EsiWelma®
a Navim Group Company

Sensigas®

EW40 Gas Detection Systems

MED/3.54 (IEC 60092-504) certified

UCE40MPA

UCE40MPA-CPB

Central Units for up to 99 EW40 Peripherals:

UR.40/41.. Gas Detectors and **M..40** I/O Modules

The EW40 system consists of a 16 bit microprocessor based central unit and up to 99 peripherals (remote sensors, relay modules, alarm modules and display modules), communicating each other through a dedicated Bus line.
RS232 and RS422/485 outputs to upper level systems. Internal relay module.
Input and calibration of remote sensor set points and plant parameters directly from the central unit.

Use

The UCE40MPA.. is used for various type of flammable and toxic gas like Methane, LPG, Gasoline Vapours, Carbon Monoxide and many others (check the following list in the relevant gas detector data sheets) in medium and large heating rooms, warehouses, industrial kitchens, car parks and, more in general, in hazard of explosion areas. Three Alarm thresholds (adjustable for each remote sensor): if their values are exceeded, relay outputs switch on and signalling devices (solenoid valves, hooters, blinkers, remote controllers, extractors, etc.) are activated.

Ordering

When ordering only indicate product code: UCE40.. and peripheral codes UR.40.., UR.41..,MAR40, MDD40 and MID40 (please refer to “possible combinations”).

Operation

While in normal operation, the UCE40MPA.. central unit cyclically polls all the peripherals to check their status and to receive information about remote sensor measurements.
A peripheral malfunction is signalled by a fault relay activation, while if one or more thresholds are exceeded, the associated relay module outputs are activated.
Alarm information is also sent to associated display modules.
From the central unit it is possible to setup the following parameters, through a wide display with 6 multi-function buttons:

Logic of Operation

Positive: (delivery condition) normally energized relays (when in alarm condition, they will be de-energized).
Negative: normally de-energized relays (they energize in alarm condition).

The setup logic of operation is effective for all configured relay modules, included the in-built central unit relays (MR0).

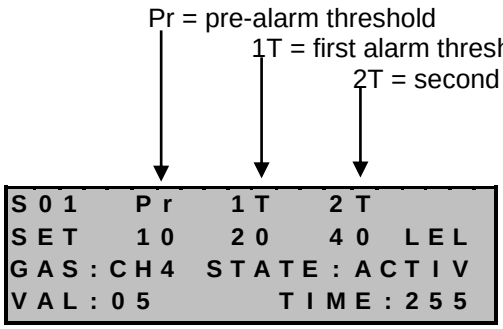
Alarm reset

Manual: (delivery condition) alarm reset requires the action of an operator.
Automatic: alarm reset takes place automatically when the alarm cause has been removed.

Alarm Thresholds

Gas detected	Alarm thresholds	Adjustable span on full scale range	Default setup (Pa, 1T, 2T)
Flammable Gases	3	0…50% LEL (UR.40..) 0..100% LEL (UR.41..)	10, 20, 40
Carbon Monoxide	3	0…500ppm	50, 100, 200 ppm
Carbon Dioxide	3	0…20.000ppm (*)	2000, 4000, 8000 ppm
Oxygen (defect)	3	0…30% v/v	19, 17, 15% v/v
Oxygen (excess)	3	0…30% v/v	22, 23, 24 % v/v

(*) other full-scale range on request

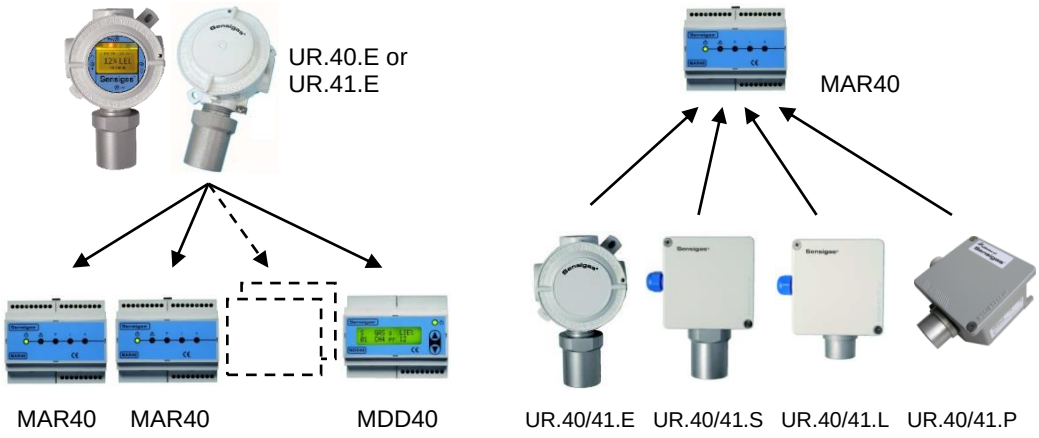


LEL = Low Explosive Limit
ppm = parts per million
v/v = percentage in volume

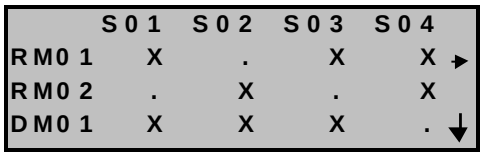
Example of setup page for sensor 1 (Methane) with the 3 alarm thresholds

Assignments

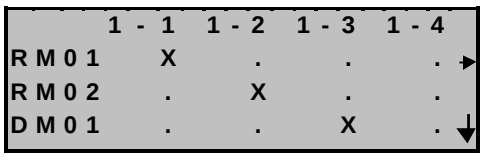
Each sensor can be associated (that is can activate) with one or more relay modules or display modules and, at the same time, a relay or display module can be associated with more sensors, even of different type.



In the similar way, each digital input of the alarm module can be associated with one or more relay modules or display modules and, at the same time, a relay or display module can be associated with more alarm modules.



Example of sensor assignments table
(X = associated ; . = not associated)
Relay Module 1 associated to Sensors 1, 3 & 4
Relay Module 2 associated to Sensors 2 & 4
Display Module 1 associated to Sensors 1, 2 & 3



Example of alarm module (AM) assignments table
(X = associated ; . = not associated)
RM 1 associated to Digital Input 1 of AM 1
RM 2 associated to Digital Input 2 of AM 1
DM 1 associated to Digital Input 3 of AM 1

Notes:
Each Digital Input of the Alarm Modules could be configurate to generates a pre-alarm, a first threshold alarm or a second threshold alarm.
In addition, each Digital Input of the Alarm Modules could be configurate to trigger a pulse or continuous voltage free contact.

Activation / deactivation of a peripheral

Each peripheral can be deactivated separately.
Deactivation prevents the peripheral direct action on the plant:

- Deactivated sensor: in case of gas detection does not send alarm commands to associated relay and display modules, (gas concentration value, and residual life time are available).
- Deactivated alarm module: in case of alarms does not send alarm commands to associated relay and display modules, (the states of digital inputs are available).
- Deactivated relay or display module: in case of alarm signal from an associated sensor they do not activate.

```
S01   Pr   1T   2T
SET   10   20   40  LEL
GAS:CH4  STATE:DEACT
VAL:05       TIME:255
```

Example of deactivated S01 Sensor

State of installation

From the central unit it is possible to display other important data such as the list of all configured peripherals and their operational status. It is a read only table.

```
      QT  Pr  1T  2T  FA
CH4    3  --  --   2  --
CO     1  --   1  --  --
RM     1   1   1   1  --
DM     1                 --
AM     1   2   1   1  --
```

In the example above we have:

- N. 3 URG40/41.. Methane gas detectors (two in 2nd Alarm Threshold)
- N. 1 URO40/41.. Carbon Monoxide detector (in 1st Alarm Threshold)
- N. 1 MAR40 Relay Module (see below explication)
- N. 1 MDD40 Display Module (see below explication)
- N. 1 MID40 Alarm Module having:
  - N.2 input in alarm preset as Pre-Alarm condition
  - N.1 input in alarm preset as 1st Alarm condition
  - N.1 input in alarm preset as 2nd Alarm condition.

The Output Peripherals as the Relay Module and Display Module are associated to all Input Peripherals (Gas Detectors and Alarm Module) so, all they outputs (relays and display), are setting up.

Lifetime of a sensor

For each sensor it is possible to know residual lifetime after which it needs to be replaced. It is a read only value.

```
S01   Pr   1T   2T
SET   10   20   40  LEL
GAS:CH4  STATE:ACTIV
VAL:05       TIME:125
```

Example of residual lifetime of a sensor:

In this case, 125 weeks to expiry time.

List of expired sensors

All expired sensors are added to a special, easily readable log.

```
EXPIRED SENSOR LIST
S03  -012  WEEKS
S01  -009  WEEKS
S07  -002  WEEKS
```

Example of sensor expired table:

Respectively from 12, 9 and 2 weeks.

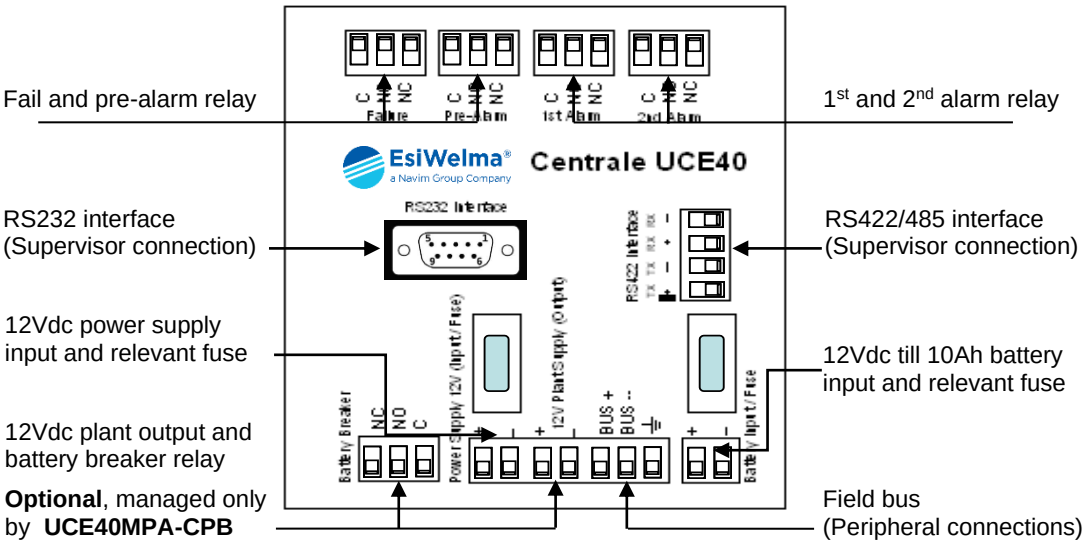
As you can see, the first sensor in the list is the sensor expired for more time.

Housing

The central unit is included in a self-extinguishing ABS plastic housing with key locked transparent door, for display and keys protection. For front panel mounting.

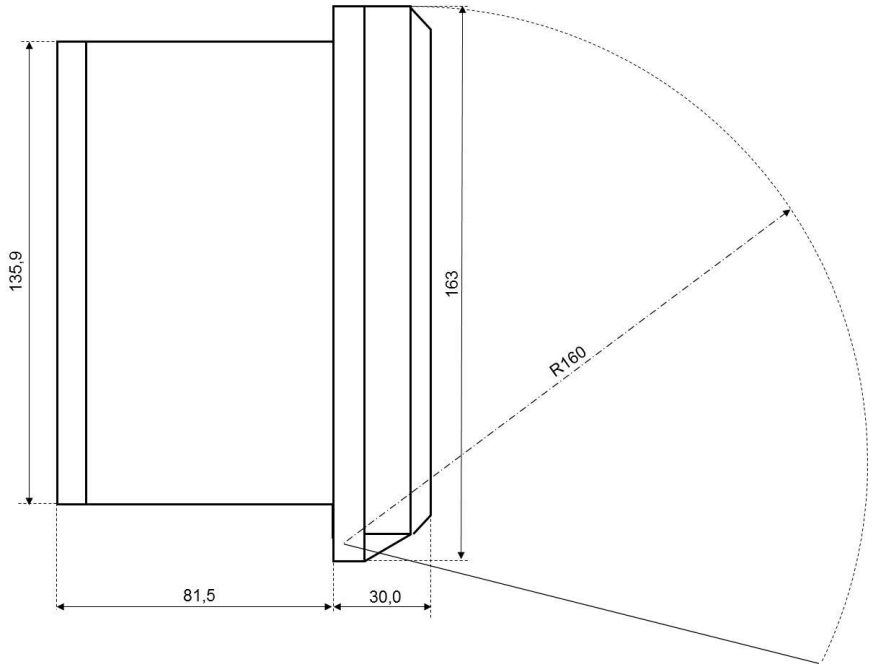
Front panel

Back panel



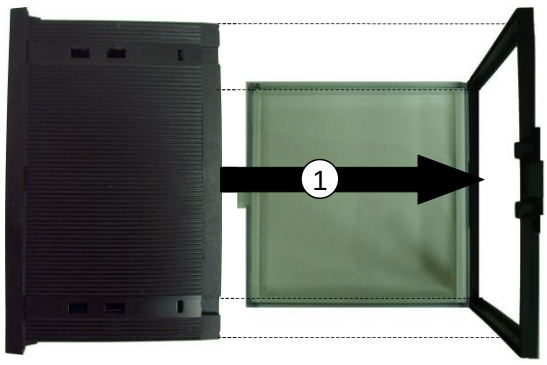
Overall Dimensions and Weight

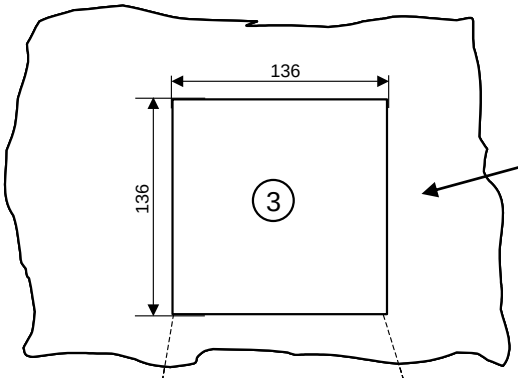
Max 171X155X123mm / 920g. with cover frame installed / 1Kg. with cover and CPB option



Mechanical installation sequences

1. Fit the device into the cover frame
2. position the cover frame
3. knock out a 136 x136 mm opening in the front panel of the electric board
4. insert the control unit into the knock-out and push it from the outside towards the inside until it fits into position
5. Insert the clamps into the dedicated slots on the sides of the device
6. push the clamps towards the back of the housing until they fit into the dedicated hooks on the side of the housing
7. tighten the screws to secure the external frame of the cover to the front panel of the electric board.

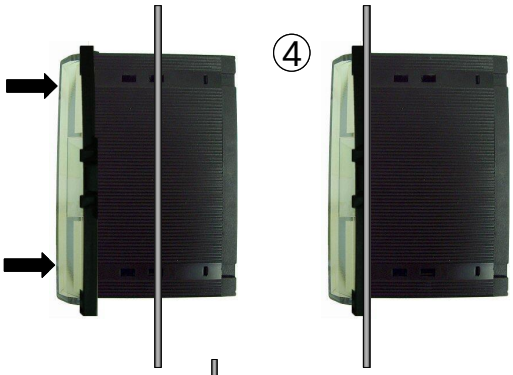


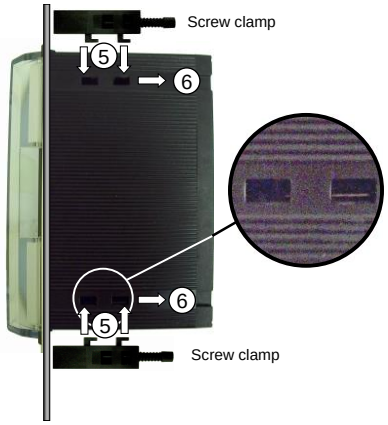


Notes:

136 x 136mm is the hole to make in the front panel

The standard dimension of central unit is 144 x 144mm.





Wirings

Power supply:

- Power cables can be placed together with other cables of an existing plant be sure that they are not high frequency lines.
- 12Vdc power cables must be sized taking into account total power consumption by peripherals and auxiliary devices (valves, lamps, hooters, etc).
- If built-in 12Vdc power supply is used, do not exceed 30W power load.

Cable sizing

Power cable cross section should be calculated considering the total power consumption of all electric loads and peripherals in the plant (typical).

DEVICE	POWER (W)
UCE40MPA..	6
MAR40	2.5
MDD40	2.5
MID40	1
12V 7Ah battery	7
Solenoid valve	12
Visual alarm	2
Audible alarm	4

DETECTORS	POWER (W)
Flammable Gases	1.6
Carbon Monoxide	0.7
Carbon Dioxide	1.6
Oxygen	0.7

BUS cable

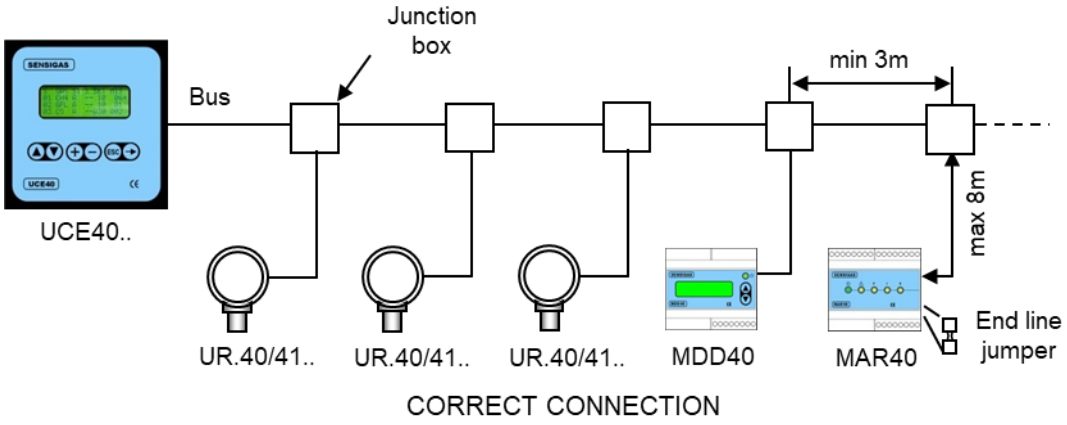
- BUS cables should be placed in a dedicated housing, or in a metal double groove housing, adequately far from power cables and high frequency lines.
- Maximum length cannot exceed **1000m.**
- Derivation length should be as short as possible and, in any case, no longer than 8m
- Junction point (terminal box) must be placed at least 3m from previous and next one.
- The BUS cable shield must be grounded (or in alternative connected to 12Vdc power negative). Ground connection is to be made only to one cable end (preferably close to Central Unit).
- BUS connection line should be unique and peripherals are to be connected to it. No braches are allowed.
- On the last peripheral, and only on it, is to be closed the BUS end of line jumper.
- BUS connections are to be carried out with a shielded twisted pair with features equivalent to BELDEN cables type 9841 or 3105A

Bus cable characteristics

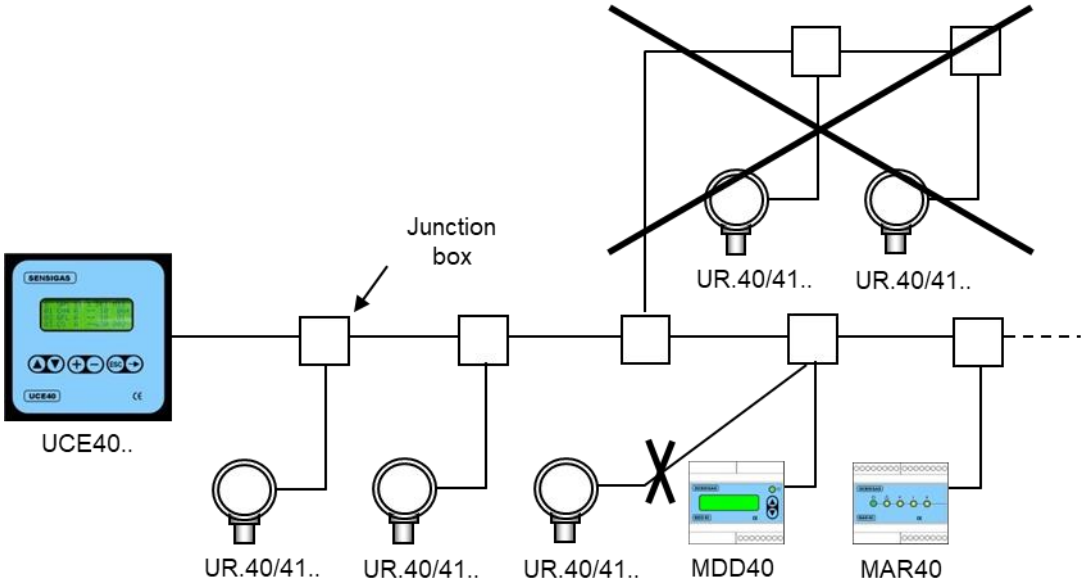
TYPE	N° OF PAIRS	DC RESISTANCE		NOMINAL IMPEDANCE Ω	NOMINAL CAPACITY		AWG
		LEADS Ω/Km	SHIELD Ω/Km		BETWEEN LEADS pF/m	LEAD SHIELD pF/m	
BELDEN 9841	1	78.7	11.0	120	42.0	75.5	24
BELDEN 3105A	1	48.2	9.5	120	36.1	65.5	22

BELDEN type 9841 or 3105A

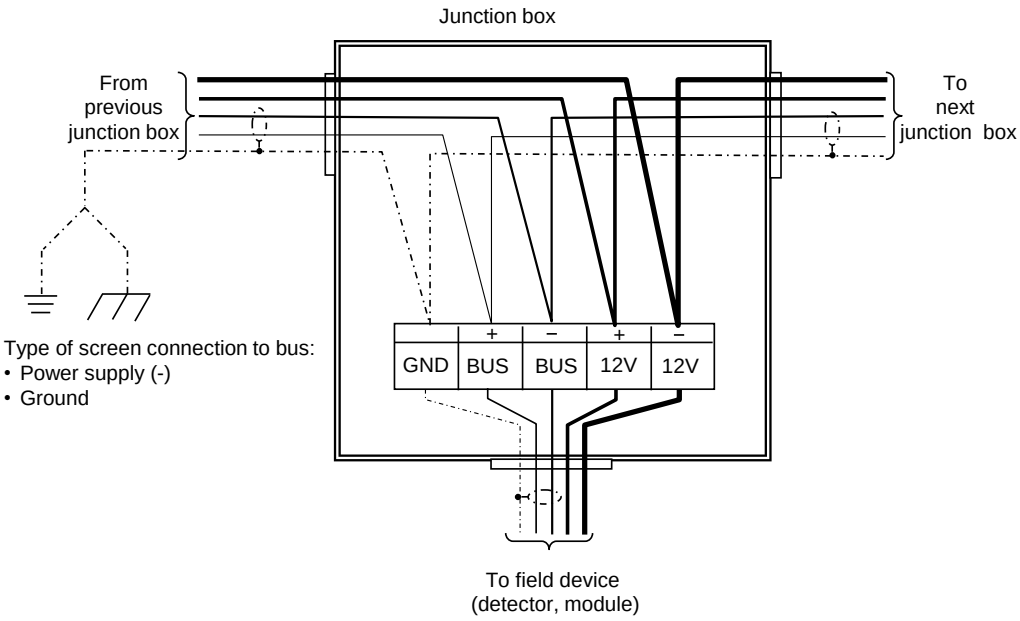
Connection examples



CORRECT CONNECTION



INCORRECT CONNECTION

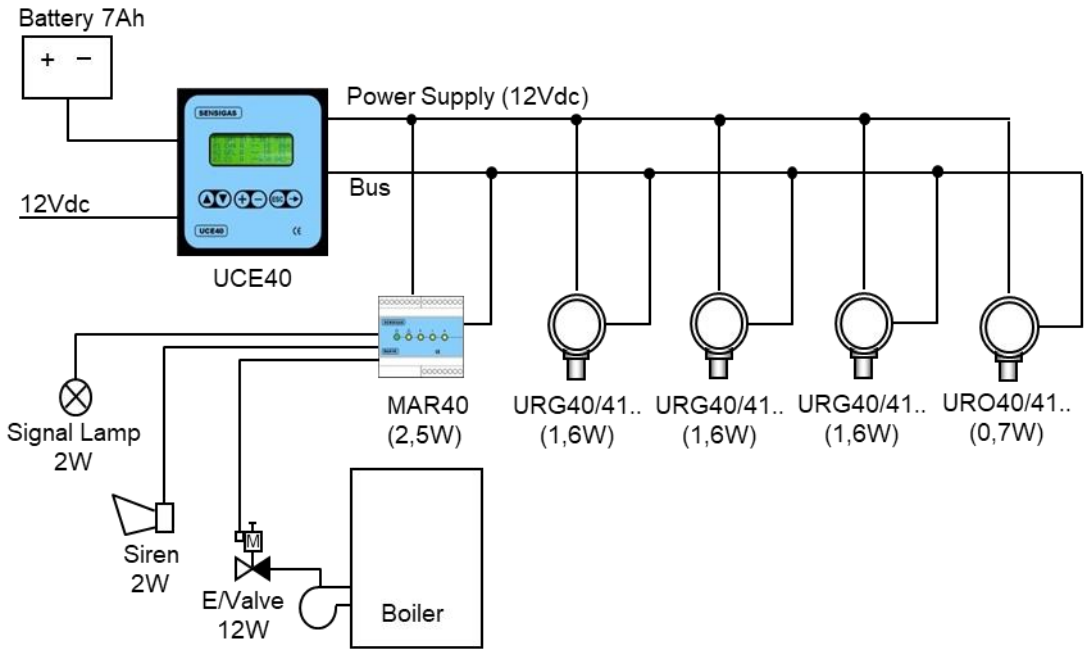


Type of screen connection to bus:
- Power supply (-)
- Ground

Plant Structures

Basic structure example:

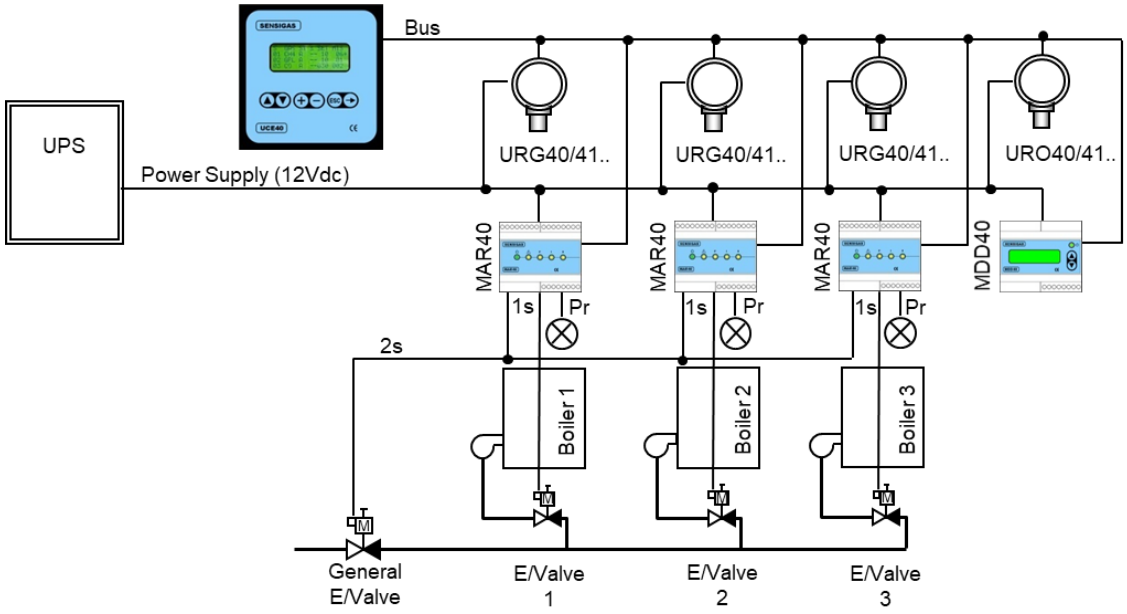
Three methane gas detectors, one carbon monoxide detector, one relay module, one audible alarm, one gas shut-off valve and one visual alarm.



Extended structure example:

When the devices exceed the power that can be managed by the control unit (30±1W) an external uninterruptible power supply (UPS) is necessary.

The example below represents a system with three boilers, each one fitted with a gas cut-off solenoid valve.
In this example one methane gas detector (URG40SS) is installed near each boiler and one carbon monoxide detector (URO40SS) covers the whole premises. A display module is placed at the entrance to monitor the system status without having to use the control unit.
Each methane gas detector is interfaced with a relay module that powers a local audible alert in the event of pre-alarm, in alarm threshold one it shuts off the boiler solenoid valve and in alarm threshold two it shuts off the general gas solenoid valve.



Detectors range

Application	Protection mode	Part number	
MED Certified (aboard ships) ATEX Classified (hazardous) areas (ATEX + MED certification required)	Group II Category 2G Ex d IIC T6 Gb certified EN60079-29-1 certified (UR.41.E) T_{AMB}: -20°C +50°C T_{AMB}: -40°C +70°C (Ext. Range)	UR.40.**E** UR.41.**E**	
	Group II Category 3G Ex nA IIC T6 Gb certified EN60079-29-1 conformity (UR.41.S) T_{AMB}: -20°C +50°C T_{AMB}: -40°C +70°C (Ext. Range)	UR.40.**S** UR.41.**S**	
MED Certified (aboard ships) ATEX unclassified areas (non-hazardous) (ATEX certification not required)	Heavy-duty applications Construction conforming to Ex d and EN60079-29-1 (UR.41.I) requirements IP65 T_{AMB}: -20°C +50°C T_{AMB}: -40°C +70°C (Ext. Range)	UR.40.**I** UR.41.**I**	
	Standard applications Construction conforming to Ex nA and EN60079-29-1 (UR.41.L) requirements IP55 T_{AMB}: -20°C +50°C T_{AMB}: -40°C +70°C (Ext. Range)	UR.40.**L** UR.41.**L**	
Unclassified (non-hazardous) areas (ATEX certification not required)	Car Parks applications Construction conforming to Ex nA and EN60079-29-1 (UR.41.P) requirements IP55 / T_{AMB}: -20°C +50°C	UR.40**SP** UR.41.**P**	

Detectors code key

Each model execution (except for car parks) has two possible kind of sensor:

- with Standard sensor (code S: UR.40**S**.; UR.41**S**.)
- with Professional sensor (code P: UR.40**P**.; UR.41**P**.)

Two types of sensors are commonly used for the gases that most frequently require detection (methane, LPG, gasoline vapours, carbon monoxide etc.): catalytic (Pellistor) and electrochemical cell. In both cases, the Professional execution is differentiated from the Standard execution by the use of sensors that are based on the same operating principle as the others but that over time have more measurement stability and higher poison resistance to interfering gases.

As you can see in the table below, the part number includes several fields for rapid identification in order to facilitate the choice of the detector according to the technical features described above:

Example:

URB41SS

Gasoline Vapour Detector

ATEX Ex nA IIC T6 Gb + MED/3.54 Certified

IP55 protection degree

Commissioning

Commissioning requires only few and simple operations that can be carried out by any skilled technician. It does not require any additional tools or software. Read carefully and follow the instruction written in the manual in order to avoid any installation problem and to obtain the best system performances.
From Central Unit it is possible to manually activate each relay of the remote module to check the correct operation of all devices connected to it (hooters, solenoid valves, extractors, etc.).
For any operation on the Central Unit please refer to relevant User's Manual.

Environmental compatibility and disposal

This product was developed and manufactured using materials and processes which take full account of environmental issues and which comply with our environmental standards.
Please note the following for disposal at the end of the product life, or in the event of its replacement:

- For disposal, this product is defined as waste from electrical and electronic equipment ("electronic waste"); do not dispose of it as household waste. This applies particularly to the PCB assembly.
- Always use the most environmentally compatible method of disposal, in line with the state-of-the-art technology in environmental protection, recycling, and waste management.

Observe all current local laws and regulations.

- Always aim for maximum re-use of the basic materials at minimum environmental stress. Observe any notes on materials and disposal that may be attached to individual components.
- Use local depots and waste management companies, or refer to your supplier or manufacturer to return used products or to obtain further information on environmental compatibility and waste disposal.

Mounting and installation hints

The installation of a gas leakage detection system does not exempt from the compliance to the safety rules and to all the laws in force concerning the installation and use of gas operating devices, for the ventilation of the room and for the discharge of flue gases. The installation, the periodic inspections or the substitution of the devices must be done by a qualified technician.

Mounting of UCE40MPA Central Unit must to be carried out in accordance with local regulations for electrical equipment installation. Moreover:

- it should be mounted in an easily accessible position to allow data read/write and operation check.
- the installation place, a room or a control panel, has to meet required environmental conditions (see technical data).
- wiring for both power and BUS should run in dedicated housings and in any case far from electromagnetic noises (high voltage, switching power supplies, VSD, etc.) see also "wiring".

For Gas Detectors and I/O modules mounting please refer to relevant datasheet.

Maintenance

In order to facilitate system maintenance Central Unit has the following dedicated commands:

New central unit — In case of Central Unit replacement allows to keep all plant settings and configurations, and to transfer them in the new Central Unit.

Replace peripheral — Allows to replace a peripheral assigning data and setup of the old peripheral.

Add peripheral — Allows to add one or more peripherals of any type to expanding an already configured and running plant.

Replace peripheral — Use before removing any peripheral from the plant.

Technical data

Power supply	
Basic structure	10…14Vdc / 30W max
Extended structure	10…14Vdc
Power consumption	6VA (13W with battery completely discharged)
Environmental conditions	
Transportation	Temperature -20°C... +70°C Humidity < 90% R.H.
Operation	Temperature -20...+55°C Humidity < 90% R.H., non condensing
Protection degree	IP40 (IP54 with cover frame installed)
Relay outputs	Built-in Relay Module (MR0), always associated with all the plant peripherals, with 4 relays: - Pre-alarm relay - 1st alarm threshold relay - 2nd alarm threshold relay - Fault relay SPDT voltage free contact 250Vac 8(5)A
Operation logic	Positive (factory preset): normally energized relays Negative (selectable): normally de-energized relays
Alarm reset	Manual (factory preset) Automatic (selectable)
Backup battery	12V / 7..10Ah (not supplied)
Built-in battery charger (optional, only for **UCE40MPA-CPB**)	13.8Vdc / 0.6A max • Battery saving function aimed at disconnecting power from the field devices connected directly by the control unit when the battery is almost completely discharged • Low battery relay, with free voltage contact of 250Vac 8(5)A accessible from terminal board.
Field BUS	CAN BUS with dedicated communications protocol
Max BUS length	1000m
Peripherals on BUS	Max 99 (Detectors and Relay modules)
Display mod. on BUS	Max 16
Alarm module on BUS	Max 10
Supervisor BUS	Communication protocol Standard ModBus® (ASCII or RTU)
Physical Layers	RS232 Standard port for point-to-point connections, to a maximum distance of 10 meters RS422/485 Standard port for multidrop connections, to a maximum distance of 300 meters and a maximum number of 64 central units.
Comm's speed	Settable from 9.600…38.400Baud
Comm's details	See dedicated specifications
User Interface	Backlit alphanumerical display 4 lines x 20 characters 6 soft-touch multifunction keys

CE Conformity — 0474 / xxxx (manufacturing year)
CERTIFICATE n. MED327120CS

MED Directive / Standards	MED 2014/90/EU / IEC 60092-504
EMC Directive / Standards	EMC 2014/30/EU / EN50270 / EN 61326-1
LVD Directive / Standards	LV 2014/35/EU / EN60730-1
Product Standard	EN60079-29-1

Routine checks

To be filled by Installer / Service Personnel	*Signature*

Notes

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Due to our policy of continuous product improvement, specifications are subject to change without notice.