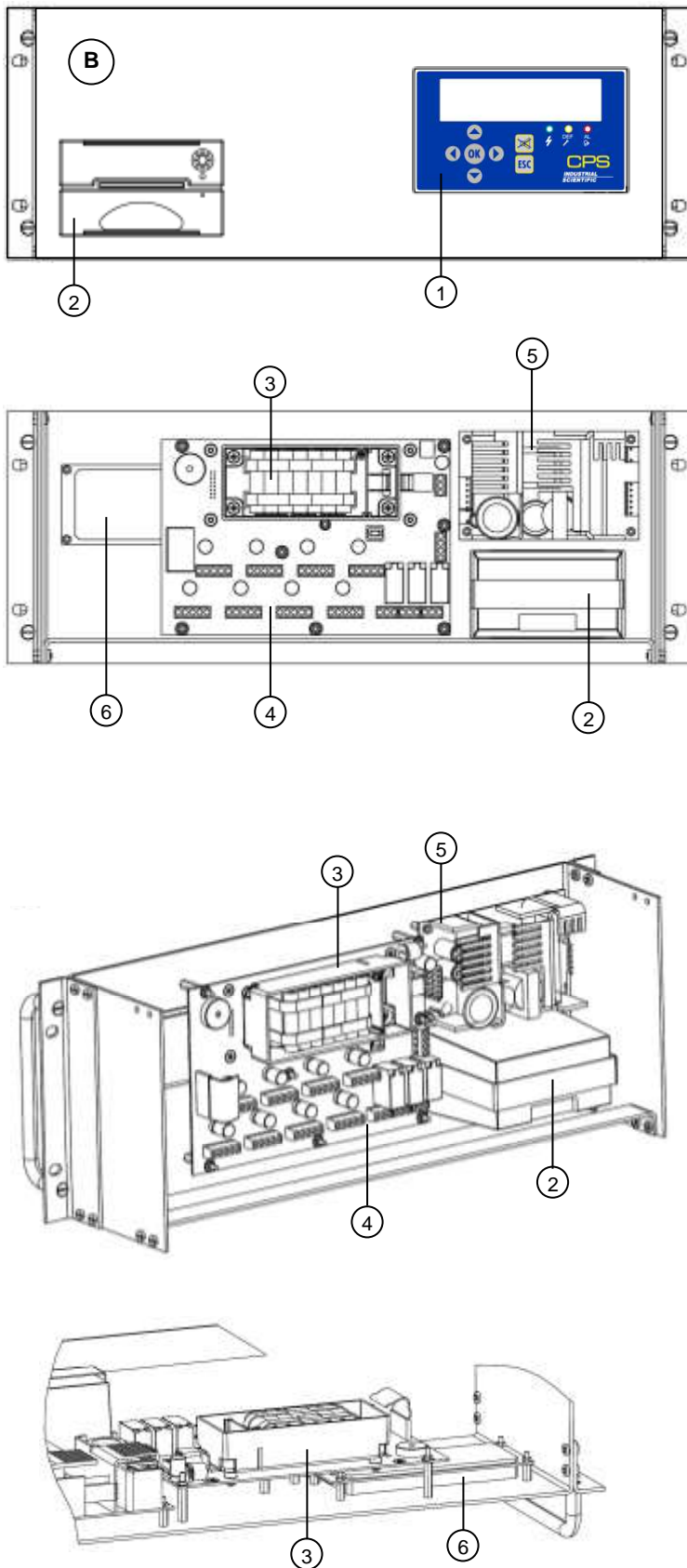
View of wall-mounted CPS
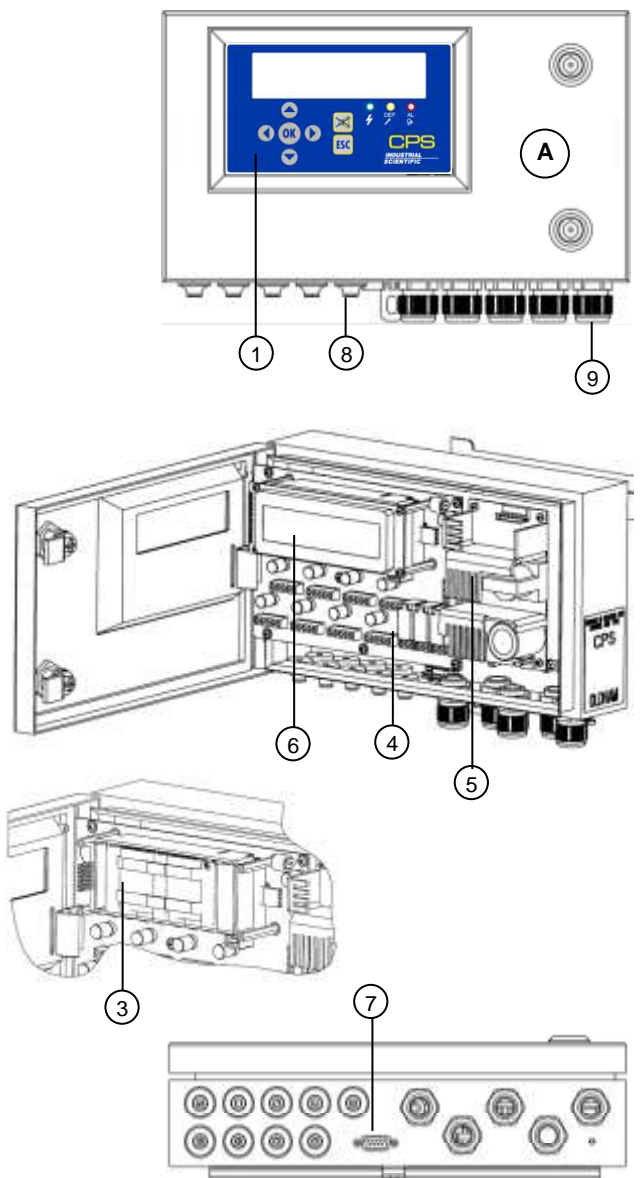
PART	DESCRIPTION	PART NUMBER
A	CPS WALL CASING	6 514 868
B	CPS RACK 19" 4U	6 514 869
1	CPS FRONT PANEL	6 122 477
2	AP1200 PRINTER	6 114 632
3	BATTERY PACK (OPTIONAL)	6 311 098
4	CPS MOTHERBOARD	6 451 596
5	24V 60W POWER SUPPLY BOARD	6 111 308
6	CPS CENTRAL CONTROLLER DISPLAY	6 133 707
7	RS232 SUB D9 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**	⚠ **WARNING**
Contact with voltage may result in serious injury or death.	**Improper installation can result in incorrect gas level readings or system failure.**
Install all equipment and complete all wiring work before turning on the power.	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, 100 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, 100 Ω. (Fig. 6).

MOTHERBOARD FOR RACK-VERSION CPS

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

0V   +24 VDC

24 VCC

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

N
L

110-240VCA

Disjoncteur

Fig. 5 : **BUS 1 to 8**
DIGITAL MODULE LIAISON
CPS 10 - CPSRM4/8 - CPSAI16 - CPSAO4

+24Vcc

0v A B

Copper
Blindages
connection shield

Bus RS485, Recommended cable:
2 shielded twisted pair cable, 100 Ω
[1 pair for module power supply, 1 pair
for RS485 communication]

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

B
A

Cable RS485 : 1shielded twisedt cable,
100 Ω

Fig. 7 : **RCT contacts**

J23   J24   J25

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 (CPS 10 – 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	
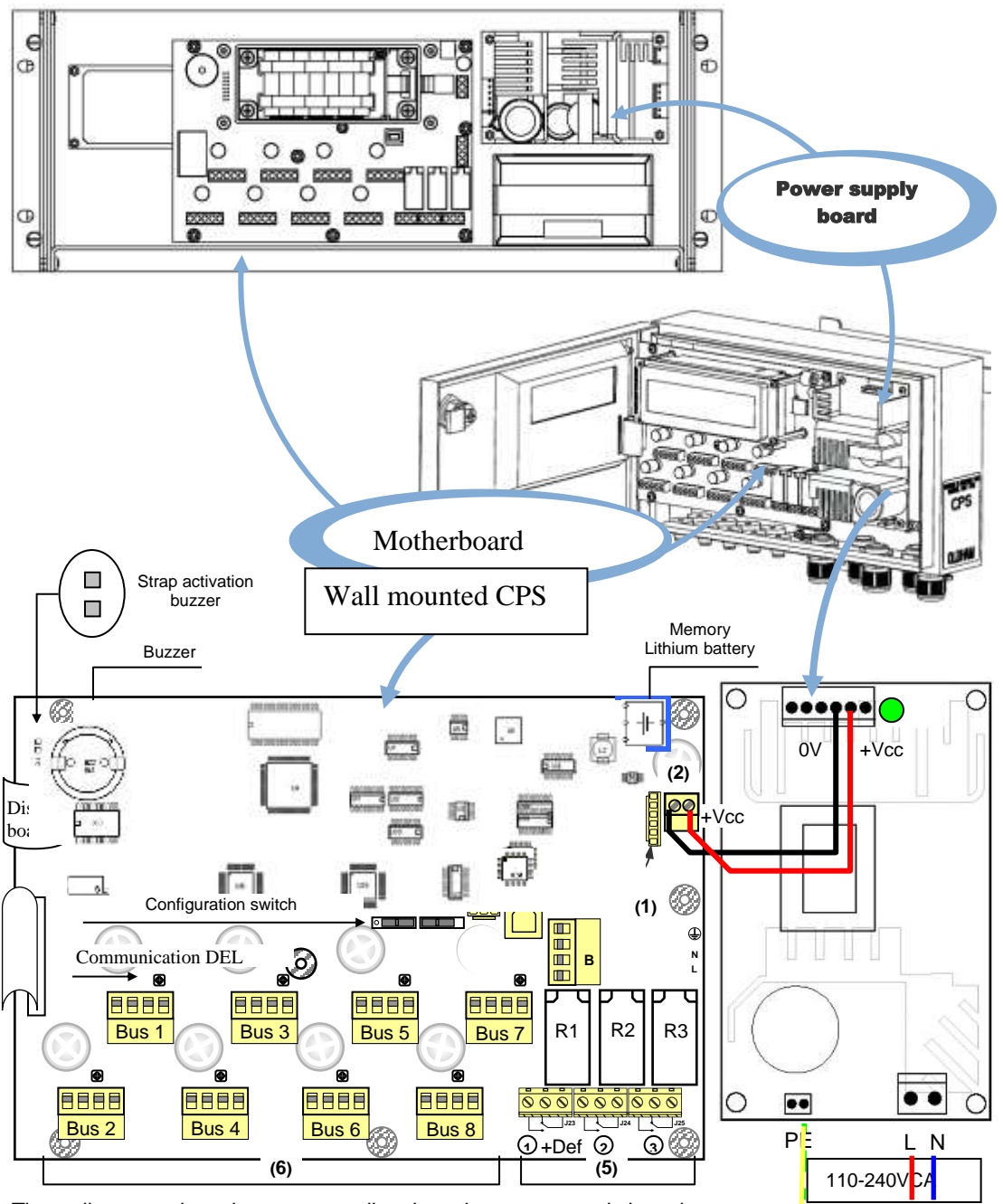
The wall-mounted version connects directly to the power supply board.

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

Communication DEL of the bus

Bus 2   Bus 4   Bus 6   Bus 8
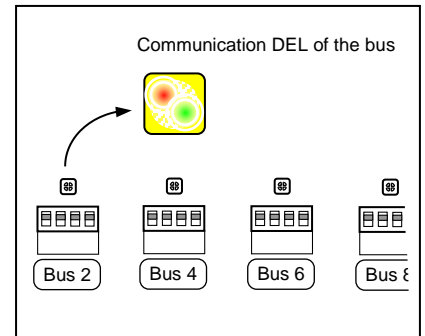
Mini-switches

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.

Programming with COM_CPS

Micro programming

A   B

Prog MEM   Run   Prg

interface USB
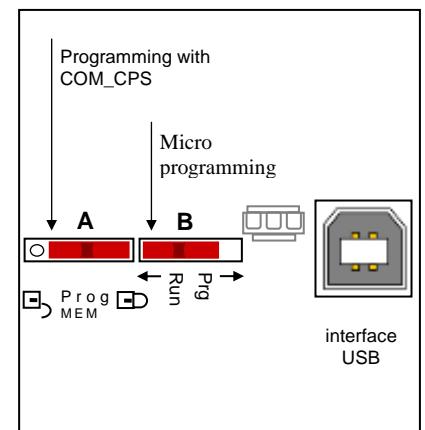
`COM_CPS` **Internal relay and buzzer**

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**.

USB

RS232

Cable RS232
6116026

Cable USB

PC
configuration
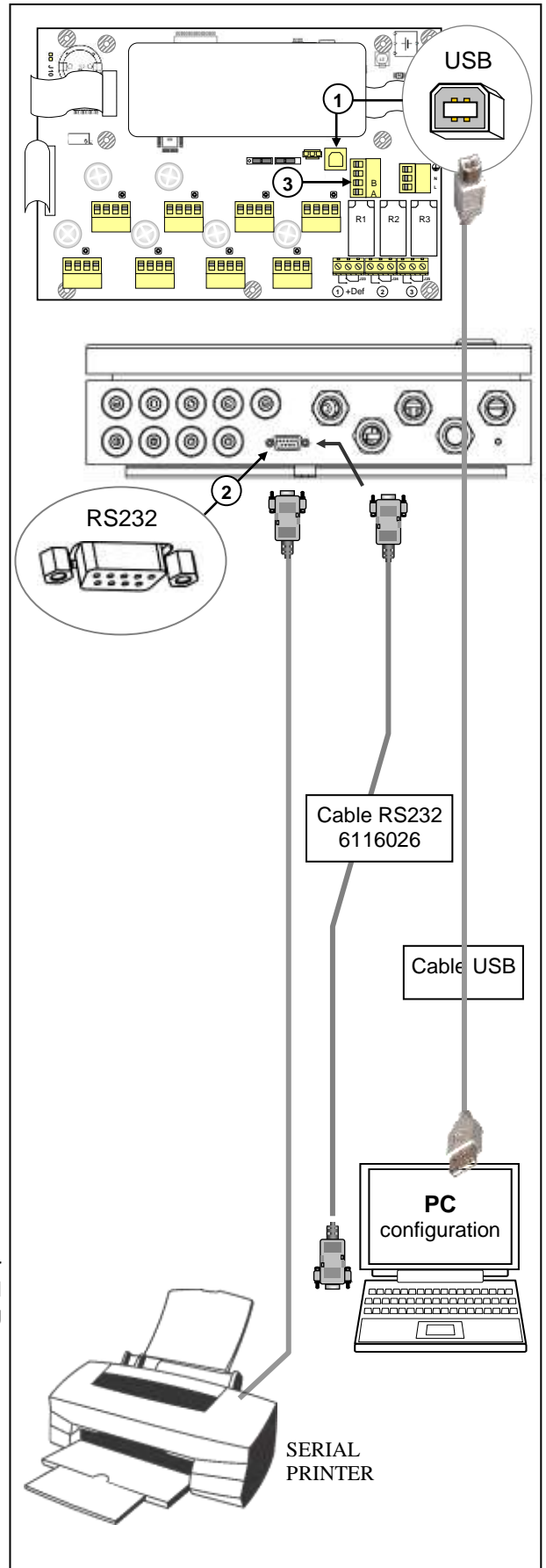
SERIAL
PRINTER

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

Icon	Description
☺	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

Key	Description
▲ ▼	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)
⬤	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.

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

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 CPS 10
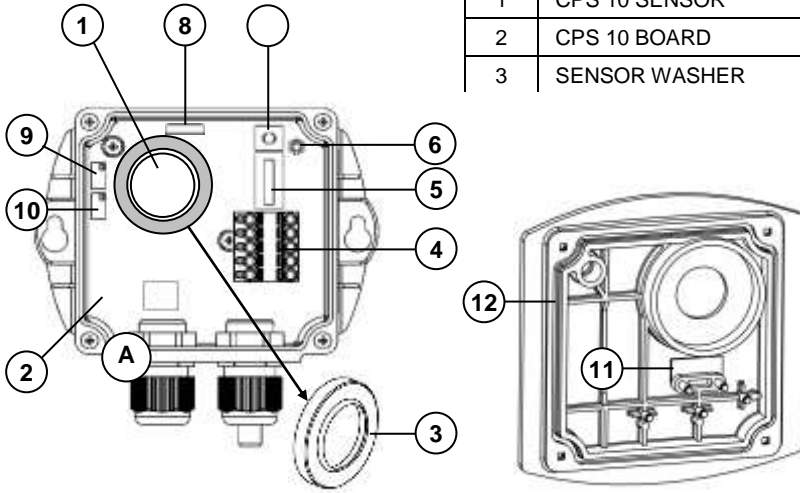
PART	DESIGNATION	CO	NO	NO2	EXPLO
A	CPS 10 SENSOR MODULE	6 513 591	6 513 592	6 513 593	6 513 594
1	CPS 10 SENSOR	6 798 301	6 113 331	6 113 332	
2	CPS 10 BOARD	6 451 597	6 451 598	6 451 599	6 451 600
3	SENSOR WASHER	6 136 243	6 136 243	6 136 243	

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	CPS 10 Magnetic switch
12	6 136 052	D2 line washer (qty : 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)
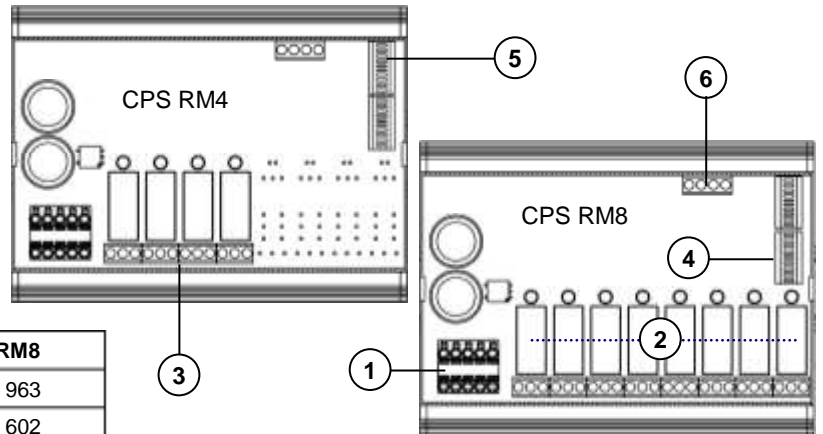
DESIGNATION	CPS RM4	CPS RM8
RELAY MODULE	6 313 962	6 313 963
RELAY MODULE BOARD	6 451 601	6 451 602

LOGIC INPUT MODULE CPS AI16
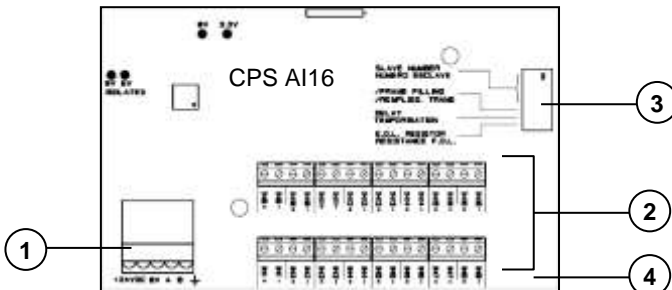
Part	DESIGNATION
1	Power supply & network connector
2	Logic input terminal (16 Inputs)
3	Configuration switches (Adresses)
4	Module board

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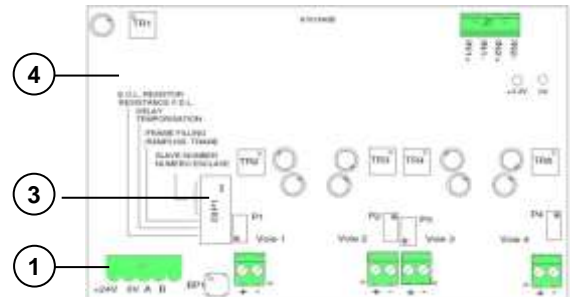
DESIGNATION	CPS AI16	CPS AO4
MODULE	6 313 964	6 313 980
MODULE BOARD	6 451 603	6 451 614

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 4 - 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**

Latest module of the bus

Per line : 32 modules max/ Max length 1,2 Km
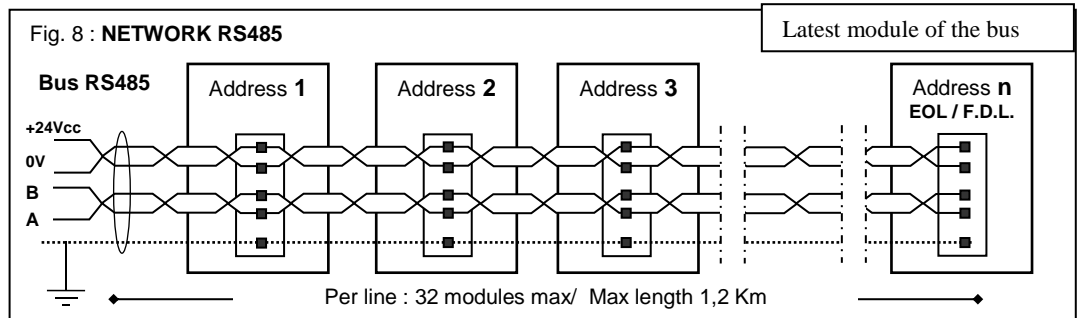
Wiring the digital network

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 impedance of 100 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**
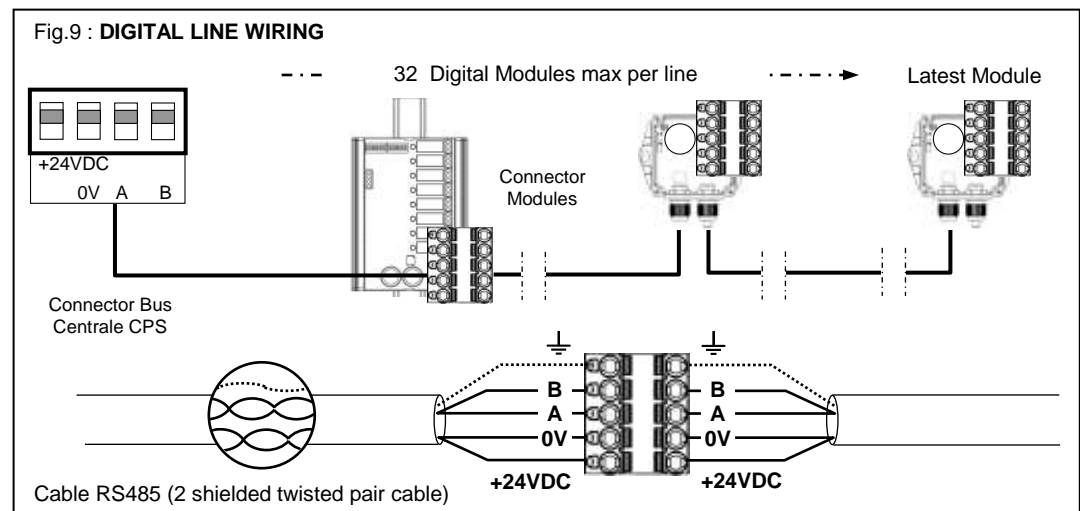
Configuring the communication settings

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).*

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.*

Fig. 10 : **CONFIGURATION SWITCH**

SLAVE NUMBER
NUMERO ESCLAVE

FRAME FILLING
REMPLISS TRAME

DELAY
TEMPORISATION

E.O.L. RESISTOR
RESISTANCE F.D.L.
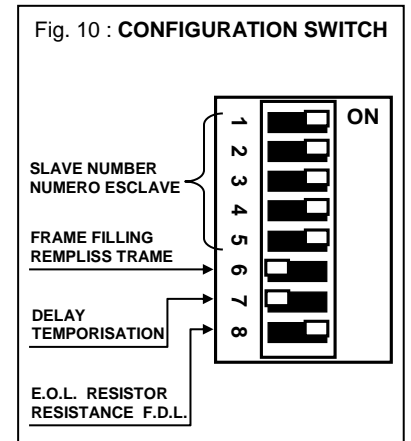
Address Table

Slave Address	SWITCHES					Slave ADdress	SWITCHES				
	ON = 1 ; OFF = 0						ON = 1 ; OFF = 0				
	1	2	3	4	5		1	2	3	4	5
1	1	0	0	0	0	17	1	0	0	0	1
2	0	1	0	0	0	18	0	1	0	0	1
3	1	1	0	0	0	19	1	1	0	0	1
4	0	0	1	0	0	20	0	0	1	0	1
5	1	0	1	0	0	21	1	0	1	0	1
6	0	1	1	0	0	22	0	1	1	0	1
7	1	1	1	0	0	23	1	1	1	0	1
8	0	0	0	1	0	24	0	0	0	1	1
9	1	0	0	1	0	25	1	0	0	1	1
10	0	1	0	1	0	26	0	1	0	1	1
11	1	1	0	1	0	27	1	1	0	1	1
12	0	0	1	1	0	28	0	0	1	1	1
13	1	0	1	1	0	29	1	0	1	1	1
14	0	1	1	1	0	30	0	1	1	1	1
15	1	1	1	1	0	31	1	1	1	1	1
16	0	0	0	0	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

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:**
    o   4 instantaneous thresholds: 0-100% measuring range,
    o   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:**
    o   "**underscale**" negative signal (exceeding the lower threshold): -10% of the range.
    o   **"SUP"** out of range (exceeding the upper threshold): +120% of the range.
    o   **"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

Enabled alarm when 100ppm threshold is reached

Disabled alarm when value below 100ppm-3% t
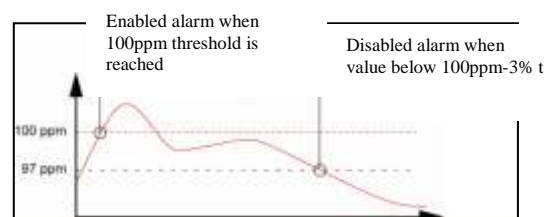
External relay module

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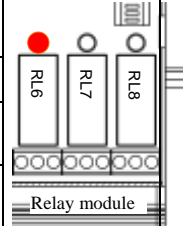
Each of the 6 sensor alarms [AL1 - AL2 - AL3 - AL4 - Out of Range - Fault] can control one or more of the 256 relays. Several events can be linked to one relay.

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)

Relay module

"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**

Relay configuration
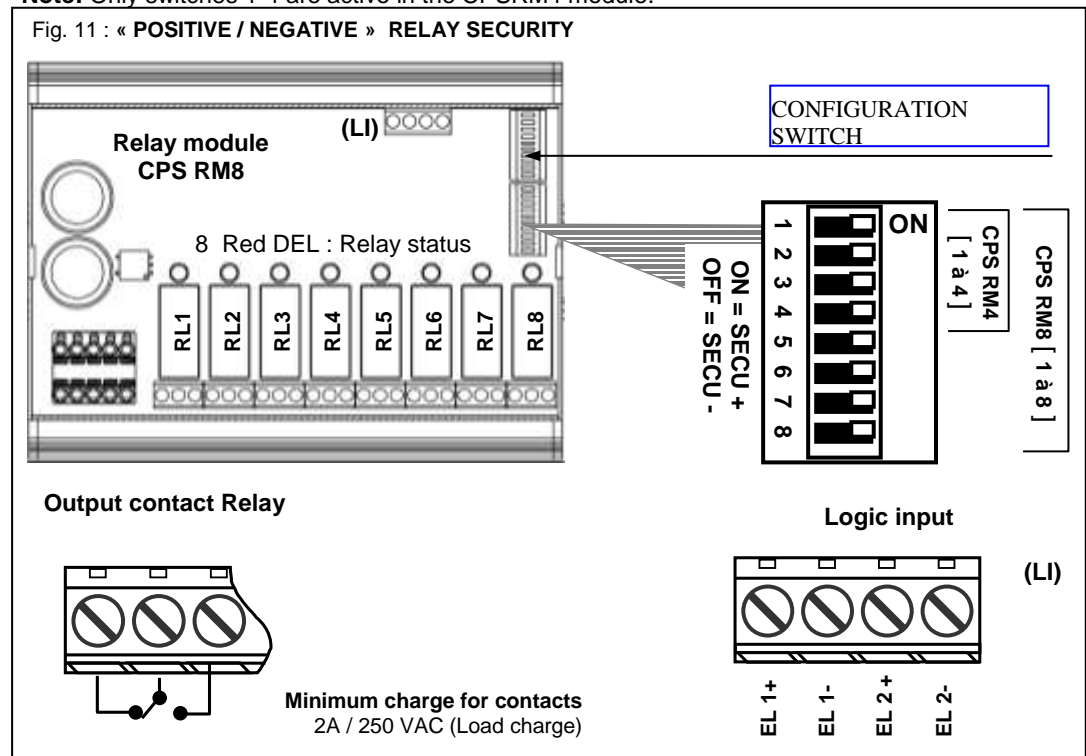
"Normal" relays

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 1 … 3600 seconds	Averaged Alarms 1 … 480 minutes	**"Buzzer modes"** Min. activation time: 0 … 300 seconds 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
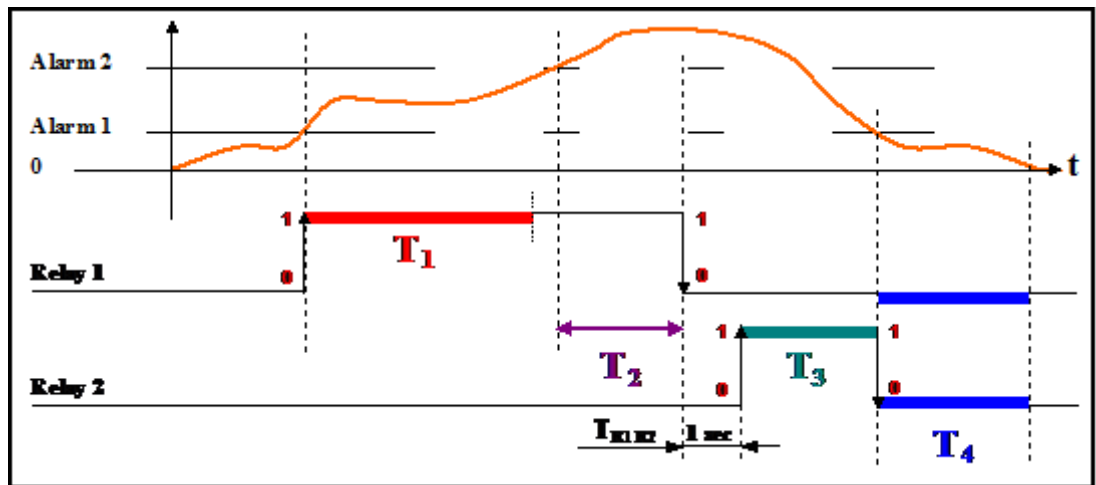
	Phases	Action operation	Default Delay*
T_1	**Min. duration LS operation** Adjustment(s): [1 … 32767]	Minimum duration, in seconds, during which the ventilator operates at low speed	5 min.
T_2	**HS operation delay** Adjustment(s): [2 … 32767]	Minimum duration for Alarm 2, after which the ventilator switches 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
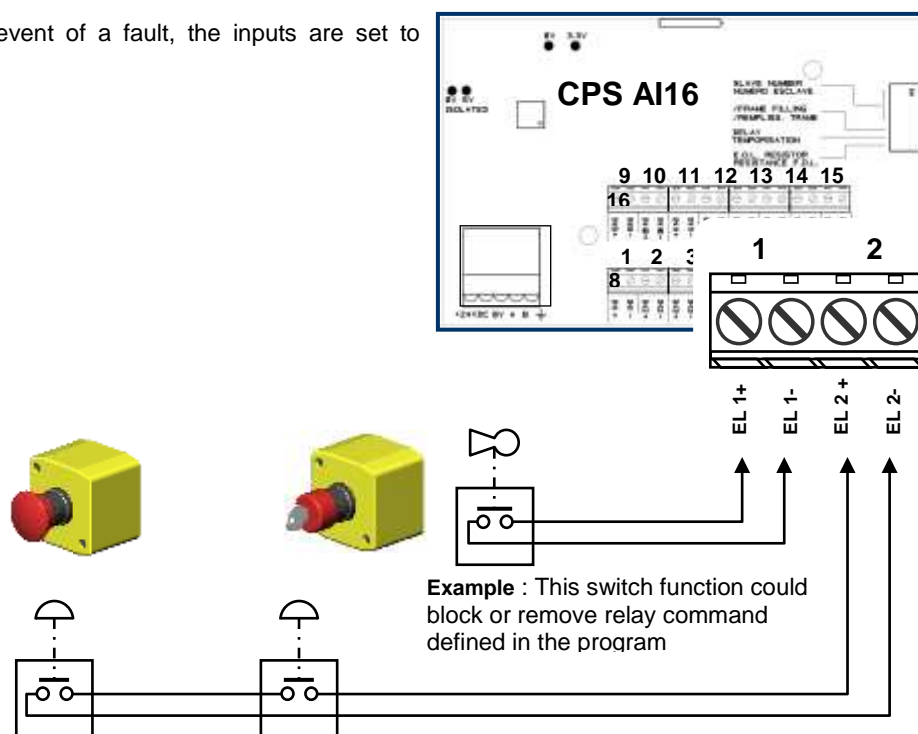
COM_CPS # Analog Outputs Module

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.

Analog output module

Example of use with analog output module

Analog output module

Logic input EL1 and EL2 (IN1 and IN2)

OUTPUT 4-20 mA from channel 1 to 3

Module power supply and digital liaison (A and B)

+24V 0V A B

Output 4-20 mA from the channel 4
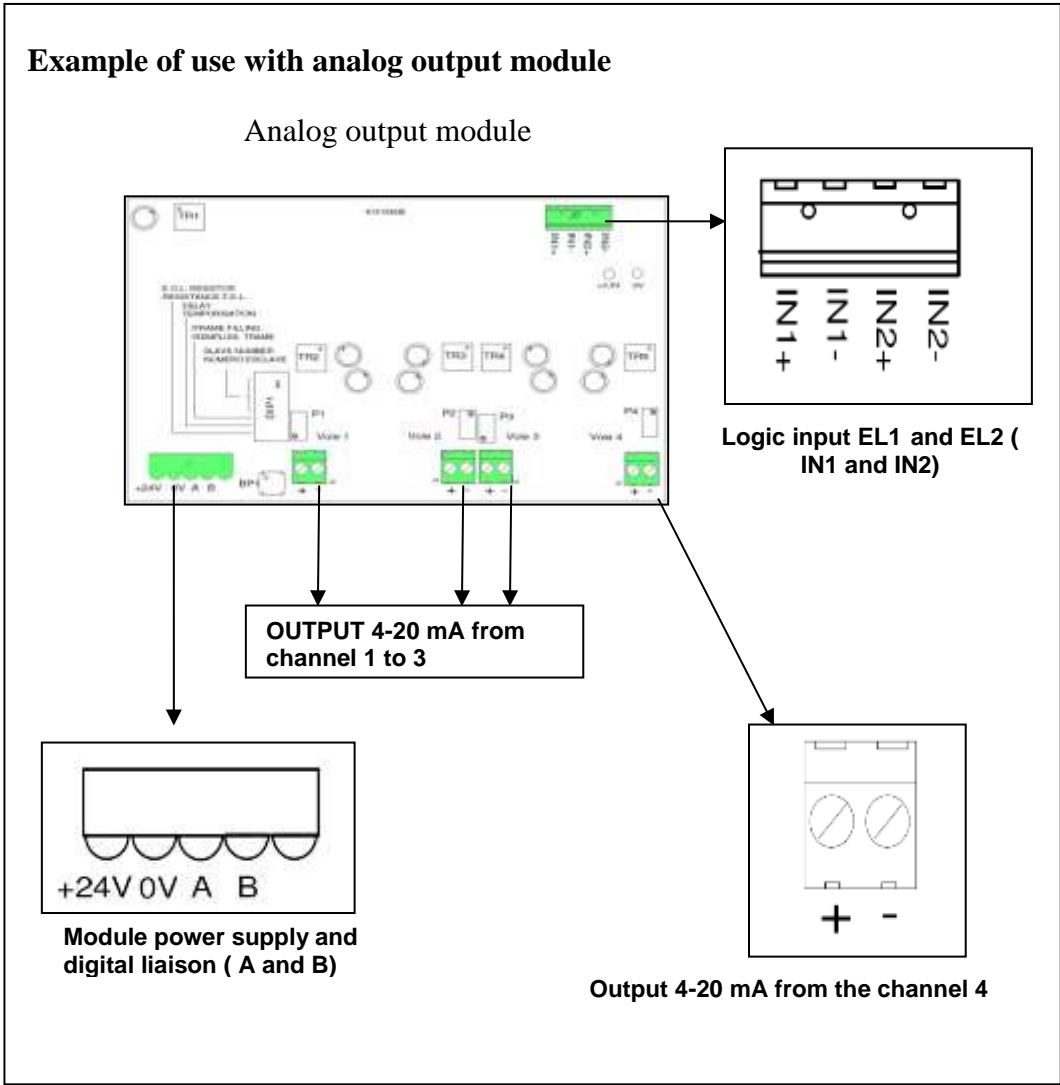
Chapter 5   Detailed Menus

Menu Tree

Start Display

Events ← Cycle ← 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 → Scan& Display → Sensor Display → Events → Relay status → Status 4-20mA → Print

ESC

OK → Cyclique → Événements
ESC

Event Print → ON/OFF printer → Module status → All module status of line → Printing System status

OK

ESC

System — OK → Activation Line, Module, relay **[XXXX acces]** (Activate : Line - module - relays - 4-20mA output) → Date and Hour → Start config

ESC

Maintenance — OK → Simulation → Module Control → Bus default → Maintenance reset

ESC

OK **[XXXX acces]**

ESC

4-20mA output → Relay status → One sensor

OK

ESC

Version COM_CPSF Micro Free time

OK

[XXXX acces]

ESC

Installation CPS Reset for calibration calculation and overscale

Infos Modules Status fault Measures Temperature ……

ESC

…… POWER SUPPLY CRC DAY NUMBER SINCE LATEST CALIBRATIONT

OK

…… Ref. Module Rate of overscale

OK

ESC

…… Visualisation retry ……

OK

ESC

…… [xxxx acces] Reset retry module

ESC

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.

```
☺ 👤 .1. .2. .3. .4. ➔ ↗ ↘ ◁)) ✎ ⓘ ⊗ ❀ 🔋
Checksum
```
1

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.)

```
☺ 👤 .1. .2. .3. .4. ➔ ↗ ↘ ◁)) ✎ ⓘ ⊗ ❀ 🔋
CPS          Ver:  1.00.00
Starting:          Test RAM
```
2

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

```
☺ 👤 .1. .2. .3. .4. ➔ ↗ ↘ ◁)) ✎ ⓘ ⊗ ❀ 🔋
Supply Bus
 1=/ 2=◇ 3=◇ 4=/ 5=/ 6=◇ 7=◇ 8=/
```

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.

```
☺ 👤 .1. .2. .3. .4. ➔ ↗ ↘ ◁)) ✎ ⓘ ⊗ ❀ 🔋
Supply Bus
1=/ 2=■ 3=■ 4=/ 5=/ 6=■ 7=■ 8= /
```
3

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

```
☺                    ➔
L:2,    Mod:    1=Stab CO
CPS 10 CO
```

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.

```
☺                              [a]
CPS     Analysis           17:04
Parking Charles de Gaulle
```

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.

```
☺                    ➔         [b]
L:2,    Mod:    1 = 0.0 ppm
CPS 10   CO    zone 45
```

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.

```
                               ✎
L:2,    Mod:    1 = Def.        CO
CPS 10   CO    zone45
```

ESC ↕

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).

```
                               ✎
CPS 10   CO    zone45
  ERR  02 : Mod. 1 01        Cell
```
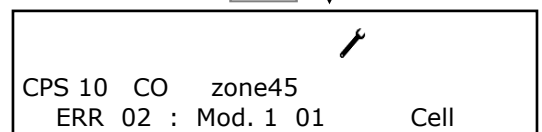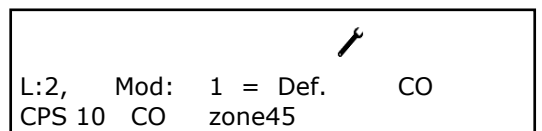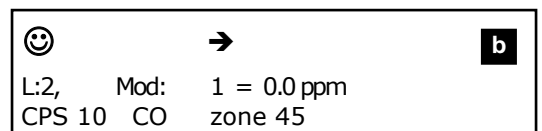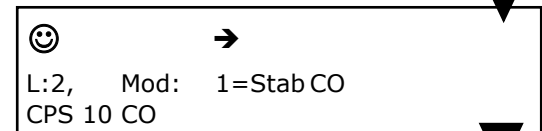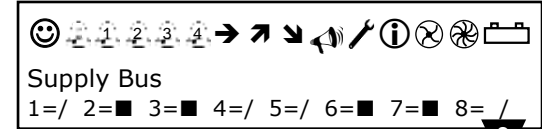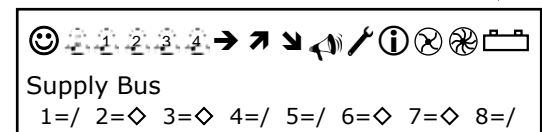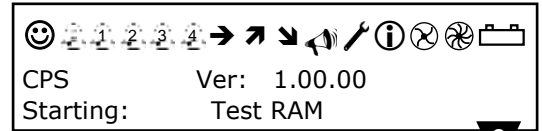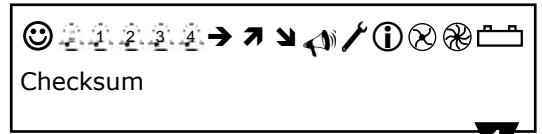
Control Menu

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.

☺

| Control | ◀▶ |
| | 13:18:19 |

☺

Control
Scan & Display ◀▶

☺
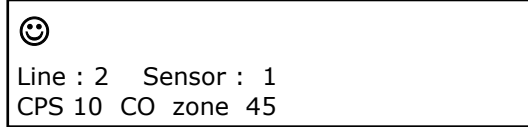
Affichage normal
Display on events ◀▶
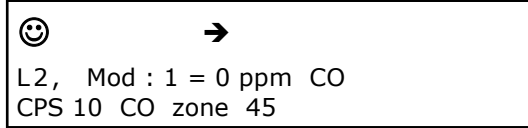
☺
.
Scan & display
Cyclic display ◀▶

☺
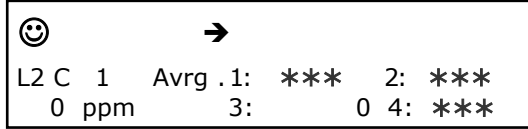
Control
   Sensor Display ◀▶

☺
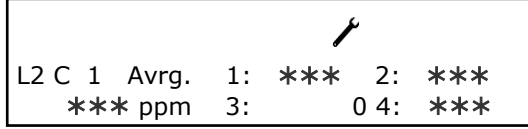
Line : 2 Sensor : 1
CPS 10 CO zone 45

☺   ➜
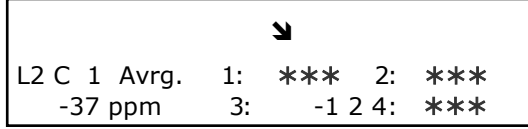
L2, Mod : 1 = 0 ppm CO
CPS 10 CO zone 45

☺   ➜

L2 C 1   Avrg .1: ✶✶✶ 2: ✶✶✶
  0 ppm   3:   0 4: ✶✶✶

            🔧

L2 C 1 Avrg. 1: ✶✶✶ 2: ✶✶✶
  ✶✶✶ ppm 3:   0 4: ✶✶✶

            ↘

L2 C 1 Avrg. 1: ✶✶✶ 2: ✶✶✶
  -37 ppm   3: -1 2 4: ✶✶✶

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:

<u>Module 2, line 8 turned on</u>

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

<u>Alarm 2 triggered</u>

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

<u>State change for Relay 2 (command relay)</u>
30/06/06 14:49:37 L:8, Mod:29

Relay 2 Normal ON

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

<u>Acknowledgement action</u>
30/06/06 14:55:21

ACKNOWL

<u>State change for Relay 2 (relay shut-down)</u>
30/06/06 14:55:21

Relay 2 Normal OFF

```
☺

  Control
    Events                           ◄►
```

```
                                      (a)

  25/ 06/ 07   19 :06 :02
  Line          2  OFF
```

```
☺                           🔧     (b)

  26/ 06/ 07  17: 07: 01  L:1, Mod: 03
  Alarme              ,D      OFF=>ON
```
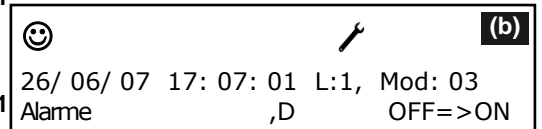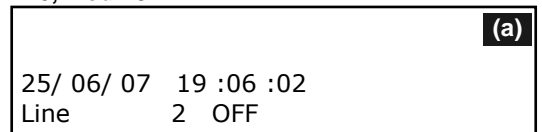
Relay Status

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.

```
☺

  Control
    Relay status                     ◄►
```

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).

```
☺

   Line :   2         MoDule  1
   Relay   Module   Level-1
```
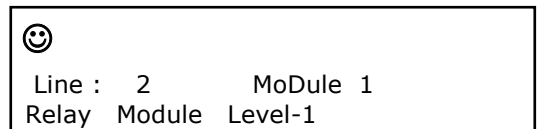
(a): (LS / HS) - Delays
(a): (Buzzer Relay) – Acknowledgement time
(b): (Buzzer Relay) – Min. activation

```
☺

   Relay  N r  1:  OFF          (a) 0
   2 – 1 – 1              Low S  (b) 0
```
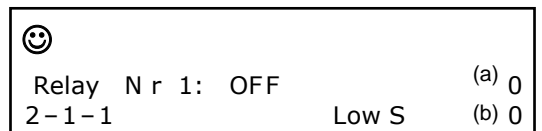
4-20 mA Output Status

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.

```
☺

  Control
    4 – 20 mA  Status                ◄►
```

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.
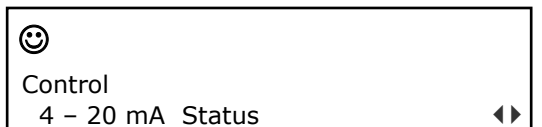
Printing

"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.

```
☺
Control                              ◀▶
                        13: 52: 17
```

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

```
☺
Control
Print                                ◀▶
```

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 [▲] and [▼] 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.

☺
System   ◀▶
                              17: 23: 17

☺

System
  Activation line, module,   relay   ◀▶

☺

0000 access

☺

  Activate Line   ◀▶

☺

  Line   :   1   OFF
Zone 1

☺

  Activate Module   ◀▶

☺

Line   :   1   Module :   1   OFF
CPS 10 CO zone 21

☺

  Activate Relay   ◀▶

☺

  Line :   2   Module :   1
Relay   module   level - 1

☺

  Relay Nr 1 :   OFF   0
2-1-1   Low S   0
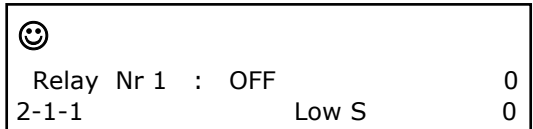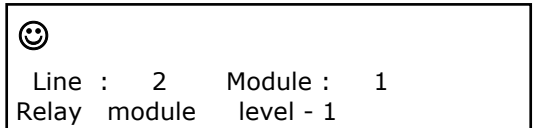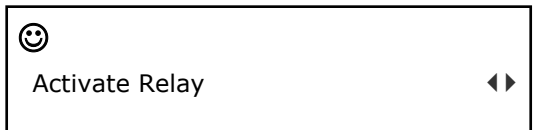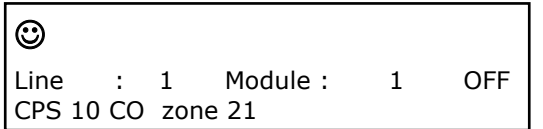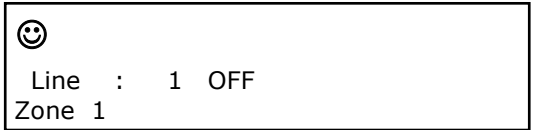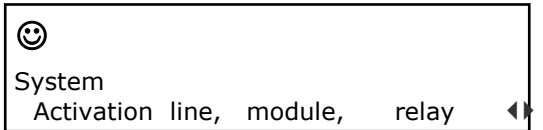
Activating analog outputs

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.

```
☺
Output          4 – 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.*

```
☺
System
  Date  and  hour                 ◄►
```

```
☺
 Date?                            ◄►
```

```
☺
Date (DD: MM: YY)
```

```
☺
 Hour?                            ◄►
```

```
☺
 Hour:
         0 9: 3 6
```

```
     0 3/  0 7/  0 7
```

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.

```
☺
System
  Start Config                    ◄►
```

```
☺
Start  Config
  Cyclic Display        ?         ◄►
```

```
☺
Start Config
  Display on events?              ◄►
```

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.

☺	
Maintenance	◀▶
	09: 52: 15

☺	
Maintenance	
Simulation	◀▶

☺
0000 access

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.

☺	
Simulation	◀▶
! Stop all sensors !	

☺
Simulation
One   sensor

☺
Sensor display
Line : 1   Detector :   1

☺	➜
Step alarm during 10 sec.	
	0

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.

☺	
Simulation	◀▶
Relay status	

☺
Line :   2   Module: 1

☺		
Relay Nr 1 : OFF		0
2-1-1	LS	0

Analog Output Simulation

Module Verification

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

```
☺
Maintenance
 Module Control                        ◀▶
```

```
☺
 Line  :  2       Module:   1      ON
CPS 10  CO     niveau-1
```

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

```
☺                    ➔
1  E 8000  D 0000  C 0003  iD  0000
01  M  0  T  33°C          Cal    300
```

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.

```
☺                    ➔
1 01    23.10V    CRC=EAA5        1J
0=   0.00%    f=100.00%  U=   0.00%
```

```
☺                    ➔
2 01    22.37V    CRC=404C
     R=00
```

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

```
☺                    ➔
1 01                Dep.    0. 0  H
Ref=6514000 6001  001 1.0     Ty0
```

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.

```
☺                    ➔
1           5813939  (a)          4 (b)
01                3  (c)          0 (d)
```

```
☺                    ➔
Reset   retry
0000  acces
```

```
☺                    ➔
Reset   retry
Module  1-01     Line  1         CPS
```

```
☺                    ➔
1               0               0
01              0               0
```

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.

Status Word

| E | 8 | 0 | 0 | 0 |

    4   3   2   1

Mot de défaut

| D | 0 | 0 | 0 | 0 |

    4   3   2   1

☺   ➜

1   E 8000 D 0000 C 0003 I D 0000
01 M   0 T 33°C   Cal   300
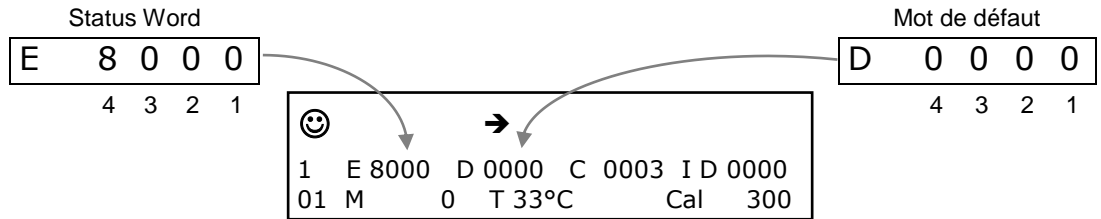
Fault word

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

```
☺

Maintenance
  Bus   default                    ◀▶
```

```
☺

.Line:   1      .     .      .       .
021XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

    ⬆ Module 1   Module 32 ⬆

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.

```
☺

Maintenance
  Reset   Maintenance            ◀▶
```

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.

```
☺

COMCPS   1.03          JBUS =  1
CPS       1. 00.00        91. 2% Free
```

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.

```
☺

0000    acces
```

CPS Installation

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

```
☺

Installation   CPS
              26 / 06 / 07
```

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: I2C (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.	🔊🔧 Sensor CO 1, level-1 ERR01 : Type 2 01 Meas=x.x

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. OLDHAM may be not responsible for their implementation.

Gas detectors are above all safety instruments. In consideration of this, **OLDHAM** 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.

The frequency of gas tests depends on the industrial application in which the detector is in use. Frequent inspections should be made in the months following the commissioning of the installation, and then become more widely spaced provided that no significant deviation is observed.

If a detector should fail to react when in contact with the gas, calibration is essential. The frequency of calibrations is a function of the results of the tests (humidity, temperature, dust, etc.). However, it must not exceed one year. It is also advisable to calibrate the sensor after exposure to high concentrations of gas.

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

- CPS 10 **CH4** = 2.5% CH4/air
- CPS 10 **H2** = 2% H2/air
- CPS 10 **C4H10** = 0.9% C4H10/air
- CPS 10 **CO** = 100ppm
- CPS 10 **NO** = 50ppm
- CPS 10 **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.
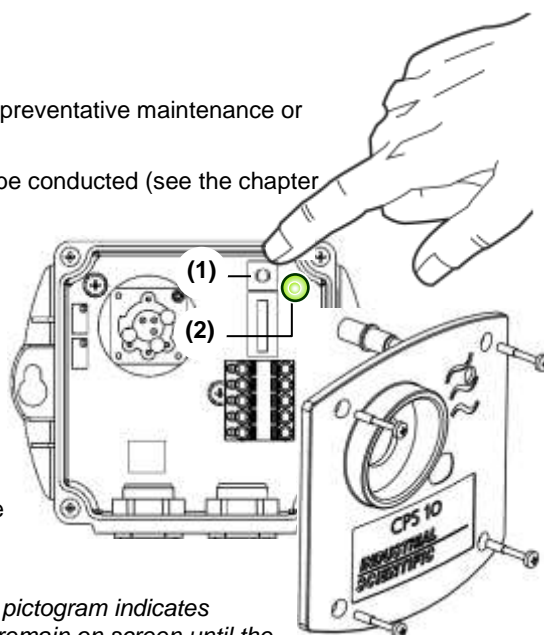
On the central controller, the "maintenance key" pictogram indicates that the sensor has been replaced. The key will remain on screen until the sensor has been calibrated or until the sensor's power supply fails. The wear settings for the sensor are initialized upon calibration


```
☺            ↗        ⓘ
L:2, Mod:  1 =   0.0  ppm      Calib
```
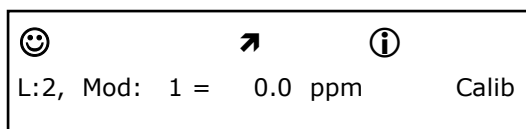
Semi-automatic calibration

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) .

	Status Del detector	Status output
Cal ON Magnetic calibration cap on **Cal OFF** magnetic calibration cap off **Tempo** Delay		
Start sensor stabilization **Stab [1 mn]**	Power down if OK Blinking if default	Meas
Normal	Power downif OK Blinking if default	Meas
Calibration Beginning **Cal ON**		
Zero stabilization **Phase de réglage du zéro** [**1 mn**] **Cal OFF**	**GREEN Blinking**	Meas
Cal OFF Stable zero **Traitement interne du zéro** [**20 à 60 s**]	**GREEN Fixed**	0
Zero validation Wait Cal OFF **Cal OFF**	Power down if OK Blinking if default	Meas
30 sec Wait Cal ON **Delay TCAL** **Cal ON**	Power down if OK Blinking if default	Meas
Cal OFF Sensitivity stabilization [**1 mn**]	**RED blinking**	Ref standard gas
Cal OFF Stable sensitivity [**20 à 60 s**]	**RED Fixed**	Ref standard gas
Sensitivity validation Wait Cal OFF **Cal OFF** **Calibration END**	Power down if OK Blinking R if default	Meas

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.

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

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

CPS 10_Explo

CPS 10_Tox
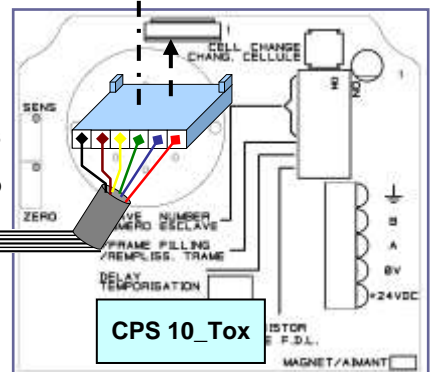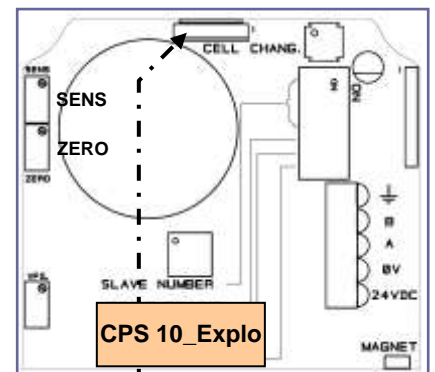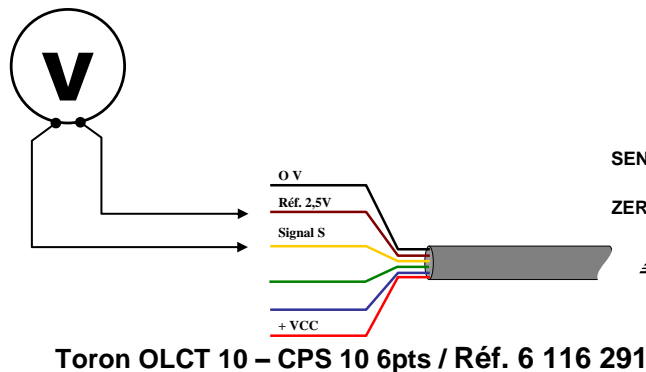
MAINTENANCE WIRES:

+VCC (**red**) = + power supply
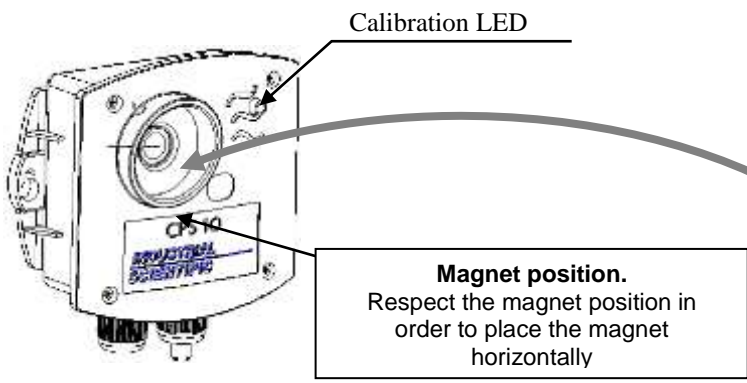
Signal S (**yellow**) = signal from 0 mV to 1600 mV for zero and sensitivity measure
Ref 2,5V (**brown**) = zero reference for signal reading from 0 mV to1600 mV
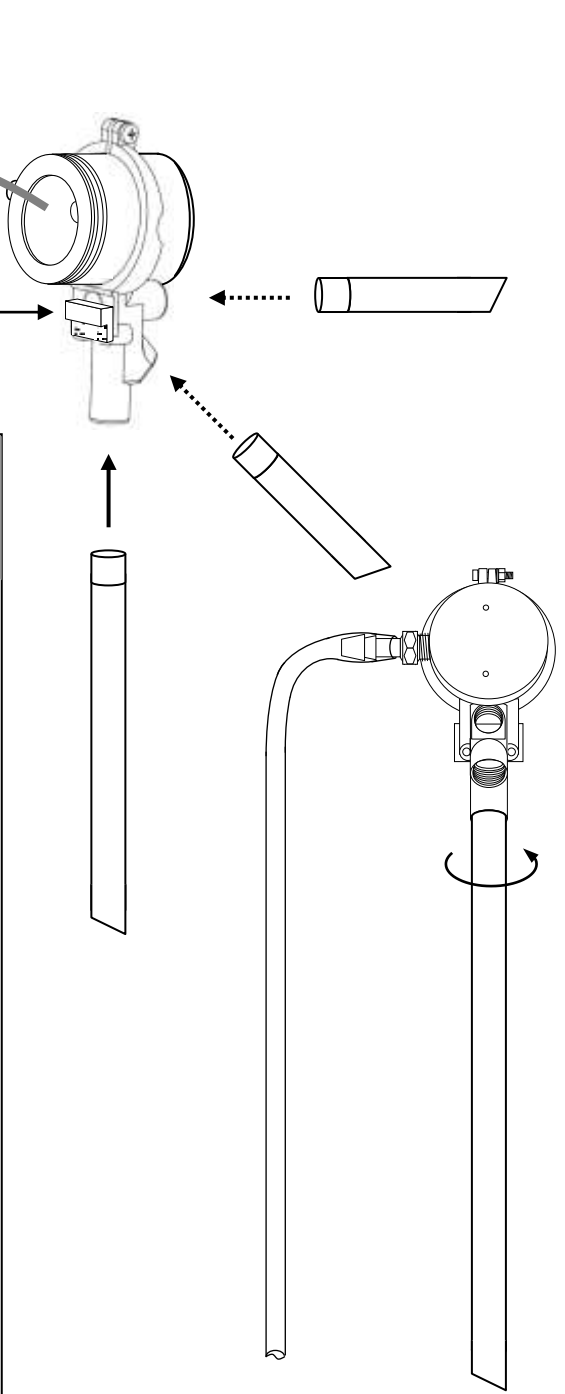
GND (**black**) = electronic circuit ground.
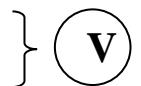
Semi-automatic calibration device
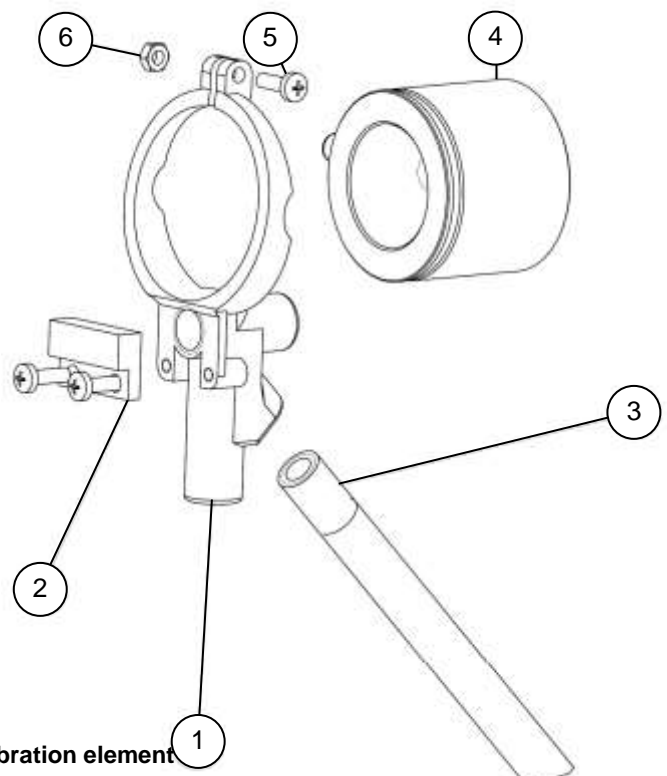
Calibration LED

Magnet position.
Respect the magnet position in order to place the magnet horizontally

Semi-automatic calibration

The magnetic calibration allows for one-man and non-intrusive calibration to **save considerable time.**
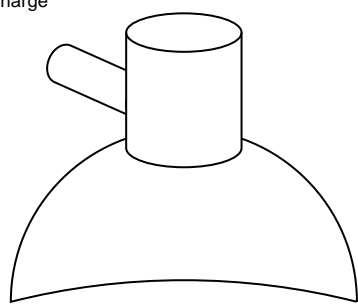
Manual calibration with zero and span potentiometers is possible by opening the CPS 10

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

Slug the gas
with a 60L/H discharge

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.
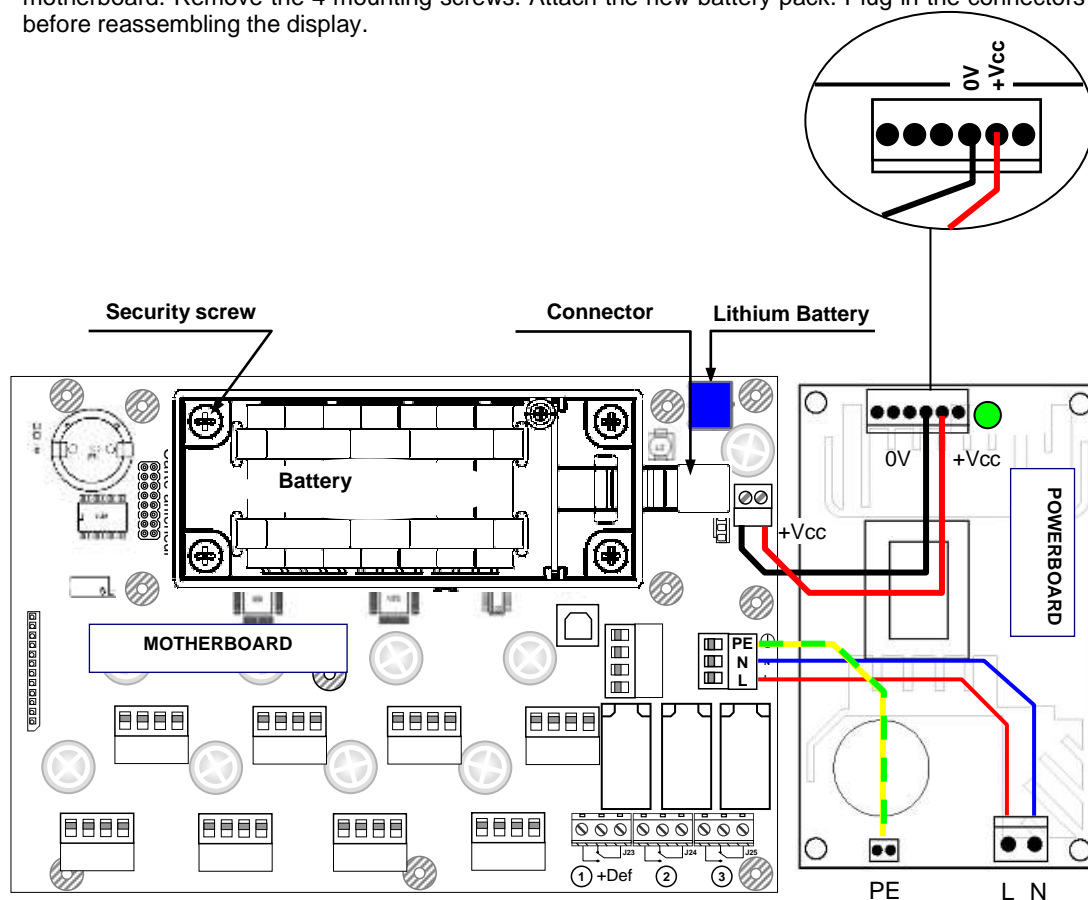
Scrapping of CPS System

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.

CPS – User Manual
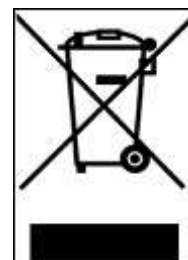
Chapter 7   Technical Specifications

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 Dl16, CPS AO4) ModBus Protocol
Cable type:	2 twisted pairs shielded RS-485 4Xawg22 (diameter 0.67mm) cable, 100□
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 65
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.
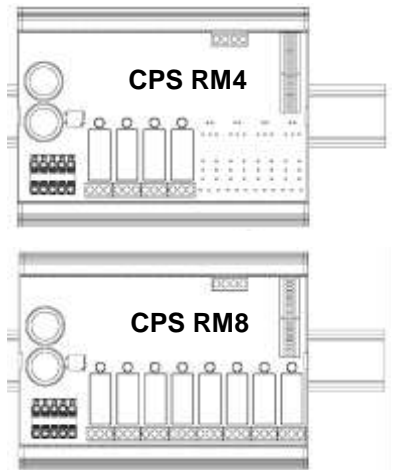
CPS DI16 Logic Inputs Module

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
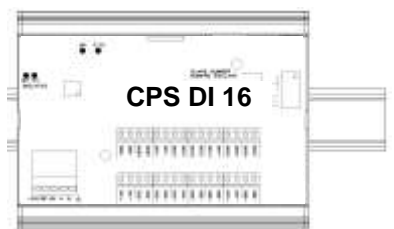
CPS AO4 Analog Output Module

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
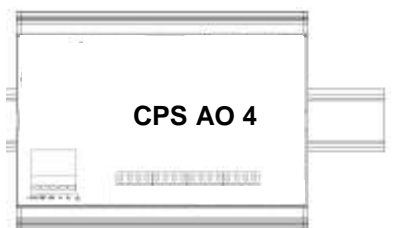
Chapter 8   Annexes

JBUS/MODBUS Protocol

JBUS Transfer Table

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

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

Idem for logic input

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

ADDRESS JBUS	HEXA ADDRESS
1	9C40

Alarm Status of each detector module

ADDRESS JBUS	HEXA ADDRESS	Description		Size
1	0001	Alarm 1 Status of each detector module	line, Module	2 bytes
2	0002			2 bytes
3	0003			2 bytes
4	0004			2 bytes
15	000F			2 bytes
16	0010			2 bytes
17	0011	Alarm 2 Status of each detector module	line, Module	2 bytes
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			

Relays Status (delayed one second)

ADDRESS JBUS	HEXA ADDRESS			Size
97	0061	relays 1-8	relays 9-16	2 bytes
98	0062	relays 17-24	relays 25-32	2 bytes
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		

Module Fault

Addr	Reg		module 1	line fault1	module 2	Fault type for the both modules	
113	0071	**Module Fault**					
113	0071	line fault1	module 1	line fault1	module 2	Fault type for the both modules	2 bytes
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 definitions:
- Bit 0 : Communication
- Bit 1 : Module type L1, M2 / L1, M1
- Bit 2 : Intern module L1, M2 / L1, M1
- Bit 3 : Alim line L1, M2 / L1, M1
- Bit 4 : Starting line L1, M2 / L1, M1
- Bit 5, Bit 6, Bit 7

forced operating

Addr	Reg			
241	00F1	**forced operating**		
241	00F1	relay 1-8	relay 9-16	2 bytes
242	00F2	relay 17-24	relay 25-32	2 bytes
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 definitions (forced operating):
- Bit 0 : relay17 / relay25 / relay9
- Bit 1 : relay18 / relay26 / relay10
- Bit 2 : relay19 / relay27 / relay11
- Bit 3 : relay20 / relay28 / relay12
- Bit 4 : relay21 / relay29 / relay13
- Bit 5 : relay22 / relay30 / relay14
- Bit 6 : relay23 / relay31 / relay15
- Bit 7 : relay24 / relay32 / relay16

Forced stop

Addr	Reg	Description	Description	Size
257	0101	**Forced stop**		
257	0101	relay 1-8	relay 9-16	2 bytes
258	0102	relay 17-24	relay 25-32	2 bytes
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 assignment (example):

Bit					
Bit 0	relay9	relay25	""	""	""
Bit 1	relay10	relay26	""	""	""
Bit 2	relay11	relay27	""	""	""
Bit 3	relay12	relay28	""	""	""
Bit 4	relay13	relay29	""	""	""
Bit 5	relay14	relay30	""	""	""
Bit 6	relay15	relay31	""	""	""
Bit 7	relay16	relay32	""	""	""
Bit 0	relay1	relay17	""	""	""
Bit 1	relay2	relay18	""	""	""
Bit 2	relay3	relay19	""	""	""
Bit 3	relay4	relay20	""	""	""
Bit 4	relay5	relay21	""	""	""
Bit 5	relay6	relay22	""	""	""
Bit 6	relay7	relay23	""	""	""
Bit 7	relay8	relay24	""	""	""

Logic input status

Addr	Reg	Description	Description	Size
273	0111	**Logic input status**		
273	0111	logic input 25 to 32	logic input 17 to 24	2 bytes
274	0112	logic input 9 to 16	logic input 1 to 8	2 bytes
275	0113	logic input 57 to 64	logic input 49 to 56	2 bytes
276	0114	logic input 41 to 48	logic input 33 to 40	2 bytes
277	0115	*if bit = 0 disabled input, if bit = 1 enabled input*		

Bit assignment (example):

Bit				
Bit 0	input 17	input 1	input 49	input 33
Bit 1	input 18	input 2	input 50	input 34
Bit 2	input 19	input 3	input 51	input 35
Bit 3	input 20	input 4	input 52	input 36
Bit 4	input 21	input 5	input 53	input 37
Bit 5	input 22	input 6	input 54	input 38
Bit 6	input 23	input 7	input 55	input 39
Bit 7	input 24	input 8	input 56	input 40
Bit 0	input 25	input 9	input 57	input 41
Bit 1	input 26	input 10	input 58	input 42
Bit 2	input 27	input 11	input 59	input 43
Bit 3	input 28	input 12	input 60	input 44
Bit 4	input 29	input 13	input 61	input 45
Bit 5	input 30	input 14	input 62	input 46
Bit 6	input 31	input 15	input 63	input 47
Bit 7	input 32	input 16	input 64	input 48

dc supply lines and errors

Addr	Reg	Description	Description	Size
277	0115	**dc supply lines and errors**		
277	0115	Alimentation line	Alimentation line error	2 bytes

if bit = 1 line OFF, otherwise line OK
if bit = 1 line problem, otherwise line ON

Bit assignment:

Bit		
Bit 0	line 1	line 1
Bit 1	line 2	line 2
Bit 2	line 3	line 3
Bit 3	line 4	line 4
Bit 4	line 5	line 5
Bit 5	line 6	line 6
Bit 6	line 7	line 7
Bit 7	line 8	line 8

278	0116	Fixed icons (if 1, fixed icon ON)	Word		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
279	0117	Blinking icon (if 1, blinking icon ON)	Word	IDEM	/	Battery / Alimentation	High Speed	Stable signal	Low speed	Alarm 4	Maintenance	Alarm 3	fault	Alarm 2	Buzzer	Alarm 1	Decrease	Alarm Averaged	increase	ok

Access read only

Byte1   Byte2

				4 bytes (32 bits not signed)		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
30001	7531	overscale delay																			
30001	7531	overscale delay	line 1	Module 1	2 bytes	16 bits de poids fort du jong															
30002	7532				2 bytes	16 bits de poids faible du jong															
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																				

Left table

Register	Hex	Description	Line	Module	Type	Value
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					

Right table

Register	Hex	Description	Type	Value / Bit meaning
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		
30809	7859	event N		Bit8-15: Day ; Bit0-7: Month
30809	7859	event N		Bit8-15: Year ; Bit0-7: Hour
30810	785A	event N		Bit8-15: Minute ; Bit0-7: seconds
30811	785B	event N		Module number / event number
30812	785C	event N		Extra Information / Extra Information
30813	785D	event N+1		Bit8-15: Day ; Bit0-7: Month
30814	785E	event N+1		Bit8-15: Year ; Bit0-7: Hour
30815	785F	event N+1		Bit8-15: Minute ; Bit0-7: seconds
30816	7860	event N+1		Module number / event number
30817	7861	event N+1		Extra Information / Extra Information
30818	7862	event N+1		
36807	9FC7	event N+1199		Module number / No event
36808	9FC8	event N+1199		Extra Information / Extra Information
36810	9FCA	Pointer on the last printed text (Module 4)	Word	
36811	9FCB	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

Detector measures — JBUS register map

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

4-20mA Outputs Value (1000 = 1mA) — JBUS register map

JBUS	Register	Description	Output	Type	Size
9D41	40257	4-20mA Outputs Value (1000 = 1mA)			
9D41	40257	Output4-20mA Value	output1	Word	2 bytes (16 bits not signed)
9D42	40258	Output4-20mA Value	Output2	Word	2 bytes (16 bits not signed)
9D43	40259	Output4-20mA Value	output3	Word	2 bytes (16 bits not signed)
9D44	40260	Output4-20mA Value	output4	Word	2 bytes (16 bits not signed)
9D45	40261	Output4-20mA Value	output5	Word	2 bytes (16 bits not signed)
9D46	40262	Output4-20mA Value	output6	Word	2 bytes (16 bits not signed)
9D47	40263	Output4-20mA Value	output7	Word	2 bytes (16 bits not signed)
9D48	40264	Output4-20mA Value	output8	Word	2 bytes (16 bits not signed)
9D49	40265	Output4-20mA Value	output9	Word	2 bytes (16 bits not signed)
9D4A	40266	Output4-20mA Value	output10	Word	2 bytes (16 bits not signed)
9D4B	40267	Output4-20mA Value	output11	Word	2 bytes (16 bits not signed)
9D4C	40268	Output4-20mA Value	output12	Word	2 bytes (16 bits not signed)
...			...		
9E40	40612	Output4-20mA Value	output256	Word	2 bytes (16 bits not signed)
9E41	40613				

Left table

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

Right table

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

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JBUS – Table 1 (Sentence1)

JBUS	Addr	Description	Bits 15–8	Bits 7–0
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 – Table 2 (Sentence2)

JBUS	Addr	Description	Bits 15–8	Bits 7–0
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			

Table 3

JBUS	Addr	Description	Content
41823	A35F	Remoted keyboard	Word
41824	A360	Blank 32bytes	
41855	A37F		

SETTINGS VIA CCMCPS

Byte1 | Byte2

Bit headers (each table): Bit15 Bit14 Bit13 Bit12 Bit11 Bit10 Bit9 Bit8 | Bit7 Bit6 Bit5 Bit4 Bit3 Bit2 Bit1 Bit0

Module list

JBUS addr	Reg	Description	Byte 1	Byte 2
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			

Relay list

JBUS addr	Reg	Description	Size	Byte 1	Byte 2
54609	D551	Relay list		Relay number on the module	
54609	D551	Module number (1byte) and relay function and position (1b) / empty Byte	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
57669	E145	Relay Name /output256 (20byte)	2 bytes	Byte 1 name	Byte 2 name
		…			
57681	E151	HS position / function output4-20mA (1byte) / Empty Byte	2 bytes	HS position	

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

Table 1 — Input list

Address	JBUS	Description	Size	Bit 13	Bit 7	Bit 6
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	E0F	Module number (1 byte) and input number (1b) Input 1 name (20 byte) relay position (1 byte)	2 bytes	Byte1 Name		Byte2 Name
60442	EC1A	Module type (1 byte) Module type (1 byte)	2 bytes	Module Name (1 byte)		Relay position (1 byte)

Table 2 — List units of the modules

Address	JBUS	Description	Bit 16	Bit 7
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	...		

Table 3 — Code of detector gas type

Address	JBUS	Description	Bit 14	Bit 6
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	EC4D	Gas code for type 3 and 4 (2 bytes)	Code type 3	Code Type 4
60496	EC50	Gas code for type 9 and 10 (2 bytes)	Code type 9	Code Type 10
60497	EC51	...		

Table 4 — Instantaneous alarm threshold

Address	JBUS	Description	Size	Bit 12
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)
60606	EC5A	Instantaneous alarm 1 threshold	Type 10	Word	2 bytes (16 bits not signed)
60607	EC5B	Instantaneous alarm 2 threshold	Type 1	Word	2 bytes (16 bits not signed)
60608	EC5C	Instantaneous alarm 2 threshold	Type 2	Word	2 bytes (16 bits not signed)
60609	EC5D	Instantaneous alarm 2 threshold	Type 3	Word	2 bytes (16 bits not signed)
60616	EC64	Instantaneous alarm 2 threshold	Type 10	Word	2 bytes (16 bits not signed)
60636	EC78	Instantaneous alarm 4 threshold	Type 10	Word	2 bytes (16 bits not signed)

JBUS

Address	JBUS	Averaged alarm threshold	Type	Word	Size
80637	EC79	**Averaged alarm threshold**			
80637	EC79	Averaged alarm 1 threshold	Type 1	Word	2 bytes (16 bits not signed)
80638	EC7A	Averaged alarm 1 threshold	Type 2	Word	2 bytes (16 bits not signed)
80639	EC7B	Averaged alarm 1 threshold	Type 3	Word	2 bytes (16 bits not signed)
		...	...		
80646	EC82	Averaged alarm 1 threshold	Type 10	Word	2 bytes (16 bits not signed)
80647	EC83	Averaged alarm 2 threshold	Type 1	Word	2 bytes (16 bits not signed)
80648	EC84	Averaged alarm 2 threshold	Type 2	Word	2 bytes (16 bits not signed)
80649	EC85	Averaged alarm 2 threshold	Type 3	Word	2 bytes (16 bits not signed)
		...	...		
80656	EC8C	Averaged alarm 2 threshold	Type 10	Word	2 bytes (16 bits not signed)
		...	...		
80676	ECA0	Averaged alarm 4 threshold	Type 10	Word	2 bytes (16 bits not signed)

JBUS

Address	JBUS	Fault Alarm Threshold	Type	Word	Size
80677	ECA1	**Fault Alarm Threshold**			
80677	ECA1	Alarm threshold	Type 1	Word	2 bytes (16 bits not signed)
80678	ECA2	Alarm threshold	Type 2	Word	2 bytes (16 bits not signed)
80679	ECA3	Alarm threshold	Type 3	Word	2 bytes (16 bits not signed)
		...	...		
80696	ECAA	Alarm threshold	Type 10	Word	2 bytes (16 bits not signed)

JBUS

Address	JBUS	Overscale Alarm threshold	Type	Word	Size
80687	ECAB	**Overscale Alarm threshold**			
80687	ECAB	alarm value	Type 1	Word	2 bytes (16 bits not signed)
80688	ECAC	alarm value	Type 2	Word	2 bytes (16 bits not signed)
80689	ECAD	alarm value	Type 3	Word	2 bytes (16 bits not signed)
		...	...		
80696	ECB4	alarm value	Type 10	Word	2 bytes (16 bits not signed)

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Table 1

JBUS			Bit 15 ... Bit 0	Word	Type
60697	ECB5	Averaged alarm delay			
60697	ECB5	averaged alarm 1 Delay	2 bytes (16 bits not signed)	Word	Type 1
60698	ECB6	averaged alarm 1 Delay	2 bytes (16 bits not signed)	Word	Type 2
60699	ECB7	averaged alarm 1 Delay	2 bytes (16 bits not signed)	Word	Type 3
		...			...
60606	ECBE	averaged alarm 1 Delay	2 bytes (16 bits not signed)	Word	Type 10
60607	ECBF	averaged alarm 2 Delay	2 bytes (16 bits not signed)	Word	Type 1
60608	ECD0	averaged alarm 2 Delay	2 bytes (16 bits not signed)	Word	Type 2
60609	ECC1	averaged alarm 2 Delay	2 bytes (16 bits not signed)	Word	Type 3
		...			...
60616	ECC8	averaged alarm 2 Delay	2 bytes (16 bits not signed)	Word	Type 10
60636	ECDC	averaged alarm 4 Delay	2 bytes (16 bits not signed)	Word	Type 10

Table 2

JBUS			Bit 15 ... Bit 0	Word	Type
60637	ECD0	Hysteresis Value			
60637	ECDD	Hysteresis	2 bytes (16 bits not signed)	Word	Type 1
60638	ECDE	Hysteresis	2 bytes (16 bits not signed)	Word	Type 2
60639	ECDF	Hysteresis	2 bytes (16 bits not signed)	Word	Type 3
		...			...
60646	ECE6	Hysteresis	2 bytes (16 bits not signed)	Word	Type 10

Table 3

JBUS			Bit 15 ... Bit 0	Word	Type
60647	ECE7	RESERVE COMOPS			
60647	ECE7		2 bytes (16 bits not signed)	Word	Type 1
60648	ECE8		2 bytes (16 bits not signed)	Word	Type 2
60649	ECE9		2 bytes (16 bits not signed)	Word	Type 3
		...			...
60656	ECF0		2 bytes (16 bits not signed)	Word	Type 10

Table 4

JBUS			Bit 15 ... Bit 0		
60657	ECF1	Enable or disable Alarms			
60657	ECF1	Type 1 (1 byte)	...	Type 2 (1 byte)	2 bytes
60658	ECF2	Type 3 (1 byte)	...	Type 4 (1 byte)	2 bytes
60661	ECF5	Type 9 (1 byte)	...	Type 10 (1 byte)	2 bytes

// bit = 1 enable alarm

JBUS — Checking of the type of connected detector

Register	Address	Description	Size	Bit 0–7	Bit 8–15
ECF6	30662	Type 1 (1 byte) / Type 2 (1 byte)	2 bytes	Code detector type 1	Code detector type 2
ECF7	30663	Type 3 (1 byte) / Type 4 (1 byte)	2 bytes	Code detector type 3	Code detector type 4
…	…	…			
ECFA	30666	Type 9 (1 byte) / Type 10 (1 byte)	2 bytes	Code detector type 9	Code detector type 10

JBUS — Gas name

Register	Address	Description	Bit 0–7	Bit 8–15
ECFB	30667	Gas name for type 1 (5 bytes)	Name 1 Byte 1	Nom 1 Byte 2
ECFD	30669	Gas name for type 1 and 2 (5 bytes)	Nom 1 Byte 5	name 2 Byte 1
ECFE	30670	Gas name for type 2 (5 bytes)	name 2 Byte 2	name 2 Byte 3
ECFF	30671	Gas name for type 2 (5 bytes)	name 2 Byte 4	name 2 Byte 5
…	…	…		
ED13	30691	Gas name for type 10 (5 bytes)	name 10 Byte 4	Name 10 Byte 5

JBUS — Gas shortened name

Register	Address	Description	Bit 0–7	Bit 8–15
ED14	30692	Gas name for type 1 (16 bytes)	name 1 Byte 1	Name 1 Byte 2
ED1B	30699	Gas name for type 2 (16 bytes)	Name 2 Byte 1	Name 2 Byte 2
…	…	…		
ED63	30771	Gas name for type 10 (16 bytes)	Name 10 Byte 15	Name 10 Byte 16

JBUS — Display format

Register	Address	Description	Size	Bit 0–7	Bit 8–15
ED64	30772	Type 1 (1 byte) / Type 2 (1 byte)	2 bytes	Display format code type 1	Display format code type 2
ED65	30773	Type 3 (1 byte) / Type 4 (1 byte)	2 bytes	Display format code type 3	Display format code type 4
…	…	…			
ED68	30776	Type 9 (1 byte) / Type 10 (1 byte)	2 bytes	Display format code type 9	Display format code type 10

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

JBUS				Bit 15 ... Bit 0
80787	ED73	Reserve COMOPS		
80787	ED73	Type 1 (1 byte)	Type 2 (1 byte)	2 bytes
80788	ED74	Type 3 (1 byte)	Type 4 (1 byte)	2 bytes
...	...	......		
80791	ED77	Type 9 (1 byte)	Type 10 (1 byte)	2 bytes

JBUS					Bit 15 ... Bit 0
80792	ED78	Alarm Delay			
80792	ED78	Alarm 1 Delay	Type 1	Word	2 bytes (16 bits not signed)
80793	ED79	Alarm 1 Delay	Type 2	Word	2 bytes (16 bits not signed)
80794	ED7A	Alarm 1 Delay	Type 3	Word	2 bytes (16 bits not signed)
		......			
80801	ED81	Alarm 1 Delay	Type 10	Word	2 bytes (16 bits not signed)
80802	ED82	Alarm 1 Delay	Type 1	Word	2 bytes (16 bits not signed)
80803	ED83	Alarm2 Delay	Type 2	Word	2 bytes (16 bits not signed)
80804	ED84	Alarm2 Delay	Type 3	Word	2 bytes (16 bits not signed)
		......			
80811	ED8B	Alarm2 Delay	Type 10	Word	2 bytes (16 bits not signed)
		......			
80831	ED9F	Alarm 4 Delay	Type 10	Word	2 bytes (16 bits not signed)

JBUS					Bit 15 ... Bit 0
80832	EDA0	Detector type Range			
80832	EDA0	Range	Type 1	Word	2 bytes (16 bits not signed)
80833	EDA1	Range	Type 2	Word	2 bytes (16 bits not signed)
80834	EDA2	Range	Type 3	Word	2 bytes (16 bits not signed)
		......			
80841	EDA9	Range	Type 10	Word	2 bytes (16 bits not signed)

CPS – User Manual

Chapter 9 UE Declaration of Conformity

DECLARATION UE DE CONFORMITE
EU Declaration of Conformity

OLDHAM

$C\,\epsilon$

La société **Oldham S.A.S.**, ZI Est 62000 Arras France, atteste que la
Oldham S.A.S. company, *ZI Est 62000 Arras France, declares that the*

Système de mesure CPS –Monitoring system CPS

Incluant la centrale de mesure, les détecteurs de gaz, les modules E/S et relais
Including the controller, the gas detectors, the relays and I/O modules

est conforme aux exigences de:
complies with the requirements of the following Directives:

I) Directive Européenne CEM 2014/30/UE du 26/02/14: Compatibilité Electromagnétique
The European Directive EMC 2014/30/UE dated from 26/02/14: Electromagnetic Compatibility

Normes harmonisées appliquées: **EN 50270**:06 for type 1&2   CEM-Appareils de détection de gaz
Harmonised applied Standards   *EMC-Apparatus for the detection of gases*

II) Directive Européenne DBT 2014/35/UE du 26/02/14: Basse Tension
The European Directive LVD 2014/35/UE dated from 26/02/14: Low Voltage

Normes harmonisées appliquées: **EN 61010-1:10**   Règles de sécurité pour appareils
Harmonised applied Standard   électriques de mesurage
                                                      Safety requirements for electrical
                                                      equipment for measurement

III) Norme de performance métrologique
Metrology Performance Standard

Normes appliquée   **VDI 2053:04, Annex2,**
Applied Standard   Mesure du CO (CO measurement)

Organisme certificateur   △ TÜVRheinland® **(Köln, Germany)**
Certification Body   Precisely Right.

Rapport d'essai   **S274 2007 T1**
Test Report

Arras, le 20/04/2016 (April 20th, 2016)   Michel Spellemaeker

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CERTIFIE   www.oldhamgas.com

UE_CPS_revA

CPS – User Manual

The Fixed Gas Detection Experts

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