



G015506

System: CGD50/500, CGS50/500

# Gas detector **ST650 EX**

Part no. See ordering table

## General description

- Combustible gas detector
- ATEX / IECEx approved
- Graphic display
- Touch screen experience, control without additional tools
- Self-diagnostics
- Reliable sensor technology
- Splashguard included

The ST650 EX is an all-round gas detector that functions well under the most difficult circumstances. The sensor is available in various versions, such as a catalytic flammable gas sensor, Infrared (NDIR) and a Thermal Conductivity sensor (TCD). The sensor has a long life-span, which achieves an optimal cost of ownership.

The ST650 EX is available with or without a graphic display. The graphic display shows the measured value and various status notifications locally. The capacitive key control gives you an experience similar to a touchscreen and does not require any additional tools, such as magnetic wands for instance. The user menu is secured with a password; unauthorized users cannot access the gas detector. The control of the user/calibration menu does not require additional tools. Simple, easy, and user-friendly!

The user menu provides different features, such as a zero and span calibration, adjusting alarm set points (local alarm indication through notifications on the display and bright colored LED), showing set points, diagnostic information and simulation of the output signal (4–20 mA) for loop testing.

## Remote applications

A remote application allows the user to mount the sensor separately from the transmitter. Remote sensors are ideal for applications where the gases present ascend, i.e., gases lighter than air. Detection areas located high above ground make it difficult to reach the detector for maintenance etc. When using a remote sensor, the sensor itself will be mounted in a high location, and the transmitter will be mounted within close reach. This makes maintenance quick and easy, and therefore cost-effective. Cable lengths up to 150 meters are supported between the transmitter and the sensor (depending on the type).

## Applications

- Chemical industry
- Refineries
- Wastewater plants
- Boiler rooms
- Marine
- Storage of packed dangerous substances
- Food industry

**Data**

|                       |                                                                                                                                                                                 |                            |                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------|
|                       |                                                                                                                                                                                 |                            | NDIR, MPS: 5-95% RH (non-condensing)                                                                              |
|                       |                                                                                                                                                                                 |                            | NDIR, acc. EN 60079-29-1: 15-95% RH (non-condensing)                                                              |
| Gas type              | Combustible gases and vapours                                                                                                                                                   | Pressure range             | Catalytic: 700 to 1300 hPa                                                                                        |
| Calibration           | Standard: Methane                                                                                                                                                               |                            | NDIR, TCD, MPS: 800 to 1200 hPa                                                                                   |
|                       | Also available for Propane, Butane, Hydrogen, Methanol, Ethanol, Kerosene, Gasoline, Toluene, Hexane, Ammonia, Acetic acid, and more (calibration to be specified when ordered) | Enclosure                  | NDIR, acc. EN 60079-29-1: 800 to 1100 hPa                                                                         |
| Sensor type           | Catalytic bead sensor                                                                                                                                                           | Dimensions (H × W × D)     | Aluminium with coating, optional SS                                                                               |
|                       | Infrared (NDIR)                                                                                                                                                                 | Weight                     | 179 × 189 × 107 mm                                                                                                |
|                       | Thermal conductivity sensor (TCD)                                                                                                                                               |                            | 1.5 kg ± 5% (Al)                                                                                                  |
| Range                 | 0-100 %LEL, 0-10 %LEL, 0-100 Vol.% (depending on gas type, sensor type, and calibration)                                                                                        | Enclosure gas sensor       | 2.6 kg ± 5% (SS)                                                                                                  |
|                       |                                                                                                                                                                                 | Specific conditions of use | SS 316                                                                                                            |
|                       |                                                                                                                                                                                 | Certification              | Refer to ATEX certificate                                                                                         |
| Display (optional)    | Digital graphic display with backlight                                                                                                                                          |                            |  0344                          |
| Status LED            | Green: OK                                                                                                                                                                       |                            | ATEX -  (Directive 2014/34/EU) |
|                       | Red: Alarm                                                                                                                                                                      |                            | Electromagnetic Compatibility (Directive 2014/30/EU)                                                              |
|                       | Yellow: System failure                                                                                                                                                          | ATEX approvals             | Compact/remote:                                                                                                   |
| Power supply          | 18-30 V DC (max. 120 mA)                                                                                                                                                        |                            | II 2G Ex d IIC T6 Gb                                                                                              |
| Outputs               | 4-20 mA, RS485 Modbus RTU (half-duplex)                                                                                                                                         |                            | II 2D Ex tb IIIC T85°C Db                                                                                         |
|                       | 2 mA system failure, >20 mA over range                                                                                                                                          |                            | Remote HT:                                                                                                        |
| Signal cable          | 3-wire shielded, 0.75 - 2.5 mm <sup>2</sup>                                                                                                                                     |                            | II 2G Ex d IIC T3 Gb                                                                                              |
|                       |                                                                                                                                                                                 | IECEx approvals            | II 2D Ex tb IIIC T200°C Db                                                                                        |
| Cable gland           | Aluminium housing: Brass / SS housing SS (thread M20x1.5)                                                                                                                       |                            | Compact/remote:                                                                                                   |
|                       |                                                                                                                                                                                 |                            | Ex d IIC T6 Gb                                                                                                    |
| Cable dimension       | Ø max. 16 mm (incl. shielding)                                                                                                                                                  |                            | Ex tb IIIC T85°C Db                                                                                               |
| Load impedance        | Max. 400 Ω at 24 V DC                                                                                                                                                           |                            | Remote HT:                                                                                                        |
| Operating temperature | Standard: -20 °C to +60 °C                                                                                                                                                      |                            | Ex d IIC T3 Gb                                                                                                    |
|                       | Catalytic remote HT: -20 °C to +120 °C                                                                                                                                          |                            | Ex tb IIIC T200°C Db                                                                                              |
|                       | NDIR acc. EN 60079-29-1: -20 °C to +50 °C                                                                                                                                       |                            |                                                                                                                   |
| Ingress protection    | Enclosure: IP66 <sup>a</sup>                                                                                                                                                    |                            |                                                                                                                   |
|                       | Sensor: IP6X                                                                                                                                                                    |                            |                                                                                                                   |
| Relative humidity     | Catalytic, TCD: 15-95% RH (non-condensing)                                                                                                                                      |                            |                                                                                                                   |

**NOTE**

More information can be found in the sensor datasheets.

<sup>a</sup>.IP ratings do not imply that the equipment will detect gas during and after exposure to those conditions.

## Ordering Information - Gas Detectors

### Standard

| Sensor type | Range                        | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|------------------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-100% LEL CH <sub>4</sub> * | Aluminium | 5150151-00A | 5150155-00A | 5150153-00A | 5150157-00A  |
|             |                              | SS 316    | 5150152-00A | 5150156-00A | 5150154-00A | 5150158-00A  |

### High Temp.

| Sensor type | Range                        | Version   | Standard | Remote      | LCD | LCD + Remote |
|-------------|------------------------------|-----------|----------|-------------|-----|--------------|
| Catalytic   | 0-100% LEL CH <sub>4</sub> * | Aluminium | N/A      | 5150159-00A | N/A | 5150161-00A  |
|             |                              | SS 316    | N/A      | 5150160-00A | N/A | 5150162-00A  |

### Vapours

| Sensor type | Range                                                        | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|--------------------------------------------------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-100% LEL VCM <sup>®</sup> C <sub>2</sub> H <sub>3</sub> Cl | Aluminium | 5150163-00A | 5150167-00A | 5150165-00A | 5150169-00A  |
|             |                                                              | SS 316    | 5150164-00A | 5150168-00A | 5150166-00A | 5150170-00A  |

### Kerosene

| Sensor type | Range               | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|---------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-100% LEL Kerosene | Aluminium | 5150179-00A | 5150183-00A | 5101183-00A | 5150185-00A  |
|             |                     | SS 316    | 5150180-00A | 5150184-00A | 5101184-00A | 5150186-00A  |

### Gasoline/Petrol

| Sensor type | Range                        | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|------------------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-100% LEL Gasoline / Petrol | Aluminium | 5150187-00A | 5150191-00A | 5150189-00A | 5150193-00A  |
|             |                              | SS 316    | 5150188-00A | 5150192-00A | 5150190-00A | 5150194-00A  |

### Diesel

| Sensor type | Range             | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|-------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-100% LEL Diesel | Aluminium | 5150195-00A | 5150199-00A | 5150197-00A | 5150201-00A  |
|             |                   | SS 316    | 5150196-00A | 5150200-00A | 5150198-00A | 5150202-00A  |

### Ammonia

| Sensor type | Range                     | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|---------------------------|-----------|-------------|-------------|-------------|--------------|
| Catalytic   | 0-10% LEL NH <sub>3</sub> | Aluminium | 5150171-00A | 5150175-00A | 5150173-00A | 5150177-00A  |
|             |                           | SS 316    | 5150172-00A | 5150176-00A | 5150174-00A | 5150178-00A  |

### Methane TCD

| Sensor type | Range                      | Version   | Standard    | Remote | LCD         | LCD + Remote |
|-------------|----------------------------|-----------|-------------|--------|-------------|--------------|
| TCD         | 0-100%Vol% CH <sub>4</sub> | Aluminium | 5150203-00A | N/A    | 5150205-00A | N/A          |
|             |                            | SS 316    | 5150204-00A | N/A    | 5150206-00A | N/A          |

The specifications described herein are subject to change without notice.

Data sheet no. See ordering table\_ST650 EX\_M\_EN\_3.0

## Methane NDIR

| Sensor type | Range                     | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|---------------------------|-----------|-------------|-------------|-------------|--------------|
| NDIR        | 0-100% LELCH <sub>4</sub> | Aluminium | 5150207-00A | 5150211-00A | 5150209-00A | 5150213-00A  |
|             |                           | SS 316    | 5150208-00A | 5150212-00A | 5150210-00A | 5150214-00A  |

## Propane NDIR

| Sensor type | Range                                    | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|------------------------------------------|-----------|-------------|-------------|-------------|--------------|
| NDIR        | 0-100% LEL C <sub>3</sub> H <sub>8</sub> | Aluminium | 5150215-00A | 5150219-00A | 5150217-00A | 5150221-00A  |
|             |                                          | SS 316    | 5150216-00A | 5150220-00A | 5150218-00A | 5150222-00A  |

## Methanol NDIR

| Sensor type | Range      | Version   | Standard    | Remote      | LCD         | LCD + Remote |
|-------------|------------|-----------|-------------|-------------|-------------|--------------|
| NDIR        | 0-100% LEL | Aluminium | 5150152-00A | 5150156-00A | 5150154-00A | 5150158-00A  |
|             |            | SS 316    | 5150153-00A | 5150157-00A | 5150155-00A | 5150159-00A  |

True LEL MPS<sup>2</sup>

| Sensor type      | Range      | Version   | Standard | Remote | LCD         | LCD + Remote |
|------------------|------------|-----------|----------|--------|-------------|--------------|
| MPS <sup>2</sup> | 0-100% LEL | Aluminium | N/A      | N/A    | 5101183-00A | 5101728-00A  |
|                  |            | SS 316    | N/A      | N/A    | 5101184-00A | 5101729-00A  |

\*) Standard calibration. Other calibrations to be specified when ordered.

\*\*) VCM (vinyl chloride monomer) is a pellistor inhibitor that can shorten sensor lifespan and cause measurement drift. The ST650EX-CAT C3H8 0–100 % LEL detector can be calibrated with propane.

2) Calibrated with Methane, True LEL for: Butane, Ethane, Hydrogen, Isobutane, Isobutylene, Isopropanol, Methyl ethyl ketone, Octane, Pentane, Propane, Propylene, Toluene, Xylene.

**NOTE**

Special care should be taken when selecting sensors for certain environments. If you are uncertain, consult your local Consilium representative.



Standard

With LCD

Remote with LCD

| Differences in sensor types                 | Catalytic      | TCD             | NDIR           | MPS            |
|---------------------------------------------|----------------|-----------------|----------------|----------------|
| Measuring range                             | up to 100% LEL | up to 100 Vol.% | up to 100% LEL | up to 100% LEL |
| Resistance to silicone poisoning            | no             | limited         | yes            | yes            |
| Detects hydrogen                            | up to 100% LEL | up to 100 Vol.% | no             | yes            |
| Affected by hazardous chemical environments | yes            | limited         | no             | no             |
| Detection in anaerobic/inert conditions     | no             | yes             | yes            | no             |
| No sensor burn-out at high concentrations   | no             | yes             | yes            | yes            |
| Sensor lifetime                             | 3 years        | 3 years         | 4–6 years      | 5 years        |

| Accessories            |             |                                                                                                 |
|------------------------|-------------|-------------------------------------------------------------------------------------------------|
| Type                   | Part no.    | Description                                                                                     |
| Splash guard           | 5150227-00A | Sensor protection against splash water                                                          |
| Inline flow adapter    | 5150228-00A | Inline flow adapter for sample applications, connection 2×6mm, SS                               |
| Protective hood        | 5150226-00A | Protective hood SS, for optimal protection in “wet” protection areas, dimensions 315×300×138 mm |
| Isolation set EMC/RFI  | 5150231-00A | Isolation board, 160×160 mm                                                                     |
| Protective bracket     | 5150225-00A | SS bracket, extra protection for use in warehouses                                              |
| Conical collector hood | 5150230-00A | Conical hood for ascending gases                                                                |

| Spare parts / consumables |             |                                          |                                                                             |
|---------------------------|-------------|------------------------------------------|-----------------------------------------------------------------------------|
| Spare gas sensor          | Part no.    | Range                                    | Description                                                                 |
| ST650 EX, Sensor          | 5150240-00A | 0-100% LEL CH <sub>4</sub>               | Gas sensor for standard applications                                        |
| ST650 EX, Sensor          | 5150247-00A | 0-100% LEL CH <sub>4</sub>               | High temperature, applications up to 120 °C ambient temperature             |
| ST650 EX, Sensor          | 5150241-00A | 0-100% LEL                               | Gas sensor for combustible vapours containing halogens                      |
| ST650 EX, Sensor          | 5150242-00A | 0-100% LEL Gasoline                      | Kerosene and Gasoline applications, range 0-100% LEL                        |
|                           |             | 0-100% LEL Kerosene                      | Ammonia applications, range 0-10% LEL                                       |
|                           |             | 0-10% LEL NH <sub>3</sub>                |                                                                             |
| ST650 EX, Sensor          | 5150243-00A | 0-100 Vol.% CH <sub>4</sub>              | Thermal Conductivity sensor, measurements up to 0-100 Vol.% CH <sub>4</sub> |
| ST650 EX, Sensor          | 5150245-00A | 0-100% LEL CH <sub>4</sub>               | Infrared sensor (NDIR), Methane                                             |
| ST650 EX, Sensor          | 5150246-00A | 0-100% LEL C <sub>3</sub> H <sub>8</sub> | Infrared sensor (NDIR), Propane                                             |
| ST650 EX, Sensor          | 5101730-00A | 0-100% LEL                               | MPS True LEL <sup>3</sup>                                                   |

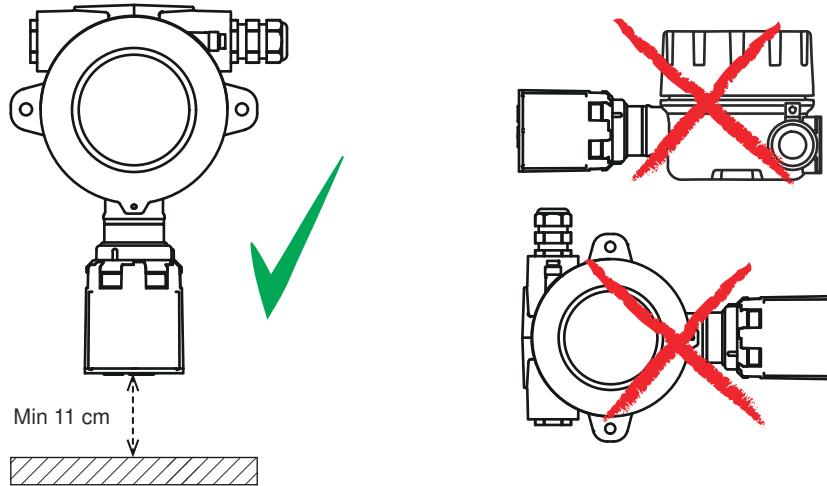
3) Calibrated with Methane, True LEL for: Butane, Ethane, Hydrogen, Isobutane, Isobutylene, Isopropanol, Methyl ethyl ketone, Octane, Pentane, Propane, Propylene, Toluene, Xylene.

**NOTE**

Special care should be taken when selecting sensors for certain environments. If you are uncertain, consult your local Consilium representative.

## Mounting

Mount the detector in a vertical position, with the sensor pointing downwards.



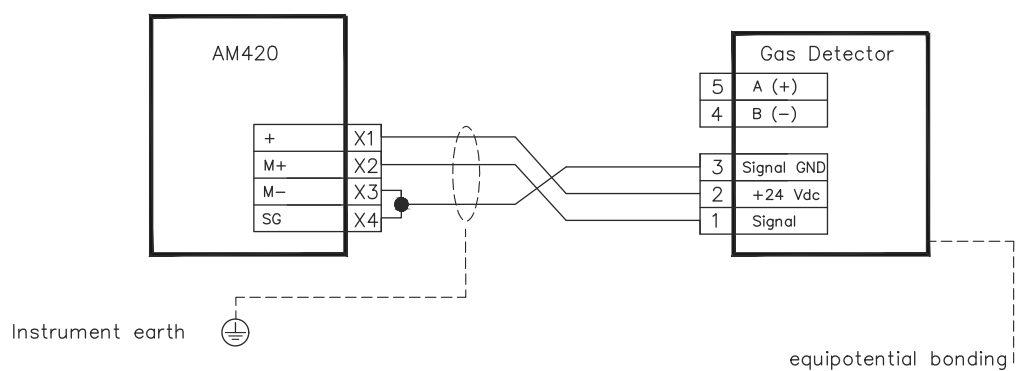
G021924



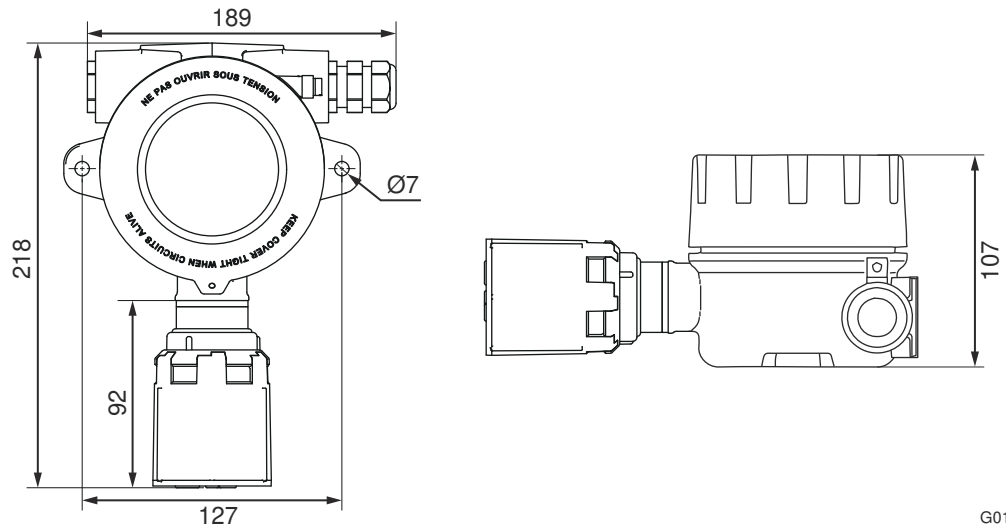
### NOTE

Leave at least 11 cm of free space below the sensor head to ensure that the splashguard can be removed during sensor exchange. This also allows connection of a hose for bump tests.

## Connections



G021389

**Dimensions (mm)**

G015510