



GAS DETECTION CONTROLLER

**GDC**

Multi-level gas monitoring &amp; alarm system — up to 30 field analyzers per cabinet

## PURPOSE

The **GDC (Gas Detection Controller)** is a stationary system for continuous monitoring of a wide range of gases and vapours through signals from remote field gas analyzers. It warns of potentially hazardous or harmful conditions, drives visual & audible signalling and message boards, issues control signals to peripheral equipment (solenoid valves, ventilation, etc.), and passes system status to the upper level — **integrating with any third-party SCADA** via open protocols.

### Three functional levels

- **Level I** — primary field measuring devices and manual call points.
- **Level II** — local GDC cabinets: data acquisition & storage, local alarm handling, control of emergency ventilation and adjacent systems.
- **Level III** — a centralised data-processing rack (APDC) with software for visualisation, storage, processing and forwarding per built-in analytical models.

### Adapts to the site

The GDC adapts to a broad range of customer requirements and is engineered to the applicable standards. Full project documentation is supplied (project drawings, data sheets, manuals, certificates).

### Upper-level protocols

Modbus TCP/IP

Modbus RTU

IEC 60870-5-104

## SYSTEM ARCHITECTURE

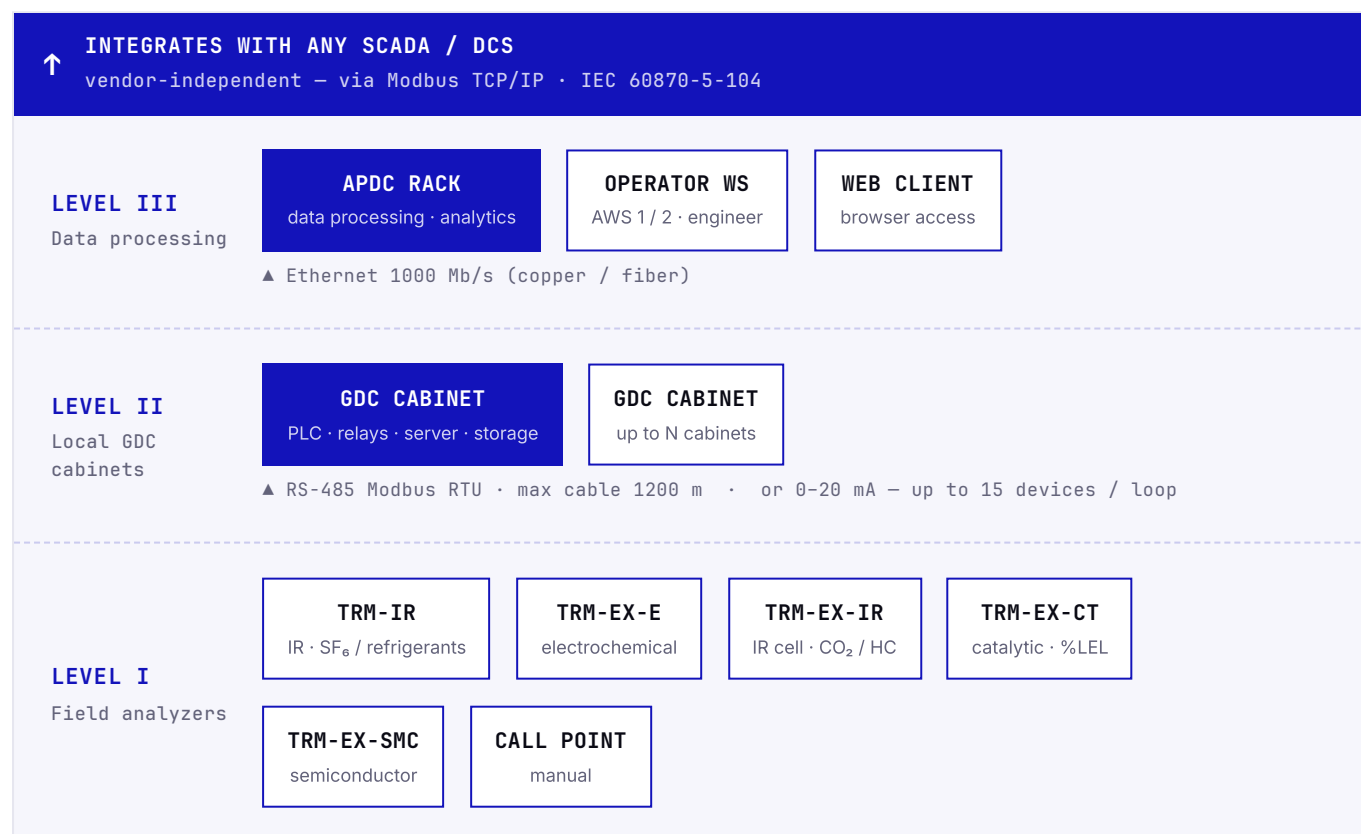


FIG. 1 — GDC THREE-LEVEL ARCHITECTURE • RS-485 MODBUS RTU AND 0-20 MA FIELD CONNECTIVITY

## ■ GDC CABINET – STANDARD CONFIGURATION



GDC cabinet – front (door • touchscreen • 4 status LEDs)

The GDC cabinet is made of powder-coated steel with a quick-release front door panel. The door carries a **colour touchscreen LCD** and **4 LED status indicators**.

Inside: DIN-rail switching power supplies (24 V DC nominal), a PLC, a relay-output module, interposing relays (max 6 A @ 24 V and 1 A @ 220 V), protective circuit breakers, an automatic phase switch, input/output terminal blocks, a 220 V socket for a service laptop, and optional add-on modules. **Two power inputs** with automatic selection are provided.

An optional redundant backup battery protects against short power interruptions. Cabinet heating (option) is applied per a separate technical specification.

### Operator touch panel

The GDC operator touch panel provides an intuitive interface for the whole system:

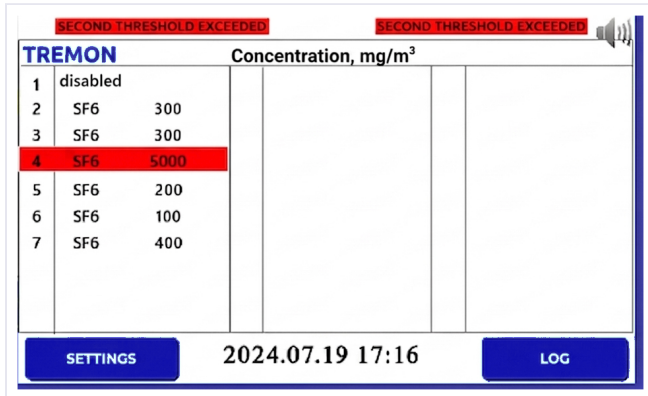
- Visualisation of measured values
- Easy navigation
- Colour alarm signalling & threshold indication
- Diagnostics of connected devices & modules
- System configuration from the panel
- Colour threshold indication (OK / WARN / ALARM)
- Per-channel gas readings in ppm / %vol / %LEL
- Manual relay override & network configuration
- Password-protected access levels

### Event log

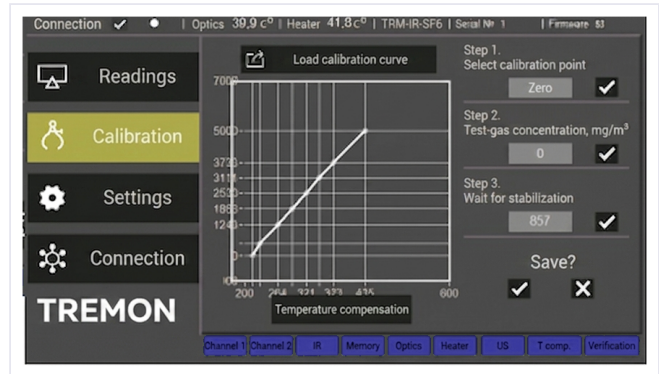
Detailed system events are kept in the panel log: event type, date, and start/end time, so operators and service engineers can trace every alarm and configuration change.

## OPERATOR PANEL & SERVICE SOFTWARE

The GDC touch panel gives operators live readings with colour alarm thresholds, manual relay override and full network configuration. Field analyzers are serviced with **Tremon Toolbox** over USB — calibration, zero/range adjustment and Modbus setup without opening the field enclosure.

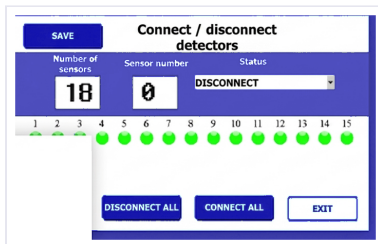


Readings — per-channel gas values with colour thresholds (OK / WARN / ALARM), audible-alarm acknowledge and event log



Tremon Toolbox — live analyzer readings, calibration & range adjustment over USB

## SERVICE & CONFIGURATION SCREENS



Manual relay control & detector connect / disconnect



Network & threshold configuration (IP / Modbus)

### Tremon Toolbox — service & calibration

- Windows 7–10 • USB
- IR-emitter status
- Heater & optics temp.
- Serial no. & firmware
- Calibration & due date
- Network • live readings
- Zero & range adjust
- Modbus addr / baud / port

Password-protected access levels separate operators from service engineers. The panel and Toolbox share the same Modbus data model, so field readings on the operator screen match the values read during service and calibration — no re-entry, no mismatch.

Toolbox connects over USB without opening the field enclosure, so commissioning and periodic verification are fast and safe in classified areas.

## ■ ORDERING / MARKING CIPHER

Example marking of a GDC cabinet:

**GDC-600-LR-LD00-LD00(24)-PS-0-LAI0-LDI0-TCP/IP-TX-H0-ATS**

Cipher structure: **GDC**-X1-X2-X3-X4-X5-X6-X7-X8-X9-X10-X11

### X1 | CABINET VARIANT (ENCLOSURE SIZE, MODULE CAPACITY)

| CODE  | DESCRIPTION                                    |
|-------|------------------------------------------------|
| 600   | Wall cabinet 600×600×250 — powder-coated steel |
| 600SS | Wall cabinet 600×600×250 — stainless steel     |
| 800   | Wall cabinet 800×600×250 — powder-coated steel |
| 800SS | Wall cabinet 800×600×250 — stainless steel     |

### X2 | PLC MODEL

| CODE | DESCRIPTION |
|------|-------------|
| LR   | LORENTZ     |

### X3 | 8-CHANNEL LDO DISCRETE-OUTPUT MODULES (“DRY CONTACT” TYPE)

| CODE           | DESCRIPTION                                   |
|----------------|-----------------------------------------------|
| LD00           | No relay modules                              |
| LD01           | One 8-channel relay module (1 relay reserved) |
| LD02 ... LD08  | Two ... eight 8-channel relay modules         |
| LD09 ... LD014 | Nine ... fourteen 8-channel relay modules     |

## MARKING CIPHER – MODULES (CONTINUED)

### X4 | LD0(24) DISCRETE-OUTPUT MODULES (24 V DC POTENTIAL)

| CODE                  | DESCRIPTION                                   |
|-----------------------|-----------------------------------------------|
| LD00(24)              | No relay modules                              |
| LD01(24)              | One 8-channel relay module (1 relay reserved) |
| LD02(24) ... LD08(24) | Two ... eight 8-channel relay modules         |
| LD09(24) ... LD14(24) | Nine ... fourteen 8-channel relay modules     |

### X6 | LAI ANALOG-INPUT MODULES (4–20 mA)

| CODE           | DESCRIPTION                                  |
|----------------|----------------------------------------------|
| LAI0           | No analog-input modules                      |
| LAI1 ... LAI7  | One ... seven 8-channel 4–20 mA modules      |
| LAI8 ... LAI14 | Eight ... fourteen 8-channel 4–20 mA modules |

### X5 | ADDITIONAL POWER SUPPLY

| CODE   | DESCRIPTION                   |
|--------|-------------------------------|
| PS-120 | 120 W additional power supply |
| PS-240 | 240 W additional power supply |
| PS-480 | 480 W additional power supply |

### X7 | LDI DISCRETE-INPUT MODULES (16-CHANNEL)

| CODE           | DESCRIPTION                           |
|----------------|---------------------------------------|
| LDI0           | No discrete-input modules             |
| LDI1 ... LDI7  | One ... seven 16-channel modules      |
| LDI8 ... LDI14 | Eight ... fourteen 16-channel modules |

X4 – 8-channel LD0(24) discrete-output modules with 24 V DC potential contact. X5 – additional power supply, required when total consumption of connected devices exceeds 180 W. X6 – 8-channel LAI analog-input modules (4–20 mA). X7 – 16-channel LDI discrete-input modules.

## MARKING CIPHER – PROTOCOLS & OPTIONS

### X8 | DIGITAL COMMUNICATION PROTOCOLS

| CODE            | DESCRIPTION                                                |
|-----------------|------------------------------------------------------------|
| TCP/IP          | Modbus RTU, Modbus TCP/IP — base configuration for LORENTZ |
| IEC 60870-5-104 | IEC 60870-5-104 — base configuration for PLC LORENTZ       |

### X10 | CABINET HEATING OPTION

| CODE | DESCRIPTION                        |
|------|------------------------------------|
| H0   | No heating                         |
| H1   | With heating (cabinet 600 / 600SS) |
| H2   | With heating (cabinet 800 / 800SS) |

### X9 | COMMUNICATION INTERFACE MODULES

| CODE | DESCRIPTION                             |
|------|-----------------------------------------|
| TX   | Ethernet over copper, no optical output |
| SM   | Ethernet over single-mode optical fiber |
| MM   | Ethernet over multi-mode optical fiber  |

### X11 | CABINET POWER TYPE

| CODE | DESCRIPTION                                  |
|------|----------------------------------------------|
| ATS  | Automatic transfer switch — two power inputs |
| UPS  | With uninterruptible power supply            |

X8 – digital communication protocols. X9 – digital communication interface modules. X10 – cabinet heating option. X11 – cabinet power type (ATS = automatic transfer switch).

## ■ TECHNICAL CHARACTERISTICS – GDC

|                                                  |                                                                                                                                      |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Type                                             | Stationary gas detection system                                                                                                      |
| Max connected field devices (analyzers, sensors) | Up to 30                                                                                                                             |
| Discrete inputs                                  | Up to 30                                                                                                                             |
| Discrete outputs                                 | Up to 112 (relays 24 V DC potential or “dry contact”, 6 A 30 VDC / 3 A 220 VAC)                                                      |
| Input connections                                | Two independent RS-485 Modbus (RTU) ports — up to 15 field devices per loop; 30 input channels 0–20 mA                               |
| Upper-level protocols                            | Modbus TCP/IP; Modbus RTU (opt.); IEC 60870-5-104 (opt.)                                                                             |
| Upper-level interfaces                           | Ethernet 1000 Mb/s; RS-485 (opt.); 1× multimode fiber 100/1000 Base-FX LC/SC/ST (opt.); 1× single-mode fiber 100/1000 Base-FX (opt.) |
| System power                                     | 2 power inputs with automatic selection; UPS in wall cabinet (opt.)                                                                  |
| Input voltage                                    | 230 V AC, ±10%                                                                                                                       |
| Power frequency                                  | 50 Hz, ±5%                                                                                                                           |
| Output voltage                                   | 24 V DC                                                                                                                              |
| Max power consumption                            | up to 240 W                                                                                                                          |
| Dimensions (H×W×D)                               | 600 × 600 × 250 mm                                                                                                                   |
| Weight                                           | 26 kg                                                                                                                                |
| Protection rating                                | IP65                                                                                                                                 |
| Operating temperature                            | +5 ... +55 °C; –40 ... +50 °C with cabinet heating (opt.)                                                                            |
| Humidity                                         | 5 ... 95 % RH, non-condensing                                                                                                        |

## ■ WALL ENCLOSURE

Wall-mounted cabinet, **600 × 600 × 250 mm** (standard). Rear panel **558 × 558 mm** with four ø8 mm mounting holes. Larger **800 × 600 × 250 mm** variant available (see cipher X1).

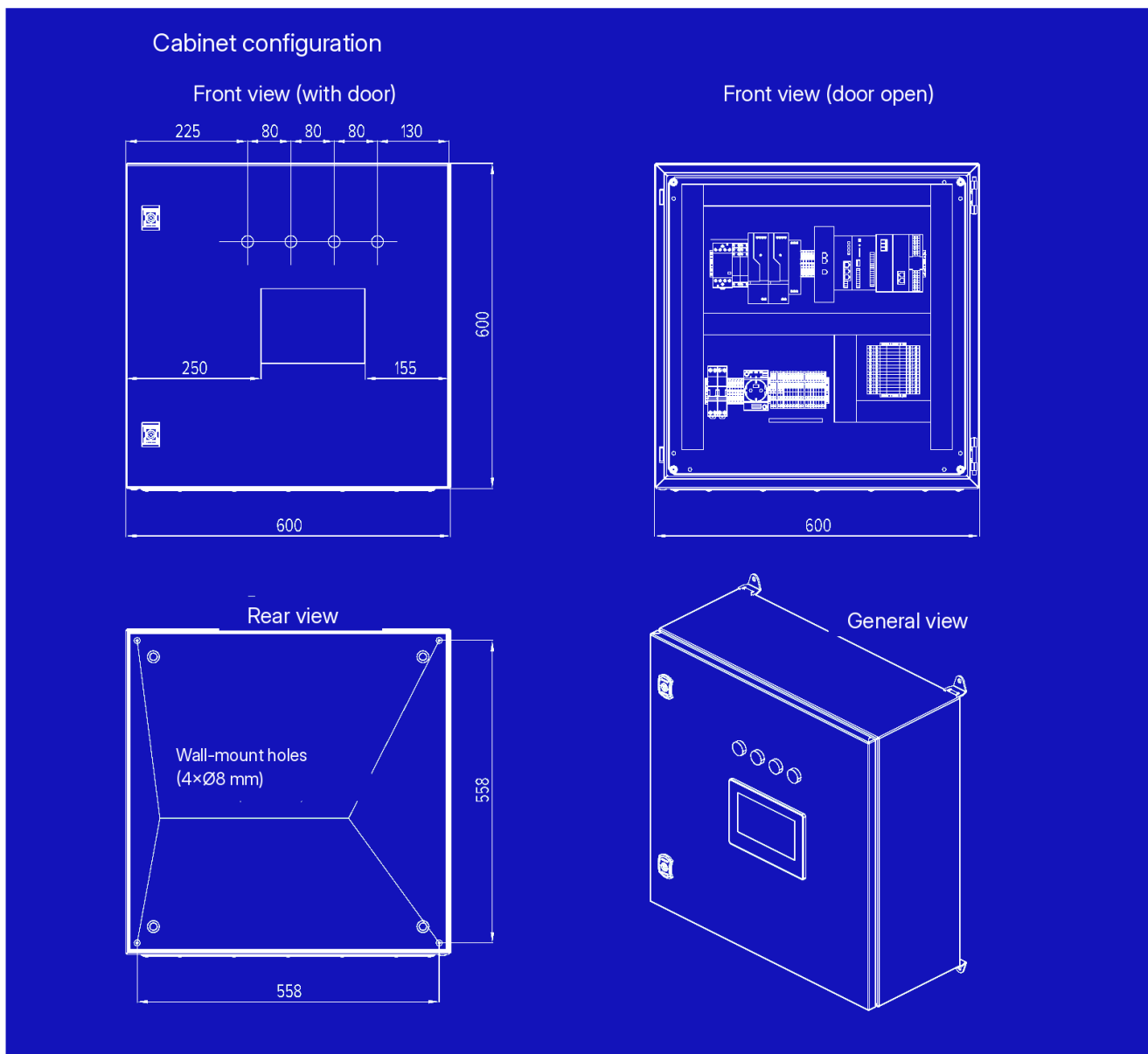
IP65

26 kg

powder-coated steel

stainless (SS) option

## ENCLOSURE &amp; OVERALL DIMENSIONS



GDC wall cabinet – front (with / without door), rear panel with  $\varnothing 8$  mm mounting holes, and general view – dimensions in mm

## Wall enclosure

Wall-mounted cabinet, **600 × 600 × 250 mm** (standard). Rear panel **558 × 558 mm** with four  $\varnothing 8$  mm mounting holes for direct wall fixing.

IP65

26 kg

powder-coated steel

## Options

Larger **800 × 600 × 250 mm** variant (cipher X1). Stainless-steel (SS) body, cabinet heating for  $-40 \dots +50$  °C operation, and internal UPS are available as ordering options.

stainless (SS) option

heating option

UPS option

## CONTROLLED SUBSTANCES

The GDC accepts field analyzers named by measuring principle: **TRM-EX-E** (electrochemical), **TRM-EX-SMC** (semiconductor), **TRM-EX-CT** (thermocatalytic), **TRM-EX-IR** (infrared cell) and the dedicated **TRM-IR** infrared analyzer. Ranges below are carried from the catalogue; the analyzer is factory-configured to the ordered range.

### TRM-EX-E — electrochemical · toxic gases

| N° | CODE                   | MEASURED COMPONENT                  | RANGE  | UNITS |
|----|------------------------|-------------------------------------|--------|-------|
| 1  | <b>NH<sub>3</sub></b>  | Ammonia (NH <sub>3</sub> )          | 0-50   | ppm   |
| 2  | <b>NH<sub>3</sub></b>  | Ammonia (NH <sub>3</sub> )          | 0-100  | ppm   |
| 3  | <b>NH<sub>3</sub></b>  | Ammonia (NH <sub>3</sub> )          | 0-250  | ppm   |
| 4  | <b>NH<sub>3</sub></b>  | Ammonia (NH <sub>3</sub> )          | 0-1000 | ppm   |
| 5  | <b>H<sub>2</sub></b>   | Hydrogen (H <sub>2</sub> )          | 0-500  | ppm   |
| 6  | <b>H<sub>2</sub></b>   | Hydrogen (H <sub>2</sub> )          | 0-1000 | ppm   |
| 7  | <b>H<sub>2</sub></b>   | Hydrogen (H <sub>2</sub> )          | 0-2000 | ppm   |
| 8  | <b>O<sub>2</sub></b>   | Oxygen (O <sub>2</sub> )            | 0-25   | %vol  |
| 9  | <b>NO<sub>2</sub></b>  | Nitrogen dioxide (NO <sub>2</sub> ) | 0-30   | ppm   |
| 10 | <b>SO<sub>2</sub></b>  | Sulfur dioxide (SO <sub>2</sub> )   | 0-10   | ppm   |
| 11 | <b>SiH<sub>4</sub></b> | Monosilane (SiH <sub>4</sub> )      | 0-1    | ppm   |
| 12 | <b>O<sub>3</sub></b>   | Ozone (O <sub>3</sub> )             | 0-1    | ppm   |
| 13 | <b>O<sub>3</sub></b>   | Ozone (O <sub>3</sub> )             | 0-5    | ppm   |
| 14 | <b>NO</b>              | Nitric oxide (NO)                   | 0-50   | ppm   |
| 15 | <b>NO</b>              | Nitric oxide (NO)                   | 0-250  | ppm   |
| 16 | <b>CO</b>              | Carbon monoxide (CO)                | 0-300  | ppm   |

| N° | CODE                   | MEASURED COMPONENT                  | RANGE  | UNITS |
|----|------------------------|-------------------------------------|--------|-------|
| 17 | <b>CO</b>              | Carbon monoxide (CO)                | 0-500  | ppm   |
| 18 | <b>CO</b>              | Carbon monoxide (CO)                | 0-1000 | ppm   |
| 19 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-20   | ppm   |
| 20 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-50   | ppm   |
| 21 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-100  | ppm   |
| 22 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-120  | ppm   |
| 23 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-250  | ppm   |
| 24 | <b>H<sub>2</sub>S</b>  | Hydrogen sulfide (H <sub>2</sub> S) | 0-500  | ppm   |
| 25 | <b>HCN</b>             | Hydrogen cyanide (HCN)              | 0-30   | ppm   |
| 26 | <b>CH<sub>2</sub>O</b> | Formaldehyde (CH <sub>2</sub> O)    | 0-10   | ppm   |
| 27 | <b>PH<sub>3</sub></b>  | Phosphine (PH <sub>3</sub> )        | 0-10   | ppm   |
| 28 | <b>F<sub>2</sub></b>   | Fluorine (F <sub>2</sub> )          | 0-5    | ppm   |
| 29 | <b>HF</b>              | Hydrogen fluoride (HF)              | 0-10   | ppm   |
| 30 | <b>Cl<sub>2</sub></b>  | Chlorine (Cl <sub>2</sub> )         | 0-10   | ppm   |
| 31 | <b>HCl</b>             | Hydrogen chloride (HCl)             | 0-25   | ppm   |

## TRM-EX-E — electrochemical · specialty gases

| N° | CODE                                 | MEASURED COMPONENT                                 | RANGE | UNITS |
|----|--------------------------------------|----------------------------------------------------|-------|-------|
| 33 | <b>C<sub>2</sub>H<sub>4</sub>O</b>   | Ethylene oxide (C <sub>2</sub> H <sub>4</sub> O)   | 0-20  | ppm   |
| 34 | <b>C<sub>2</sub>H<sub>4</sub>O</b>   | Ethylene oxide (C <sub>2</sub> H <sub>4</sub> O)   | 0-100 | ppm   |
| 35 | <b>AsH<sub>3</sub></b>               | Arsine (AsH <sub>3</sub> )                         | 0-1   | ppm   |
| 36 | <b>BF<sub>3</sub></b>                | Boron trifluoride (BF <sub>3</sub> )               | 0-10  | ppm   |
| 37 | <b>BCl<sub>3</sub></b>               | Boron trichloride (BCl <sub>3</sub> )              | 0-25  | ppm   |
| 38 | <b>SiH<sub>2</sub>Cl<sub>2</sub></b> | Dichlorosilane (SiH <sub>2</sub> Cl <sub>2</sub> ) | 0-25  | ppm   |
| 39 | <b>Si<sub>2</sub>H<sub>6</sub></b>   | Disilane (Si <sub>2</sub> H <sub>6</sub> )         | 0-15  | ppm   |
| 40 | <b>GeH<sub>4</sub></b>               | Germane (GeH <sub>4</sub> )                        | 0-5   | ppm   |
| 41 | <b>CH<sub>3</sub>SiH<sub>3</sub></b> | Methylsilane (CH <sub>3</sub> SiH <sub>3</sub> )   | 0-1   | ppm   |
| 42 | <b>N<sub>2</sub>O</b>                | Nitrous oxide (N <sub>2</sub> O)                   | 0-30  | ppm   |
| 43 | <b>SiCl<sub>4</sub></b>              | Silicon tetrachloride (SiCl <sub>4</sub> )         | 0-25  | ppm   |

| N° | CODE                                 | MEASURED COMPONENT                                    | RANGE | UNITS |
|----|--------------------------------------|-------------------------------------------------------|-------|-------|
| 44 | <b>SiF<sub>4</sub></b>               | Silicon tetrafluoride (SiF <sub>4</sub> )             | 0-10  | ppm   |
| 45 | <b>SF<sub>4</sub></b>                | Sulfur tetrafluoride (SF <sub>4</sub> )               | 0-10  | ppm   |
| 46 | <b>HSiCl<sub>3</sub></b>             | Trichlorosilane (HSiCl <sub>3</sub> )                 | 0-15  | ppm   |
| 47 | <b>WF<sub>6</sub></b>                | Tungsten fluoride (WF <sub>6</sub> )                  | 0-10  | ppm   |
| 48 | <b>B<sub>2</sub>H<sub>6</sub></b>    | Diborane (B <sub>2</sub> H <sub>6</sub> )             | 0-1   | ppm   |
| 49 | <b>HNO<sub>3</sub></b>               | Nitric acid (HNO <sub>3</sub> )                       | 0-30  | ppm   |
| 50 | <b>C<sub>2</sub>SiH<sub>8</sub></b>  | Dimethylsilane (C <sub>2</sub> SiH <sub>8</sub> )     | 0-1   | ppm   |
| 51 | <b>C<sub>3</sub>H<sub>10</sub>Si</b> | Trimethylsilane (SiH(CH <sub>3</sub> ) <sub>3</sub> ) | 0-15  | ppm   |
| 52 | <b>PF<sub>5</sub></b>                | Phosphorus pentafluoride (PF <sub>5</sub> )           | 0-10  | ppm   |
| 53 | <b>CH<sub>3</sub>F</b>               | Fluoromethane (CH <sub>3</sub> F)                     | 0-10  | ppm   |
| 54 | <b>H<sub>2</sub>Se</b>               | Hydrogen selenide (H <sub>2</sub> Se)                 | 0-5   | ppm   |

## TRM-EX-SMC — semiconductor sensor · refrigerants

| N° | CODE          | MEASURED COMPONENT                                                                                                                              | RANGE   | UNITS |
|----|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|
| 1  | <b>R-125</b>  | Pentafluoroethane (C <sub>2</sub> HF <sub>5</sub> )                                                                                             | 0-2000  | ppm   |
| 2  | <b>R-134a</b> | 1,1,1,2-tetrafluoroethane (C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                                                       | 0-2000  | ppm   |
| 3  | <b>R-134a</b> | 1,1,1,2-tetrafluoroethane (C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                                                       | 0-5000  | ppm   |
| 4  | <b>R-143a</b> | 1,1,1-trifluoroethane (C <sub>2</sub> H <sub>3</sub> F <sub>3</sub> )                                                                           | 0-2000  | ppm   |
| 5  | <b>R-22</b>   | Chlorodifluoromethane (CHClF <sub>2</sub> )                                                                                                     | 0-2000  | ppm   |
| 6  | <b>R-32</b>   | Difluoromethane (CH <sub>2</sub> F <sub>2</sub> )                                                                                               | 0-2000  | ppm   |
| 7  | <b>R-32</b>   | Difluoromethane (CH <sub>2</sub> F <sub>2</sub> )                                                                                               | 0-10000 | ppm   |
| 8  | <b>R-404a</b> | Refrigerant R404a (C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>3</sub> F <sub>3</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> ) | 0-2000  | ppm   |

| N° | CODE                  | MEASURED COMPONENT                                                                                                                                                              | RANGE  | UNITS |
|----|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 9  | <b>R-404a</b>         | Refrigerant R404a (C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>3</sub> F <sub>3</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                 | 0-5000 | ppm   |
| 10 | <b>R-407a</b>         | Refrigerant R407a (CH <sub>2</sub> F <sub>2</sub> +C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                               | 0-2000 | ppm   |
| 11 | <b>R-407c</b>         | Refrigerant R407c (CH <sub>2</sub> F <sub>2</sub> +C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                               | 0-5000 | ppm   |
| 12 | <b>R-407f</b>         | Refrigerant R407f (CH <sub>2</sub> F <sub>2</sub> +C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )                                               | 0-2000 | ppm   |
| 13 | <b>R-410a</b>         | Refrigerant R410a (CH <sub>2</sub> F <sub>2</sub> +C <sub>2</sub> HF <sub>5</sub> )                                                                                             | 0-2000 | ppm   |
| 14 | <b>R-427a</b>         | Refrigerant R427a (CH <sub>2</sub> F <sub>2</sub> +C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>3</sub> F <sub>3</sub> +C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> ) | 0-1000 | ppm   |
| 15 | <b>R-507</b>          | Refrigerant R507 (C <sub>2</sub> HF <sub>5</sub> +C <sub>2</sub> H <sub>3</sub> F <sub>3</sub> )                                                                                | 0-2000 | ppm   |
| 16 | <b>SF<sub>6</sub></b> | Sulfur hexafluoride (SF <sub>6</sub> )                                                                                                                                          | 0-2000 | ppm   |

## TRM-EX-CT — thermocatalytic sensor (all ranges 0-100 %LEL)

| Nº | CODE                                 | MEASURED COMPONENT                                  | RANGE      |
|----|--------------------------------------|-----------------------------------------------------|------------|
| 1  | <b>NH<sub>3</sub></b>                | Ammonia (NH <sub>3</sub> )                          | 0-100 %LEL |
| 2  | <b>C<sub>2</sub>H<sub>2</sub></b>    | Acetylene (C <sub>2</sub> H <sub>2</sub> )          | 0-100 %LEL |
| 3  | <b>C<sub>3</sub>H<sub>6</sub>O</b>   | Acetone (C <sub>3</sub> H <sub>6</sub> O)           | 0-100 %LEL |
| 4  | <b>C<sub>6</sub>H<sub>6</sub></b>    | Benzene (C <sub>6</sub> H <sub>6</sub> )            | 0-100 %LEL |
| 5  | <b>C<sub>4</sub>H<sub>6</sub></b>    | 1,3-butadiene (C <sub>4</sub> H <sub>6</sub> )      | 0-100 %LEL |
| 6  | <b>C<sub>4</sub>H<sub>10</sub></b>   | Butane (C <sub>4</sub> H <sub>10</sub> )            | 0-100 %LEL |
| 7  | <b>C<sub>4</sub>H<sub>9</sub>OH</b>  | Butanol (C <sub>4</sub> H <sub>9</sub> OH)          | 0-100 %LEL |
| 8  | <b>i-C<sub>4</sub>H<sub>8</sub></b>  | Isobutylene (i-C <sub>4</sub> H <sub>8</sub> )      | 0-100 %LEL |
| 9  | <b>H<sub>2</sub></b>                 | Hydrogen (H <sub>2</sub> )                          | 0-100 %LEL |
| 10 | <b>C<sub>6</sub>H<sub>14</sub></b>   | Hexane (C <sub>6</sub> H <sub>14</sub> )            | 0-100 %LEL |
| 11 | <b>C<sub>7</sub>H<sub>16</sub></b>   | Heptane (C <sub>7</sub> H <sub>16</sub> )           | 0-100 %LEL |
| 12 | <b>o-C<sub>8</sub>H<sub>10</sub></b> | o-xylene (o-C <sub>8</sub> H <sub>10</sub> )        | 0-100 %LEL |
| 13 | <b>m-C<sub>8</sub>H<sub>10</sub></b> | m-xylene (m-C <sub>8</sub> H <sub>10</sub> )        | 0-100 %LEL |
| 14 | <b>p-C<sub>8</sub>H<sub>10</sub></b> | p-xylene (p-C <sub>8</sub> H <sub>10</sub> )        | 0-100 %LEL |
| 15 | <b>C<sub>4</sub>H<sub>8</sub></b>    | Butylene (C <sub>4</sub> H <sub>8</sub> )           | 0-100 %LEL |
| 16 | <b>C<sub>3</sub>H<sub>8</sub>O</b>   | Isopropyl alcohol (C <sub>3</sub> H <sub>8</sub> O) | 0-100 %LEL |
| 17 | <b>C<sub>2</sub>H<sub>6</sub>O</b>   | Dimethyl ether (C <sub>2</sub> H <sub>6</sub> O)    | 0-100 %LEL |
| 18 | <b>CH<sub>4</sub></b>                | Methane (CH <sub>4</sub> )                          | 0-100 %LEL |
| 19 | <b>CH<sub>3</sub>OH</b>              | Methanol (CH <sub>3</sub> OH)                       | 0-100 %LEL |

| Nº | CODE                                            | MEASURED COMPONENT                                             | RANGE      |
|----|-------------------------------------------------|----------------------------------------------------------------|------------|
| 20 | <b>C<sub>8</sub>H<sub>18</sub></b>              | Octane (C <sub>8</sub> H <sub>18</sub> )                       | 0-100 %LEL |
| 21 | <b>C<sub>5</sub>H<sub>12</sub></b>              | Pentane (C <sub>5</sub> H <sub>12</sub> )                      | 0-100 %LEL |
| 22 | <b>C<sub>3</sub>H<sub>8</sub></b>               | Propane (C <sub>3</sub> H <sub>8</sub> )                       | 0-100 %LEL |
| 23 | <b>C<sub>3</sub>H<sub>6</sub></b>               | Propylene (C <sub>3</sub> H <sub>6</sub> )                     | 0-100 %LEL |
| 24 | <b>C<sub>8</sub>H<sub>8</sub></b>               | Styrene (C <sub>8</sub> H <sub>8</sub> )                       | 0-100 %LEL |
| 25 | <b>CxHy</b>                                     | Hydrocarbons ΣCxHy (by methane)                                | 0-100 %LEL |
| 26 | <b>CxHy</b>                                     | Hydrocarbons ΣCxHy (by propane)                                | 0-100 %LEL |
| 27 | <b>CxHy</b>                                     | Hydrocarbons ΣCxHy (by hexane)                                 | 0-100 %LEL |
| 28 | <b>C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub></b> | Toluene (C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub> )       | 0-100 %LEL |
| 29 | <b>C<sub>6</sub>H<sub>12</sub></b>              | Cyclohexane (C <sub>6</sub> H <sub>12</sub> )                  | 0-100 %LEL |
| 30 | <b>C<sub>5</sub>H<sub>10</sub></b>              | Cyclopentane (C <sub>5</sub> H <sub>10</sub> )                 | 0-100 %LEL |
| 31 | <b>C<sub>2</sub>H<sub>6</sub></b>               | Ethane (C <sub>2</sub> H <sub>6</sub> )                        | 0-100 %LEL |
| 32 | <b>C<sub>2</sub>H<sub>5</sub>OH</b>             | Ethanol (C <sub>2</sub> H <sub>5</sub> OH)                     | 0-100 %LEL |
| 33 | <b>C<sub>4</sub>H<sub>8</sub>O<sub>2</sub></b>  | Ethyl acetate (C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> )  | 0-100 %LEL |
| 34 | <b>C<sub>2</sub>H<sub>4</sub></b>               | Ethylene (C <sub>2</sub> H <sub>4</sub> )                      | 0-100 %LEL |
| 35 | <b>C<sub>2</sub>H<sub>4</sub>O</b>              | Acetaldehyde (CH <sub>3</sub> CHO)                             | 0-100 %LEL |
| 36 | <b>C<sub>6</sub>H<sub>12</sub>O<sub>2</sub></b> | Butyl acetate (C <sub>6</sub> H <sub>12</sub> O <sub>2</sub> ) | 0-100 %LEL |
| 37 | <b>C<sub>9</sub>H<sub>20</sub></b>              | Nonane (C <sub>9</sub> H <sub>20</sub> )                       | 0-100 %LEL |
| 38 | <b>C<sub>4</sub>H<sub>8</sub>O</b>              | 2-butanone (C <sub>4</sub> H <sub>8</sub> O)                   | 0-100 %LEL |

## TRM-EX-IR — infrared (cell) sensor

| N° | CODE                               | MEASURED COMPONENT                             | RANGE  | UNITS |
|----|------------------------------------|------------------------------------------------|--------|-------|
| 1  | <b>CO<sub>2</sub></b>              | Carbon dioxide (CO <sub>2</sub> )              | 0-5    | %vol  |
| 2  | <b>CO<sub>2</sub></b>              | Carbon dioxide (CO <sub>2</sub> )              | 0-5000 | ppm   |
| 3  | <b>C<sub>4</sub>H<sub>6</sub></b>  | 1,3-butadiene (C <sub>4</sub> H <sub>6</sub> ) | 0-100  | %LEL  |
| 4  | <b>C<sub>4</sub>H<sub>10</sub></b> | Butane (C <sub>4</sub> H <sub>10</sub> )       | 0-100  | %LEL  |
| 5  | <b>C<sub>6</sub>H<sub>14</sub></b> | Hexane (C <sub>6</sub> H <sub>14</sub> )       | 0-100  | %LEL  |
| 6  | <b>CH<sub>4</sub></b>              | Methane (CH <sub>4</sub> )                     | 0-100  | %LEL  |

| N° | CODE                               | MEASURED COMPONENT                        | RANGE | UNITS |
|----|------------------------------------|-------------------------------------------|-------|-------|
| 7  | <b>C<sub>5</sub>H<sub>12</sub></b> | Pentane (C <sub>5</sub> H <sub>12</sub> ) | 0-100 | %LEL  |
| 8  | <b>C<sub>3</sub>H<sub>8</sub></b>  | Propane (C <sub>3</sub> H <sub>8</sub> )  | 0-100 | %LEL  |
| 9  | <b>CxHy</b>                        | Hydrocarbons<br>ΣCxHy (by methane)        | 0-100 | %LEL  |
| 10 | <b>CxHy</b>                        | Hydrocarbons<br>ΣCxHy (by propane)        | 0-100 | %LEL  |
| 11 | <b>CxHy</b>                        | Hydrocarbons<br>ΣCxHy (by hexane)         | 0-100 | %LEL  |

TRM-IR series — infrared sensor (dedicated, SF<sub>6</sub> / refrigerants)

| N° | CODE                  | MEASURED COMPONENT                                                              | RANGE            | UNITS             |
|----|-----------------------|---------------------------------------------------------------------------------|------------------|-------------------|
| 1  | <b>SF<sub>6</sub></b> | Sulfur hexafluoride (SF <sub>6</sub> )                                          | 0-6000 / 0-12000 | mg/m <sup>3</sup> |
| 2  | <b>R-134a</b>         | 1,1,1,2-tetrafluoroethane [C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> ]       | 0-4240 / 0-8480  | mg/m <sup>3</sup> |
| 3  | <b>R-125</b>          | Pentafluoroethane [C <sub>2</sub> HF <sub>5</sub> ]                             | 0-4990 / 0-9980  | mg/m <sup>3</sup> |
| 4  | <b>R-22</b>           | Chlorodifluoromethane [CHClF <sub>2</sub> ]                                     | 0-3600 / 0-7200  | mg/m <sup>3</sup> |
| 5  | <b>R-113</b>          | 1,1,2-trichlorotrifluoroethane [C <sub>2</sub> Cl <sub>3</sub> F <sub>3</sub> ] | 0-7790 / 0-15580 | mg/m <sup>3</sup> |
| 6  | <b>R-12</b>           | Dichlorodifluoromethane [CCl <sub>2</sub> F <sub>2</sub> ]                      | 0-251 / 0-503    | mg/m <sup>3</sup> |
| 7  | <b>R-227ea</b>        | 1,1,1,2,3,3,3-heptafluoropropane [C <sub>3</sub> HF <sub>7</sub> ]              | 0-7070 / 0-35350 | mg/m <sup>3</sup> |
| 8  | <b>R-407c</b>         | Refrigerant blend R407c*                                                        | 0-3583 / 0-7165  | mg/m <sup>3</sup> |

\* Refrigerant blend R407c (by mass): R32 (CH<sub>2</sub>F<sub>2</sub>) 23%, R125 (C<sub>2</sub>HF<sub>5</sub>) 25%, R134a (C<sub>2</sub>H<sub>2</sub>F<sub>4</sub>) 52%. ppm values are volumetric (v/v) at 20 °C and 101.3 kPa. Two ranges available per component; factory-configured to the ordered range.

## SYSTEM SELECTION SUMMARY

### Controller

| ITEM                   | VALUE                                         |
|------------------------|-----------------------------------------------|
| <b>GDC-600</b>         | Wall cabinet 600×600×250, powder-coated steel |
| <b>GDC-600SS</b>       | Wall cabinet 600×600×250, stainless steel     |
| <b>GDC-800 / 800SS</b> | Wall cabinet 800×600×250                      |

### Capacity

- Up to 30 field devices per controller
- Up to 112 discrete outputs
- Up to 30 discrete inputs / 0–20 mA channels
- 2× RS-485 Modbus RTU input ports (≤15 devices per loop)

### Field analyzers

| LINE              | SENSOR / APPLICATION                                           |
|-------------------|----------------------------------------------------------------|
| <b>TRM-IR</b>     | Infrared — SF <sub>6</sub> & refrigerants (mg/m <sup>3</sup> ) |
| <b>TRM-EX-E</b>   | Electrochemical — toxic & specialty gases                      |
| <b>TRM-EX-SMC</b> | Semiconductor — refrigerants (ppm)                             |
| <b>TRM-EX-CT</b>  | Thermocatalytic — combustibles (%LEL)                          |
| <b>TRM-EX-IR</b>  | Infrared cell — CO <sub>2</sub> & hydrocarbons                 |

### Integration

[Modbus TCP/IP](#)[Modbus RTU](#)[IEC 60870-5-104](#)

Vendor-independent — integrates with any SCADA / DCS.



CONTACT

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