



GAS DETECTION CONTROLLER

GDC

Modular controller for continuous multi-level gas monitoring, alarm and control — up to 30 field analyzers per cabinet

WARNING Strictly follow these Instructions for Use. The user must fully understand and observe the instructions. Use the product only for the purpose specified in the Intended Use section of this document.

CONTENTS

1 • IMPORTANT INFORMATION

1.1	For your safety	3
1.2	Definitions of alert icons	3
1.3	General Warnings	3
1.4	General Cautions	3
1.5	How to Use this Manual	3
1.6	Conventions Used	3

2 • SAFETY CAUTIONS & HAZARDS

2.1	Safety Cautions	4
2.2	Safety Hazards	4
2.3	Component Testing & Replacement	4
2.4	Antistatic Precautions	4
2.5	Good Practice	4
2.6	Lithium Battery Hazard	4
2.7	Product Compliance	5
2.8	Conditions of Use	5
2.9	Training of Personnel	5
2.10	Due Authorisation	5
2.11	Marking	5

3 • GENERAL DESCRIPTION

3.1	System General Description	6
3.2	Parameters	7
3.3	Construction	7
3.4	LCP2116 — Processor Module	8
3.5	LCP2116 — Technical data	8
3.6	LCP2116 — Status LEDs	10
3.7	LCP2116 — Reset	10
3.8	LCP2116 — RS-485 interface	10
3.9	LCP2116 — Project installation	10
3.10	LCP2116 — Ethernet interface	10
3.11	LCP2116 — RS-485 connection example	11
3.12	LCP2116 — RS-485 output circuit	11
3.13	LDO1128 — Relay Output Module	12
3.14	LDO1128 — Technical data	12
3.15	LDO1128 — Status LEDs	13
3.16	LDO1128 — Relay Pinout	13
3.17	LDO1128 — Supply / Network Pinout	13
3.18	LDO1128 — Network Address Switch	13
3.19	LDO1128 — Connection example	14
3.20	Output circuit diagram	14
3.21	General data points	14
3.22	Minimum cycle time	14

4 • INSTALLATION & SETUP

4.1	Common design requirements	15
4.2	Wiring	15

5 • GDC USER GUIDE

5.1	User Interface — General	16
5.2	Touchscreen	16
5.3	Switching On and Off	16
5.4	Menu Items and Access Levels	17
5.5	SD Card Usage	17
5.6	Normal Operation	17
5.7	User Interface Screen & Navigation	18
5.8	View Active Alarms	18
5.9	Event Information	18
5.10	Acknowledging Events	18

6 • SYSTEM CONFIGURATION

6.1	General Information	19
6.2	RS-485 ports	19
6.3	Output Relays	19
6.4	Date and Time	19
6.5	Inhibiting Detectors	19
6.6	Ethernet Protocol	19

7 • MAINTENANCE & TESTING

7.1	Routine Testing	20
7.2	Exercising the Relays	20
7.3	Check system reaction	20
7.4	Periodic Scheduled Testing	20

8 • SERVICING

8.1	Back-up Battery Maintenance	21
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9 • TROUBLESHOOTING

9.1	Calling for Technical Support	21
9.2	Fault Codes	21
9.3	Modules Status	22
9.4	Redundant loops	22
9.5	Modules Replacement	22

APPENDICES

A	Technical characteristics (system)	23
	Cabinet dimensions & mounting	24
B	Ordering / marking cipher (X1–X11)	25
C	Field analyzer line-up	26
D	Controlled substances (measured components)	27

1 IMPORTANT INFORMATION

1.1 FOR YOUR SAFETY

Before using this product, carefully read the Instructions for Use. Do not dispose of them — ensure they are retained and appropriately used by the product user. Only fully trained and competent users are permitted to use this product. Comply with all local and national rules and regulations associated with this product.

Only trained and competent personnel are permitted to inspect, repair and service the product as detailed in these Instructions for Use. Further maintenance work not detailed here must only be carried out by **TREMON** or personnel qualified by TREMON. Use only genuine TREMON spare parts and accessories, or the proper functioning of the product may be impaired. Do not use a faulty or incomplete product, and do not modify the product.

1.5 HOW TO USE THIS MANUAL

This manual should be read by everyone who operates or monitors the GDC gas detection system. Only personnel fully trained by TREMON are authorised to install, set up, service, test, repair or recondition gas detection systems.

1.2 DEFINITIONS OF ALERT ICONS

Alert icons highlight text that requires greater awareness by the user:

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in physical injury or damage to the product or environment. Also used to alert against unsafe practices.

NOTICE

Indicates additional information on how to use the product.

1.6 CONVENTIONS USED

Boot up — starting the software from cold. **Reboot** — shutting down and restarting the software without interrupting power. **Restart** — cycling the power off then on. **Start up** — switching on the system. **Touch** — direct interaction with the touchscreen by finger. **Settings > Service > Relay** highlights a command sequence; **[Start]** highlights a unique button touch. **GDC** refers to the Gas Detection System. **TREMON** • GDC • INSTRUCTIONS FOR USE

1.3 GENERAL WARNINGS

- 1 Do not operate the system or its components outside their rated operating specification.
- 2 All equipment containing a User Interface must be suitably protected from direct sunlight and rain.
- 3 Power supply fluctuations must not exceed AC 180–250 V supply or $\pm 10\%$ of nominal.
- 4 All enclosure apparatus is electrical Class 1 and must be connected to Protective Earth (Ground).
- 5 The installation must include a means of isolating or disconnecting the input voltage supply, conveniently located and clearly labelled. The AC mains disconnection device must disconnect both line and neutral poles but maintain earth (ground) continuity.
- 6 Input voltage supply must include over-current protection.
- 7 All cabling must be appropriately rated and approved per local, national and company regulations.
- 8 Cabling must satisfy the requirements of connected field-device manuals, especially where a device is certified for a hazardous location.
- 9 Cable glands, blanking plugs, reducers, adaptors and breather devices must be suitably approved and must not reduce the IP rating.
- 10 Access doors and entry points must be kept closed when the system is energised.
- 11 The GDC contains hazardous live terminals — operators must have appropriate training and experience.
- 12 The protection provided by the GDC may be impaired if installed or used in an incorrect, unspecified or unauthorised way.

1.4 GENERAL CAUTIONS

The system's control, input and output modules have no user-serviceable parts — in the unlikely event of a failure the item must be replaced using only manufacturer-supplied parts. Do not use sharp objects on the touchscreen. Clean only with a soft, damp cloth or screen wipe — no solvents or abrasives. Do not place objects on top of the enclosures.

2 SAFETY CAUTIONS AND HAZARDS

2.1 SAFETY CAUTIONS

Incorrect set-up, maintenance, operation or modification of the GDC or its installation may constitute a serious hazard to the health and safety of personnel and their environment. It is imperative that this chapter is thoroughly understood by everyone with access to the system. When properly installed, the enclosure is rated **IP65**. Hazards that may be encountered include:

- Class 1 electrical hazards (AC 220 V, DC 18–32 V)
- Mechanical hazards (heavy components, swinging access doors, locking handles)
- Environmental hazards (toxic atmospheres)
- Fire and ignition hazards

2.2 SAFETY HAZARDS – LETHAL VOLTAGE PRESENT

! WARNING

All power supplies must be hard-wired and include a circuit breaker and, close by and unobstructed, a means of manually isolating and locking-out the supply without breaking the protective earth connection. Lethal current may be present when power is applied and after it is removed. Isolate power before opening access panels and ensure residual current is fully discharged before touching live terminals. All installations must be grounded to protective earth and stay earthed when the supply is interrupted.

I NOTICE

The GDC and/or its sensors may become contaminated by the ambient environment in which they are used. It is the customer's sole responsibility to ensure appropriate safety precautions before handling any components or transferring them to any other party.

Each enclosure is heavy and weighs considerably more when packed. Carry out a Manual Handling Risk Assessment before moving or installing, and fit enclosures securely to a suitable vertical surface. The GDC uses high-energy AC and DC currents that may arc and spark if shorted — always wear eye protection when the enclosure is open, and hearing protection near loud alarms/sirens. **Always follow a Safe System of Work when working with safety systems.**

2.3 COMPONENT TESTING AND REPLACEMENT

Before any electrical testing or component replacement: read this Manual to become familiar with the location of high-voltage components; isolate the system at the main circuit breaker, lock it in the 'Off' position and attach a maintenance-in-progress notice; never assume the polarity of cabling or replacement components — refer to electrical schematics or contact TREMON; use only TREMON approved replacement parts. Only TREMON trained and certified technicians are authorised to carry out component testing and replacement.

! CAUTION

Unauthorised work may result in a potentially dangerous situation and will invalidate the manufacturer's warranty.

2.4 ANTISTATIC PRECAUTIONS

PCBs use static-sensitive components that can be damaged by static discharge. Static generated on the human body is discharged through the first contacted route to earth and can jump gaps between items of differing electrical potential — observe antistatic precautions.

2.5 GOOD PRACTICE

After switching off the system, wait at least **10 seconds** before switching on again. This lets the circuits and RAM discharge adequately before power-up; failing to do so may cause data corruption.

2.6 LITHIUM BATTERY HAZARD

Lithium batteries are fitted to the PLC as a backup power source. Replace the factory-installed battery with type **CR2032** only. Use of other batteries may present a risk of fire or explosion.

! CAUTION

Lithium batteries may cause severe injury or death if swallowed, and may catch fire or explode if mishandled, recharged, burned or disposed of incorrectly. Handle with care, keep out of reach of children, and dispose of carefully per local regulations. Batteries shall only be fitted, removed or replaced in non-hazardous (safe) areas.

2.7 PRODUCT COMPLIANCE

This product complies with the applicable EU directives and harmonised standards for electromagnetic compatibility and electrical safety of low-voltage equipment. Other safety directives may apply to the complete system installation if the product is integrated into other equipment or machinery. Conformity is declared for the equipment as supplied.

EMC Directive 2014/30/EU

Low Voltage Directive 2014/35/EU

CE

I NOTICE

The equipment referred to in this manual contains components and assemblies each certified for use in a variety of differing environments. It is the site owner's responsibility to confirm the suitability of the equipment prior to its installation and use.

2.8 CONDITIONS OF USE

This equipment shall only be operated by properly trained personnel, under TREMON-approved conditions, with due authorisation, and using approved maintenance and servicing procedures.

2.9 TRAINING OF PERSONNEL

TREMON can provide training for operators and maintenance personnel. Trained personnel shall be limited to the procedures taught during the course; TREMON certified technicians must carry out all other tasks. Retraining is recommended periodically and whenever the equipment is changed or upgraded.

2.10 DUE AUTHORISATION

Before any production, maintenance or servicing procedure, written authorisation must be obtained from TREMON personnel to confirm that the proposed task satisfies the necessary safety conditions.

2.11 MARKING

Each cabinet carries an identification label with the **TREMON** wordmark, the product marking cipher (e.g. **GDC-600-LR-...**), serial number and rating data (supply, power, IP rating). The GDC can handle a wide range of gas detectors via current loop or RS-485 through analogue inputs, and can control audible/visible signals, solenoid valves and venting systems. Events are transferred via **Modbus** or **IEC 60870-5-104** to the control room or SCADA. Every cabinet has a service USB connector for configuration and diagnostics.

The full ordering / marking cipher (fields X1-X11) and the system technical characteristics are given in **Appendix A** and **Appendix B** at the end of this manual. Quote the serial number and cipher when contacting technical support.

3 GENERAL DESCRIPTION

3.1 SYSTEM GENERAL DESCRIPTION

The **Gas Detection Controller (GDC)** continuously monitors remote sensor transmitters in order to warn of potentially dangerous or harmful conditions. The system is based on a modular PLC intended to be installed in a rack-based cabinet.

The controller monitors the current signals from the remote sensor transmitters on its input channels and provides warnings when alarm or fault conditions occur. Each input channel can provide alarms for up to **two gas levels** and **one fault condition**. The gas-level alarms indicate potentially dangerous or harmful gas concentrations at the transmitter; the fault alarm operates when the transmitter sends the relevant fault signal.

The combination of internal modules (input modules, relay modules and output modules) and the controller configuration can be altered to meet the gas-detection and warning requirements. The warning devices used with the controller can likewise be selected and configured as required. The GDC is configured using a Microsoft Windows®-based program and also has a built-in configuration system.

The GDC can handle a wide range of gas detectors via current loop or RS-485 through analogue inputs, and can control various outputs such as audible and visible signals, solenoid valves and venting systems. All events are transferred via **Modbus** or **IEC 60870-5-104** to the control room or SCADA. Every cabinet has a service USB connector for configuration and diagnostics.

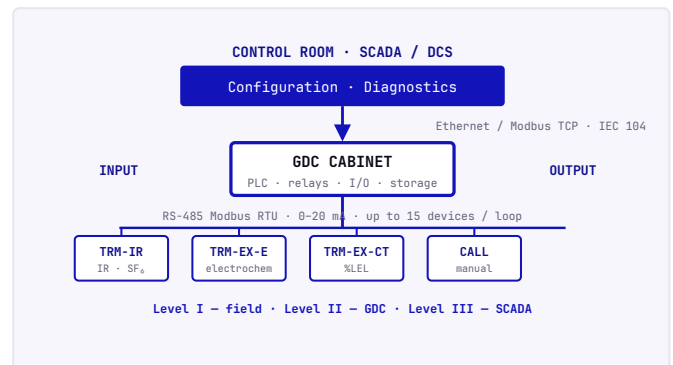


Fig. 1 – Typical installation – three levels: field detectors → GDC cabinet (input / output) → control room (configuration & diagnostics)



Fig. 2 – GDC gas detection system, wall-mounted



Fig. 3 – Internal arrangement: PLC, relay-output modules, circuit breakers, phase selector, PSU and I/O terminals on DIN rail

3.2 PARAMETERS

Based on one CPU and two relay-output modules. The GDC is designed to operate on a single-phase, 50–60 Hz, 100 ... 240 VAC supply with a maximum power consumption of less than **100 W** (depends on configuration). An optional backup battery guards against short-term power disruption.

Features of the controller unit

- Colour LCD touchscreen with multi-language GUI & menus
- Password protection
- Flexible mains input: 50–60 Hz, 100 ... 240 VAC
- Up to 64 modules on one line
- Remote field-bus module network
- User-configurable relay-controlled outputs
- Alarm update on acknowledge
- Automatic self-diagnostics with error codes
- Event recording to SD card
- 2× Ethernet (Modbus TCP, IEC 104, PRP)
- Redundant modules

POWER SUPPLY – ELECTRICAL RATINGS	VALUE
Input voltage	100 ... 240 VAC
AC frequency range	50 – 60 Hz ± 6 %
DC voltage output	24 V
Rated power output	up to 200 W
POWER CONSUMPTION	MAX POWER
Touchscreen	5 W
CPU module	0.6 W
Relay output module	1.5 W
Analog input module	0.3 W

* Depends upon configuration.

3.3 CONSTRUCTION

The system cabinet is constructed from powder-coated steel with a quick-release front access door panel. The door panel holds a touch-sensitive colour LCD and **4 status LEDs**. Inside the cabinet is a DIN-rail switched-mode power supply providing a nominal **24 V DC** output, an optional lithium-ion backup battery, a main CPU module, two relay-output modules, protection circuit breakers, an automatic phase selector, and input/output terminals.

SYSTEM DIMENSIONS

External dimension — Depth 250* mm

External dimension — Height 600* mm

External dimension — Width 600* mm

System weight 25 kg*

Ambient operating temperature — standard cabinet +1 °C ... +55 °C

Ambient operating temperature — with heater option -40 °C ... +50 °C

Operating humidity (non-condensing) 5 % ... 95 % RH

Storage — without batteries -25 °C ... +60 °C, 5–95 % RH non-condensing

Storage — with batteries -20 °C ... +25 °C (1 yr) · -20...+45 °C (3 mo) · -20...+60 °C (1 mo)

IP rating IP65

The cabinet is supplied with a wall mounting or can be directly mounted to any solid vertical surface. Cable entry is via a rubber gland on the lower side. The GDC is rated **IP65** — dustproof and able to withstand low-pressure water without significant ingress — making it particularly suited to offices, control rooms and unheated boiler rooms. The enclosure contains a common earth (ground) rail that must be connected to Protective Earth (Ground).

IP65 powder-coated steel quick-release door

4 status LEDs

3.4 LCP2116 – PROCESSOR MODULE

The processor module is equipped with:

- 32-bit ARM CPU with integrated I/O
- 2 GB onboard flash drive
- 100 kB SRAM
- Interface for X2X network modules
- 1 USB interface
- 6 RS-485 interfaces
- 2 Ethernet interfaces 10/100BASE-T
- Push-in fast terminals

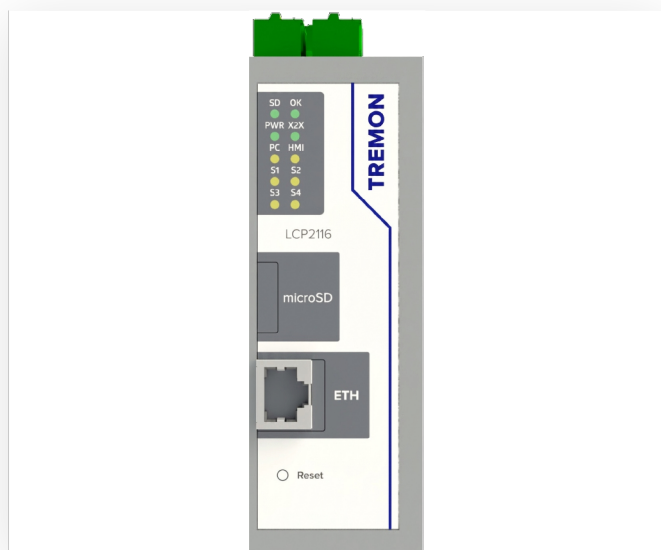


Fig. 4 – LCP2116 processor module

3.5 LCP2116 – TECHNICAL DATA

Interfaces	6× RS-485, 2× Ethernet, 1× USB, 1× X2X network
System module diagnostics	CPU function, RS-485, Ethernet, power supply, X2X — via status LED
Controller redundancy	Yes
Power consumption (excl. interface CPU & X2X Link supply)	1 W
Input voltage	24 V DC -15 % / +20 %
Input current	max. 1 A
Fuse	Integrated, cannot be replaced
Reverse-polarity protection	Yes
Processor type	ARM
Clock frequency	84 MHz
SRAM	100 kB
RAM buffer	4 kB ECC
Remanent variables	512 kB FRAM
Shortest task-class cycle time	2 ms
Application memory	2 GB microSD
Writable data amount	40 TB
Guaranteed erase / write cycles	20 000
Dimensions (W × H × D)	164 × 144 × 40 mm
Weight	150 g
Degree of protection	IP20

3.5 LCP2116 – INTERFACES & ELECTRICAL PROPERTIES

COMMUNICATION INTERFACES

INTERFACE	SIGNAL / PROPERTY	VALUE
Interface 0	RS-485	Max. distance 900 m · max. 1.0 Mbit/s · 2-wire terminal
Interfaces 1 ... 6	RS-485	Max. distance 1200 m · max. 115 kbit/s · 2-wire terminal
Interfaces 7 ... 8	Ethernet	Max. 100 m per segment · 10/100 Mbit/s · 1× RJ45 shielded
Interface 9	USB 2.0	Connection type B

ELECTRICAL & AMBIENT

Physical layer (Ethernet)	10BASE-T / 100BASE-TX, half- and full-duplex
Electrical isolation	Ethernet, POWERLINK and X2X isolated from each other; channel isolated from bus
Mounting orientation	Horizontal and vertical
Degree of protection	IP20
Temperature — operation	-25 ... 60 °C
Temperature — storage / transport	-40 ... 85 °C
Relative humidity (all modes)	5 ... 95 %, non-condensing

Interface addressing: IF0 is the high-speed X2X module link (up to 1 Mbit/s over 900 m); IF1-IF6 are the RS-485 field interfaces (up to 115 kbit/s over 1200 m) used to communicate with the gas detectors; IF7-IF8 are the Ethernet ports; IF9 is the USB service port.

3.6 LCP2116 – STATUS LEDS

LED	STATE	DESCRIPTION
SD	On / Blink	SD OK; blinking = read; error indication
Ok	On / Blink	RUN mode (on) · PREOPERATIONAL (blink 500 ms) · error (blink 20 ms)
Pwr	On / Off	Module power supply OK (on) · not connected / error (off)
X2X	On / Blink	RUN (on) · PREOPERATIONAL (blink) · standby (off)
S1-S4	Blink	CPU transmitting data via the RS-485
Ethernet	On / Blink	Link established (on) · activity (blink) · no connection (off)



Fig. 5 – LCP2116 – front / connector face

3.7 RESET

Press the reset button for less than **2 seconds** to trigger a hardware reset on the CPU: all application programs stop, all outputs are set to zero, then the controller boots and runs.

3.8 RS-485 INTERFACE

Six fault-protected RS-485 interfaces with extended common-mode range, intended to serve as the online interface for communication with the gas detectors.

3.9 PROJECT INSTALLATION

Project installation is described in the [Tremon Automation Studio](#) Instructions for Use.

3.10 ETHERNET INTERFACE

Designed for 10BASE-T / 100BASE-TX transmission. Supports the following hard-wired TCP/IP protocols: TCP, UDP, ICMP, IPv4, ARP, IGMP. Up to 6 simultaneous connections on each Ethernet port.

3.11 LCP2116 – RS-485 CONNECTION & OUTPUT CIRCUIT

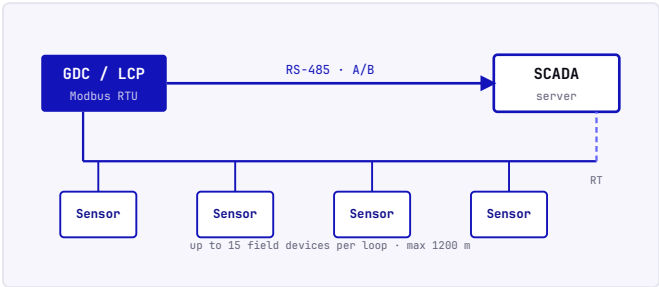


Fig. 7 – RS-485 connection example – LCP (Modbus RTU) → SCADA; up to 15 sensors per loop, termination at loop end

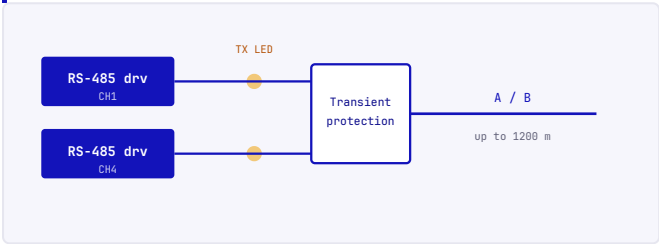


Fig. 8 – RS-485 output circuit – driver channels with TX status LED and transient-voltage protection

RS-485 A1_A4 / B1_B4	RS-485 channel pairs
RS-485 A_H / B_H	High-speed X2X pair
RS-485 A_P / B_P	Powered field pair
+24 VDC / GND	Module supply

Fig. 6 – LCP2116 terminal pinout

3.12 RS-485 PARAMETERS

RS-485 PARAMETER	VALUE
Bus-pin fault protection	> ±70 V
Common-mode voltage range	–20 V ... 25 V
Electrostatic discharge	±16 kV JEDEC
Nodes	< 256 nodes
Signalling rate	115 kbps
Cable length	< 1500 m
Termination resistor	Yes

ETHERNET PARAMETERS

ETHERNET PARAMETER	VALUE
Independent sockets	8
Tx / Rx buffers	32 Kbytes
Modbus TCP	Yes
IEC 104	Yes
PRP	Yes

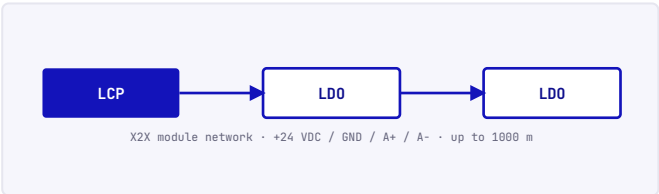


Fig. 9 – X2X module network – LCP daisy-chained to LD0 modules (+24 VDC / GND / A+ / A-)

3.13 LD01128 – RELAY OUTPUT MODULE

The module is equipped with **8 relay outputs** for 3-wire connections:

- 8 digital outputs
- Relay module for 240 VAC / 30 VDC
- Switching current 2 A
- 8 normally-open / normally-closed contacts
- Push-in fast terminals
- Up to 1000 m remote communication

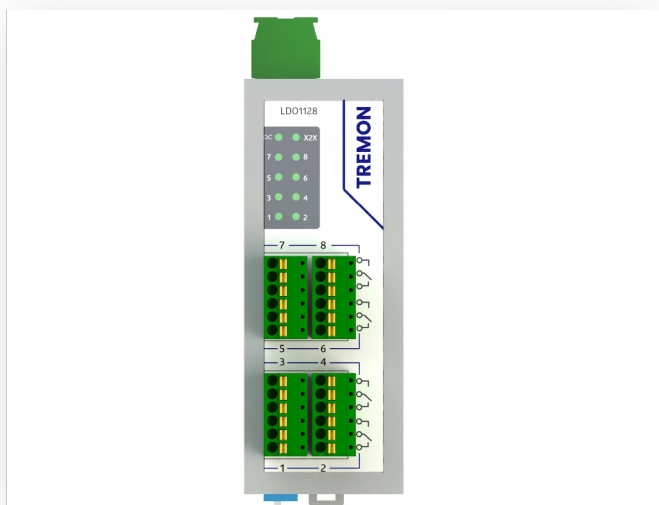


Fig. 10 – LD01128 relay output module

3.14 LD01128 – TECHNICAL DATA

I/O module	8 digital outputs, 30 VDC / 250 VAC, 3-wire, isolated
Variant	Relay — normally open / closed contacts; channels isolated
Nominal voltage	30 VDC / 250 VAC
Max. voltage	264 VAC
Switching voltage	max. 50 VDC / 264 VAC
Rated frequency	DC / 45 ... 63 Hz
Nominal output current	2 A @ 30 VDC / 2 A @ 250 VAC
Total nominal current	16 A @ 30 VDC / 16 A @ 250 VAC
Contact resistance	max. 100 mΩ
Switching delay 0 → 1 / 1 → 0	≤ 10 ms
Isolation — channel-bus	tested at 2300 VAC
Isolation — channel-channel	tested at 750 VAC
Service life — electrical	min. 500 000 ops (2 A / 240 VAC)
Service life — mechanical	5 000 000 ops
Bus power consumption	2 W
Degree of protection	IP20
Temperature — operation / storage	-25 ... 50 °C / -40 ... 85 °C

3.15 LD01128 – STATUS LEDS, PINOUTS & ADDRESS

LED	STATE	DESCRIPTION
DC	On / Off	Power supply OK (on) · not connected (off)
X2X	On / Blink	RUN mode (on) · PREOPERATIONAL (blink) · error (off)
1 – 8	On / Off	Digital output on (on) · digital output off (off)

3.16 RELAY PINOUT

Each of the 8 channels provides three terminals: **NO x** (normally open), **COM x** (common) and **NC x** (normally closed).

NO 1 ... NO 8	Normally-open contacts
COM 1 ... COM 8	Common
NC 1 ... NC 8	Normally-closed contacts

Fig. 11 – LD01128 relay pinout – 8× (NO / COM / NC)



Fig. 13 – LD01128 with binary network-address DIP switch

3.17 SUPPLY / NETWORK PINOUT

X2X module network terminals: **A-**, **A+**, **GND** and **+24 VDC** (doubled for daisy-chaining).

A- / A+	X2X data pair
GND	Ground
+24 VDC	Module supply

Fig. 12 – LD01128 supply / network pinout

3.18 NETWORK ADDRESS SWITCH

A binary address switch sets the module bus address using weighted positions **1 · 2 · 4 · 8 · 16**.

3.19 LD01128 – CONNECTION, CIRCUIT & DATA

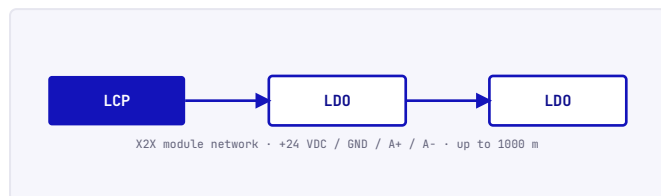


Fig. 14 – LD01128 connection example – 24 VDC supply, X2X to LCP

Command	from PLC logic
Output	relay coil driver
Status LED	green – commanded state
COM / NO / NC	contact set, 240 VAC

Fig. 15 – LD01128 output circuit – command → relay contact set

3.20 OUTPUT CIRCUIT DIAGRAM

Each output drives an isolated relay contact set with a green status LED indicating the commanded state.

3.21 GENERAL DATA POINTS

The module has general data points that are not module-specific but contain general information such as serial number and hardware variant. Fixed modules require their data points in a specific order in the frame; cyclic access occurs at a predefined offset (not by register address), while acyclic access continues to be based on register numbers.

BIT	NAME	VALUE → INFORMATION
0	DigitalOutput01	0 = output 01 reset · 1 = output 01 set
...	...	...
7	DigitalOutput07	0 = output 07 reset · 1 = output 07 set

3.22 MINIMUM CYCLE TIME

The minimum cycle time is the shortest bus cycle achievable without communication errors. Very fast cycles reduce the idle time available for monitoring, diagnostics and acyclic commands. **Recommended cyclic time > 10 ms**, or use sporadic data transmission.

4 INSTALLATION AND SETUP DOCUMENTATION

The gas detection system is designed for each customer by TREMON. The system is very flexible and configured individually. Every system is shipped with a **Customer Drawing Package**, which includes:

- 1 **System Block Diagram** — overview of the complete system and end-user utility requirements.
- 2 **Field Unit Arrangement** — external and internal arrangement of system components and main system dimensions.
- 3 **Field Unit Installation** — installation instructions for the system and probes.
- 4 **Flow Diagram** — complete flow diagram and logic table.
- 5 **Interconnect Wiring** — power and signal connections inside the customer connection enclosure.

I NOTICE

System installation and wiring must be done per the TREMON Customer Drawings. Strictly follow these Instructions for Use. Use only TREMON approved parts.

4.1 COMMON DESIGN REQUIREMENTS

- Prevent unauthorised access
- Provide a nearest grounded chassis point
- Protect against shock, vibration, temperature extremes, overpressure, excess voltage and humidity
- Use only proper interface connections to external devices
- Separate power and signal cables
- Shielded cables recommended for detector wiring
- Cat-5e for Ethernet (up to 100 m)
- Prevent output overloads
- RS-485 cable impedance 120 Ω

4.2 WIRING

All input and output terminal blocks use push-in connection technology. Insert rigid conductors or conductors with ferrules from **0.25 mm²** into the conductor shaft — the contact spring opens automatically and provides the required pressure against the current bar. For smaller conductors from **0.14 mm²**, use a standard screwdriver to actuate the contact spring.

- Double-check wire insulation; replace if damaged
- Do not stress cables
- Replace any damaged terminal immediately

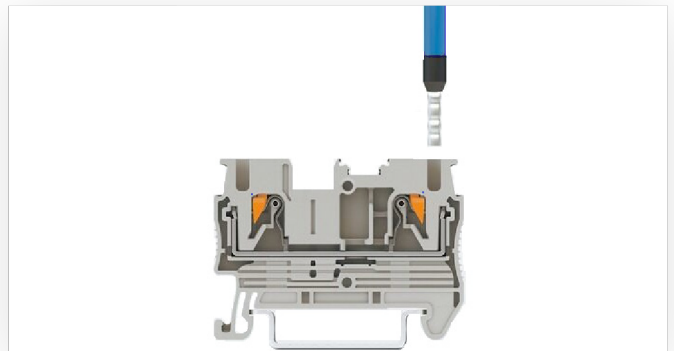


Fig. 16 / 17 – Push-in terminal technology & field wiring

5 GDC USER GUIDE

! CAUTION

Opening the enclosure may expose live electrical circuits. Touching exposed terminals or wires may cause death or serious injury. Do not operate the system in normal mode with the door insecure. Take alternative site safety precautions while power is off.

5.1 USER INTERFACE – GENERAL

The User Interface panel has a colour touchscreen for normal operation, maintenance and configuration, with power / alarm / fault / inhibit indicators, active-channel (01–40) status indicators, and IP addresses of connected servers. Further interfaces:

- Silence-sounder button
- 16 configurable relays (basic config)
- Detector-alarm, system-alarm and gas warning/alarm outputs for visual & audio devices
- SD-card slot for data logging and firmware/software updates
- X2X network for expansion modules
- Remote RS-485 interface networking
- Remote Modbus TCP/IP or IEC 104 protocol

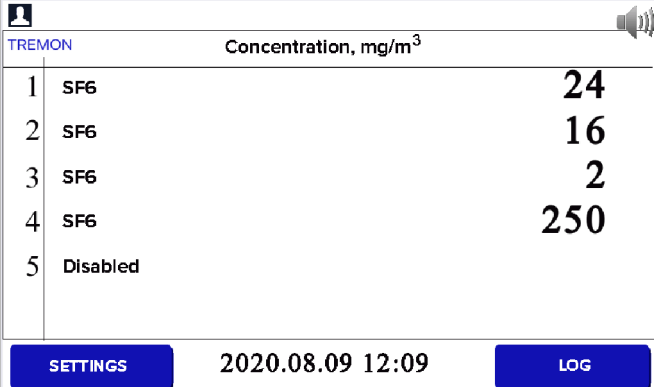
5.2 TOUCHSCREEN

The touchscreen is touch-only — no swipe or pinch gestures. It has two access levels: **View** mode is available to all users, while **Configuration, Maintenance and System Test** functions are password-protected.

5.3 SWITCHING ON AND OFF

Before switching power on, ensure the system has been commissioned or that a qualified person has checked the wiring is safe and conforms to local regulations. Check that the battery isolator switches are 'On' and that an SD card is fitted (including the optional expansion unit).

Switch on power at the circuit breakers and wait for the system to initialise (the start-up sequence may last up to **15 seconds** depending on the number of channels). The GDC first displays the main screen showing the current status of the detectors.



TREMONTM		Concentration, mg/m ³
1	SF6	24
2	SF6	16
3	SF6	2
4	SF6	250
5	Disabled	

SETTINGS 2020.08.09 12:09 LOG

Fig. 18 – Home screen – per-channel readings, status icons, settings & log buttons

Home-screen icons: SETTINGS (menu options) • LOG (event history) • sounder enabled / silenced • login state (nobody / admin) • battery OK / low (blinking) • latched alarm events (blinking).

5.4 MENU ITEMS AND ACCESS LEVELS

The Administrator can edit everything. The Operator can view and acknowledge events. A user logs in by touching the log-in icon and entering a valid password.

MENU ITEM	OPERATOR	ADMIN
Settings – Ports	view	edit
Settings – Relay (Gas / Fault relays)	view	edit
Settings – Service (Date & Time, Modules Status, Emulation, Toolbox)	—	edit
Relay Test • Redundancy • IEC 104 • Detector Settings	—	edit
LOG – view / acknowledge events	yes	yes
LOG – delete	—	yes

I NOTICE

Authentication resets after 15 minutes of inactivity. For security, do not leave the touchscreen unattended while logged in.

5.5 SD CARD USAGE

The SD card stores the system event history and configuration; the GDC logs all events. The system accepts standard SD cards of **2 to 32 GB (FAT32)**. Cards must be formatted on first insertion.

5.6 NORMAL OPERATION

During normal operation:

- The system collects sensor data every **100 ms** from the ports
- The cause-and-effect matrix is evaluated immediately on each event and commands are sent to the appropriate relay
- Any change in channel status is reported to the User Interface and logged in the event history
- Events (alarms, faults, inhibits, etc.) are reported and logged
- Any internal fault activates the System Fault relay
- Any safety-function failure (e.g. lost sensor connection) activates the Detector Fault relay

Touchscreen interactions

The colour touchscreen is activated with a finger; do not use sharp or abrasive objects. All interactions are a single tap (no gestures or swipes). Some actions open a new window that can be closed with the **X** or **[Cancel]** button.

5.7 USER INTERFACE SCREEN & NAVIGATION

Icons in the navigation toolbar toggle through the User Interface options. Typical icons: **BACK** (go up a menu), warning event, alarm event, and OK state. The menu requires the appropriate access-level password to enter Configuration and System Test options.

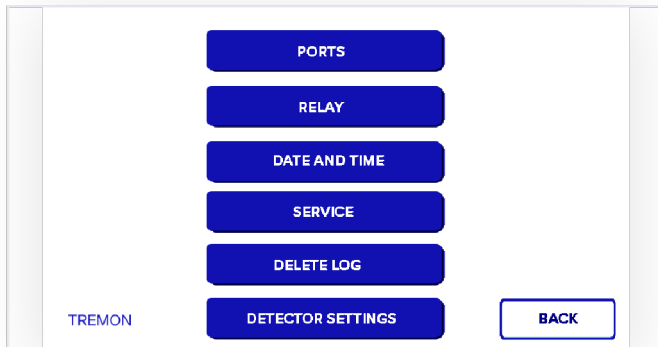


Fig. 20 – Menu access – Ports • Relay • Service • Toolbox • Redundancy

5.8 VIEW ACTIVE ALARMS

Active alarms can be viewed from the Home screen. Touch the LOG button to display the events, most recent first. To silence the sounder, touch the flashing button — this silences the alarm for **10 minutes**.

NOTICE

Check for new alarms if the sounder restarts after you have acknowledged it.

5.9 EVENT INFORMATION

Detailed information about active events is viewed via the LOG button on the bottom toolbar. The screen lists events with date and start/end time. Touch **Delete** to clear the log.

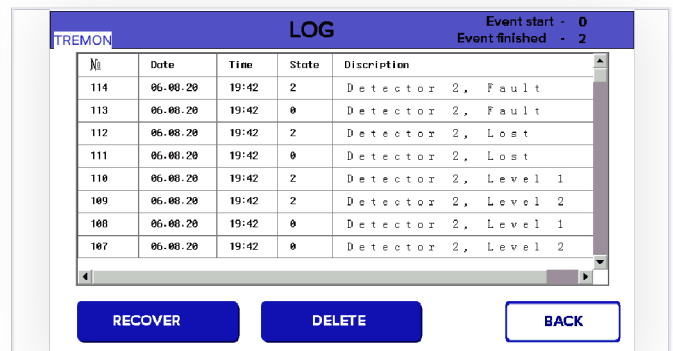


Fig. 22 – Log screen – event type, date, start / end time

5.10 ACKNOWLEDGING EVENTS

Active and latched events are acknowledged by pressing the LOG button, which acknowledges all active events and silences the sounder.

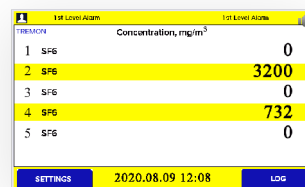


Fig. 21 – 1st-level (warning)

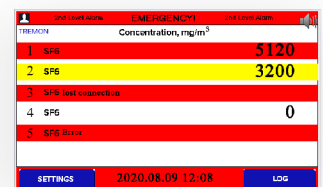


Fig. 23 – 2nd-level (alarm)

6 SYSTEM CONFIGURATION

6.1 GENERAL INFORMATION

For GDC configuration use the **Tremon Automation Studio** software — a Microsoft Windows based program that requires a USB-B cable and a compatible PC. The software and interface unit are available from TREMON; see the Instructions for Use supplied with the software. Several settings can also be changed using the built-in configuration system.

6.2 RS-485 PORTS

Four RS-485 serial ports are available. The **PORTS** screen binds an RS-485 port to the proper output terminal. Ports are viewed in **Settings > Ports**.

SERIAL PORTS				
4				
SERIAL				
OUTPUT	1	2	3	4
1	✓			
2		✓		
3			✓	
4				✓

Fig. 23 – Serial port screen – RS-485 port binding

6.3 OUTPUT RELAYS

Configure in **Settings > Relays**: select the digital output module and detector address, set the 1st (Yellow) and 2nd (Red) gas levels, then save the configuration.

RELAY MODULE 1								
DETECTOR 7								
RELAY NUMBER								
LEVEL	1	2	3	4	5	6	7	8
500	✓	✓				✓		
5000	✓			✓			✓	

Fig. 24 – Relay settings – gas-level assignment (Yellow / Red)

6.4 DATE AND TIME

Set in **Settings > Date and Time**, then save.

NOTICE

If the system is connected to SCADA via IEC 104, there is no need to set the date and time manually — SCADA syncs it automatically. Otherwise it must be done manually.

6.5 INHIBITING DETECTORS

- 1 Log in as Administrator.
- 2 Go to **Settings > Detector Settings**.
- 3 Choose the detector number and Inhibit or Enable it.
- 4 Save settings.

6.6 ETHERNET PROTOCOL

The Ethernet interface supports two protocols and 6 clients. IP, subnet, gateway, etc. are configured in Tremon Automation Studio. The touchscreen allows choosing protocol IEC 104 or Modbus TCP in **Settings > Service > IEC104**. After choosing and accepting, the PLC reboots — wait for loading.

NOTICE

All valid connections are listed in the Connected Servers table.

7 MAINTENANCE AND SCHEDULED TESTING

! CAUTION

Test outputs will be generated and relays will be activated during testing. Ensure that relay-activated output systems (e.g. emergency deluge / sirens) are isolated before starting any test.

7.1 ROUTINE TESTING

It is normal practice to sound the site alarms periodically, both to check they work and to accustom personnel to the sound. As this involves inhibiting emergency systems, it may be more prudent to test the GDC relays only on a planned monthly basis.

- Visually inspect all cables for loose connections, security and damage
- Wipe the controller with a soft damp cloth or PC screen cleaner; check for dust contamination
- Periodically exercise the outputs to confirm functionality

7.2 EXERCISING THE RELAYS

Relay output channels can be tested by forcing the relays to an active state:

- 1 Isolate relay-activated output systems (deluge / sirens).
- 2 Log in as Administrator or Service:
Settings > Service > Test Relay.
- 3 Touch the active (yellow) relay output channels to be tested and toggle them on.
- 4 Check the selected relay output contact switching with a suitable test tool or voltmeter.
- 5 Touch **[Finish] > [Cancel]** — all selections turn off.

! CAUTION

If the relays are switching mains voltages, hazardous live terminals may be present. Ensure all mains current is isolated and dissipated before touching live terminals.

7.3 CHECK SYSTEM REACTION

The GDC reaction to every event (gas-level alarms, faults, etc.) can be tested by emulation of the event: **Settings > Service > Emulation** — choose the detector number and event, then activate and accept.

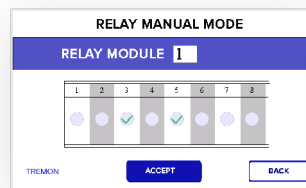


Fig. 28 – Force relay

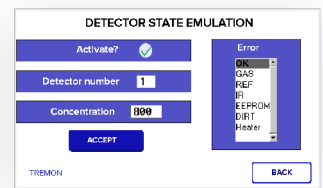


Fig. 29 – Event emulation

! CAUTION

Emulation generates digital output signals and corresponding register values via Ethernet and RS-485 to SCADA.

7.4 PERIODIC SCHEDULED TESTING

Periodic scheduled testing should only be carried out by a TREMON authorised technician or a qualified trained person. Besides the safety considerations, TREMON field-service technicians can minimise downtime should a fault become apparent during testing.

8 SERVICING

! WARNING

Repairs, replacements and upgrades should only be carried out by authorised TREMON technicians or by qualified persons trained per TREMON requirements. Failure to follow this advice will invalidate your warranty and may lead to death, injury or irreparable damage.

8.1 BACK-UP BATTERY MAINTENANCE

Replace the battery only with type **CR2032**. Use of other batteries may present a risk of fire or explosion. Batteries shall only be fitted, removed or replaced in non-hazardous (safe) areas.

- 1 Ensure the environment is safe and the atmosphere is below flammable levels.
- 2 Switch the GDC off and isolate its power supplies.
- 3 Disconnect plugs from the PLC unit.
- 4 Unmount the PLC from the DIN rail.
- 5 Unscrew the four locking screws and open the enclosure.
- 6 Replace the battery with a CR2032.
- 7 Close the enclosure and secure with the four screws.
- 8 Mount the PLC on the DIN rail and reconnect all plugs.
- 9 Switch power on and restore the GDC to normal operation; check the power icon for battery state.

! CAUTION

Lithium batteries may cause severe injury or death if put in the mouth or swallowed. Keep away from children and dispose of as hazardous waste per local regulations.

9 TROUBLESHOOTING

! CAUTION

Read Chapter 2 (Safety) and all related warnings and cautions before carrying out any work on the gas detection system.

Problems are signalled by an error on the control-panel display and recorded in the event log; the screen can be cancelled once the fault is corrected. Contact TREMON if an error appears repeatedly, cannot be cleared, or is not listed below.

9.1 CALLING FOR TECHNICAL SUPPORT

Have ready: your company and contact details; the system serial number (on the identification label); error messages / codes shown on screen; a description of the difficulty; and the system status (inoperative, partially operative, still functioning). You may be asked to email a copy of your event log.

9.2 FAULT CODES

DISPLAY IN EVENT HISTORY	DESCRIPTION
Detector lost	Detector does not respond. Check the connection.
Memory fault	uSD memory-card fault.
uSD missing	uSD memory card is not inserted.
Detector fault	Remote fault notified by a detector. Check the detector manual.
Relay Output Error	Relay not controlled.
Battery Fault	Backup battery fault or running low.
Configuration Fault	Configuration file corrupted.
Loop broken	RS-485 redundant loop is broken.

9.3 MODULES STATUS, REDUNDANCY & REPLACEMENT

Information about the PLC and modules is viewed in **Settings > Service > Modules Status**. A list of all configured modules is displayed — **green LED** = module OK, **red LED** = error.

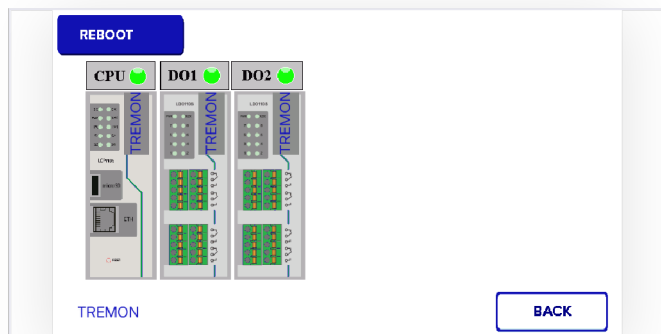


Fig. 30 – Modules status – configured-module health list

9.4 REDUNDANT LOOPS

Information about redundant RS-485 loops is viewed in **Settings > Service > Redundancy**. Loop state: **green** = loop OK, **red** = loop broken.

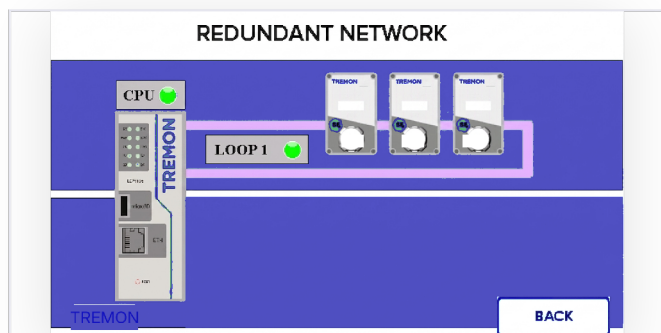


Fig. 31 – Redundancy – RS-485 loop state

9.5 MODULES REPLACEMENT

The GDC is a modular system, combining hot-pluggable electronics with spare bus slots for added options. Results in a system that is easy to service and expand.

CAUTION

Prevent short circuits while hot-swapping a module.

Removing

- 1 Unplug connectors from the module.
- 2 Release the locking mechanism on the snap-on foot with a suitable screwdriver; hold the device by the housing cover and tilt it upwards.
- 3 Carefully lift the device off the DIN-rail connector.

Mounting

- 1 Set the correct module bus address (same as the removed module).
- 2 Connect the DIN-rail connectors together for a connection station.
- 3 Push the connected DIN-rail connectors into the DIN rail.
- 4 Place the device onto the DIN rail from above, aligned with the connector.
- 5 Push the device towards the mounting surface until the snap-on foot audibly clicks; check it is fixed securely.
- 6 Reconnect the unplugged connectors.
- 7 During start-up, check the device is operating, wired and marked correctly.

A APPENDIX A – TECHNICAL CHARACTERISTICS (SYSTEM)

System-level ratings for the assembled GDC controller. Values depend on the ordered configuration (see the marking cipher in Appendix B). Module-level data for the LCP2116 and LDO1128 is given in chapter 3.

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 for direct wall fixing. Larger 800 × 600 × 250 mm variant available (cipher X1).

IP65 26 kg powder-coated steel

stainless (SS) option

Options

Stainless-steel (SS) body, cabinet heating for –40 ... +50 °C operation, additional power supply (X5), and internal UPS are available as ordering options.

heating option

UPS option

ATS – dual supply

■ ■ APPENDIX A – CABINET DIMENSIONS & MOUNTING

General-arrangement drawing of the standard **600 × 600 × 250 mm** wall cabinet (cipher X1 = 600). Front view shows the module layout behind the door; the rear view gives the wall-mounting hole pattern. All dimensions in millimetres. The larger **800 × 600 × 250 mm** variant (cipher X1 = 800) shares the same mounting principle.

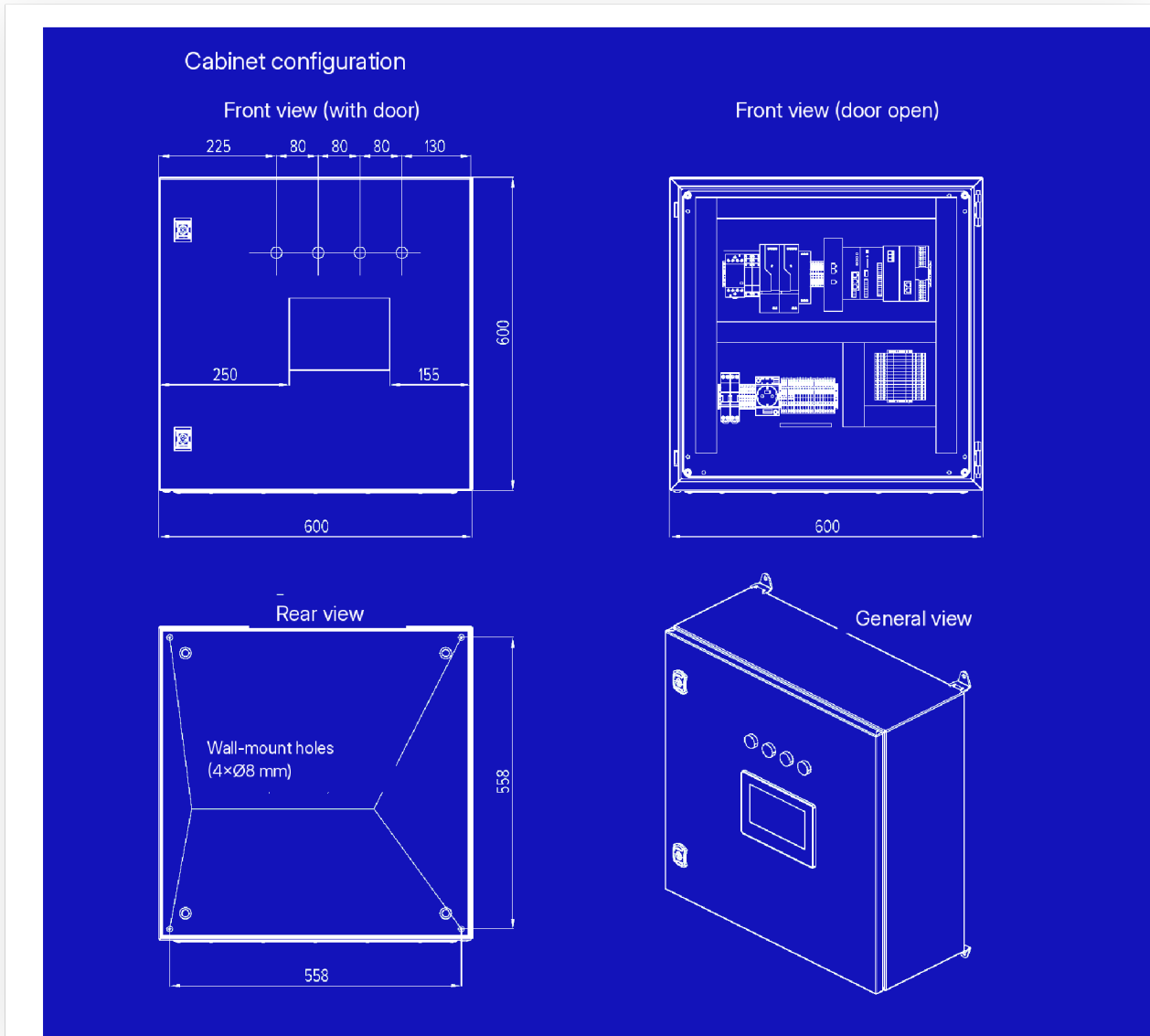


Fig. A1 – Cabinet configuration: front (door closed / open), rear mounting pattern and general view

H 600 mm W 600 mm D 250 mm

rear panel 558 × 558 mm 4 × Ø8 mm mounting holes

B APPENDIX B – 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”)

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

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

X4 | LDO(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) ... LD014(24)	Nine ... fourteen 8-channel relay 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 LDO(24) 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.

B APPENDIX B – PROTOCOLS, OPTIONS & FIELD ANALYZERS

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

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

X10 | CABINET HEATING OPTION

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

X11 | CABINET POWER TYPE

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

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

C APPENDIX C – FIELD ANALYZER LINE-UP

The GDC accepts field analyzers named by measuring principle. Each analyzer is factory-configured to the ordered gas and range; the full controlled-substances list is published in the GDC data sheet.

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

Modbus TCP/IP Modbus RTU IEC 60870-5-104

Vendor-independent — integrates with any third-party SCADA / DCS.

■ D APPENDIX D – CONTROLLED SUBSTANCES (MEASURED COMPONENTS)

Field analyzers are 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 are carried from the catalogue; each analyzer is factory-configured to the ordered component and range.

TRM-EX-E — electrochemical sensor · toxic & specialty gases (1 of 2)

N°	CODE	MEASURED COMPONENT	RANGE	UNITS
1	NH₃	Ammonia (NH ₃)	0–50	ppm
2	NH₃	Ammonia (NH ₃)	0–100	ppm
3	NH₃	Ammonia (NH ₃)	0–250	ppm
4	NH₃	Ammonia (NH ₃)	0–1000	ppm
5	H₂	Hydrogen (H ₂)	0–500	ppm
6	H₂	Hydrogen (H ₂)	0–1000	ppm
7	H₂	Hydrogen (H ₂)	0–2000	ppm
8	O₂	Oxygen (O ₂)	0–25	%vol
9	NO₂	Nitrogen dioxide (NO ₂)	0–30	ppm
10	SO₂	Sulfur dioxide (SO ₂)	0–10	ppm
11	SiH₄	Monosilane (SiH ₄)	0–1	ppm
12	O₃	Ozone (O ₃)	0–1	ppm
13	O₃	Ozone (O ₃)	0–5	ppm
14	NO	Nitric oxide (NO)	0–50	ppm

N°	CODE	MEASURED COMPONENT	RANGE	UNITS
15	NO	Nitric oxide (NO)	0–250	ppm
16	CO	Carbon monoxide (CO)	0–300	ppm
17	CO	Carbon monoxide (CO)	0–500	ppm
18	CO	Carbon monoxide (CO)	0–1000	ppm
19	H₂S	Hydrogen sulfide (H ₂ S)	0–20	ppm
20	H₂S	Hydrogen sulfide (H ₂ S)	0–50	ppm
21	H₂S	Hydrogen sulfide (H ₂ S)	0–100	ppm
22	H₂S	Hydrogen sulfide (H ₂ S)	0–120	ppm
23	H₂S	Hydrogen sulfide (H ₂ S)	0–250	ppm
24	H₂S	Hydrogen sulfide (H ₂ S)	0–500	ppm
25	HCN	Hydrogen cyanide (HCN)	0–30	ppm
26	CH₂O	Formaldehyde (CH ₂ O)	0–10	ppm
27	PH₃	Phosphine (PH ₃)	0–10	ppm
28	F₂	Fluorine (F ₂)	0–5	ppm

TRM-EX-E — electrochemical sensor · toxic & specialty gases (2 of 2)

№	CODE	MEASURED COMPONENT	RANGE	UNITS
29	HF	Hydrogen fluoride (HF)	0–10	ppm
30	Cl ₂	Chlorine (Cl ₂)	0–10	ppm
31	HCl	Hydrogen chloride (HCl)	0–25	ppm
33	C ₂ H ₄ O	Ethylene oxide (C ₂ H ₄ O)	0–20	ppm
34	C ₂ H ₄ O	Ethylene oxide (C ₂ H ₄ O)	0–100	ppm
35	AsH ₃	Arsine (AsH ₃)	0–1	ppm
36	BF ₃	Boron trifluoride (BF ₃)	0–10	ppm
37	BCl ₃	Boron trichloride (BCl ₃)	0–25	ppm
38	SiH ₂ Cl ₂	Dichlorosilane (SiH ₂ Cl ₂)	0–25	ppm
39	Si ₂ H ₆	Disilane (Si ₂ H ₆)	0–15	ppm
40	GeH ₄	Germane (GeH ₄)	0–5	ppm
41	CH ₃ SiH ₃	Methylsilane (CH ₃ SiH ₃)	0–1	ppm
42	N ₂ O	Nitrous oxide (N ₂ O)	0–30	ppm

№	CODE	MEASURED COMPONENT	RANGE	UNITS
43	SiCl ₄	Silicon tetrachloride (SiCl ₄)	0–25	ppm
44	SiF ₄	Silicon tetrafluoride (SiF ₄)	0–10	ppm
45	SF ₄	Sulfur tetrafluoride (SF ₄)	0–10	ppm
46	HSiCl ₃	Trichlorosilane (HSiCl ₃)	0–15	ppm
47	WF ₆	Tungsten fluoride (WF ₆)	0–10	ppm
48	B ₂ H ₆	Diborane (B ₂ H ₆)	0–1	ppm
49	HNO ₃	Nitric acid (HNO ₃)	0–30	ppm
50	C ₂ SiH ₆	Dimethylsilane (C ₂ SiH ₆)	0–1	ppm
51	C ₃ H ₁₀ Si	Trimethylsilane (SiH(CH ₃) ₃)	0–15	ppm
52	PF ₅	Phosphorus pentafluoride (PF ₅)	0–10	ppm
53	CH ₃ F	Fluoromethane (CH ₃ F)	0–10	ppm
54	H ₂ Se	Hydrogen selenide (H ₂ Se)	0–5	ppm

TRM-EX-SMC — semiconductor sensor · refrigerants

№	CODE	MEASURED COMPONENT	RANGE	UNITS
1	R-125	Pentafluoroethane (C ₂ HF ₅)	0–2000	ppm
2	R-134a	1,1,1,2-tetrafluoroethane (C ₂ H ₂ F ₄)	0–2000	ppm
3	R-134a	1,1,1,2-tetrafluoroethane (C ₂ H ₂ F ₄)	0–5000	ppm
4	R-143a	1,1,1-trifluoroethane (C ₂ H ₃ F ₃)	0–2000	ppm
5	R-22	Chlorodifluoromethane (CHClF ₂)	0–2000	ppm
6	R-32	Difluoromethane (CH ₂ F ₂)	0–2000	ppm
7	R-32	Difluoromethane (CH ₂ F ₂)	0–10000	ppm
8	R-404a	Refrigerant R404a (C ₂ HF ₅ +C ₂ H ₃ F ₃ +C ₂ H ₂ F ₄)	0–2000	ppm

№	CODE	MEASURED COMPONENT	RANGE	UNITS
9	R-404a	Refrigerant R404a (C ₂ HF ₅ +C ₂ H ₃ F ₃ +C ₂ H ₂ F ₄)	0–5000	ppm
10	R-407a	Refrigerant R407a (CH ₂ F ₂ +C ₂ HF ₅ +C ₂ H ₂ F ₄)	0–2000	ppm
11	R-407c	Refrigerant R407c (CH ₂ F ₂ +C ₂ HF ₅ +C ₂ H ₂ F ₄)	0–5000	ppm
12	R-407f	Refrigerant R407f (CH ₂ F ₂ +C ₂ HF ₅ +C ₂ H ₂ F ₄)	0–2000	ppm
13	R-410a	Refrigerant R410a (CH ₂ F ₂ +C ₂ HF ₅)	0–2000	ppm
14	R-427a	Refrigerant R427a (CH ₂ F ₂ +C ₂ HF ₅ +C ₂ H ₃ F ₃ +C ₂ H ₂ F ₄)	0–1000	ppm
15	R-507	Refrigerant R507 (C ₂ HF ₅ +C ₂ H ₃ F ₃)	0–2000	ppm
16	SF ₆	Sulfur hexafluoride (SF ₆)	0–2000	ppm

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

Nº	CODE	MEASURED COMPONENT	RANGE
1	NH₃	Ammonia (NH ₃)	0–100 %LEL
2	C₂H₂	Acetylene (C ₂ H ₂)	0–100 %LEL
3	C₃H₆O	Acetone (C ₃ H ₆ O)	0–100 %LEL
4	C₆H₆	Benzene (C ₆ H ₆)	0–100 %LEL
5	C₄H₆	1,3-butadiene (C ₄ H ₆)	0–100 %LEL
6	C₄H₁₀	Butane (C ₄ H ₁₀)	0–100 %LEL
7	C₄H₉OH	Butanol (C ₄ H ₉ OH)	0–100 %LEL
8	i-C₄H₈	Isobutylene (i-C ₄ H ₈)	0–100 %LEL
9	H₂	Hydrogen (H ₂)	0–100 %LEL
10	C₆H₁₄	Hexane (C ₆ H ₁₄)	0–100 %LEL
11	C₇H₁₆	Heptane (C ₇ H ₁₆)	0–100 %LEL
12	o-C₈H₁₀	o-xylene (o-C ₈ H ₁₀)	0–100 %LEL
13	m-C₈H₁₀	m-xylene (m-C ₈ H ₁₀)	0–100 %LEL
14	p-C₈H₁₀	p-xylene (p-C ₈ H ₁₀)	0–100 %LEL
15	C₄H₈	Butylene (C ₄ H ₈)	0–100 %LEL
16	C₃H₈O	Isopropyl alcohol (C ₃ H ₈ O)	0–100 %LEL
17	C₂H₆O	Dimethyl ether (C ₂ H ₆ O)	0–100 %LEL
18	CH₄	Methane (CH ₄)	0–100 %LEL
19	CH₃OH	Methanol (CH ₃ OH)	0–100 %LEL

Nº	CODE	MEASURED COMPONENT	RANGE
20	C₈H₁₈	Octane (C ₈ H ₁₈)	0–100 %LEL
21	C₅H₁₂	Pentane (C ₅ H ₁₂)	0–100 %LEL
22	C₃H₈	Propane (C ₃ H ₈)	0–100 %LEL
23	C₃H₆	Propylene (C ₃ H ₆)	0–100 %LEL
24	C₈H₈	Styrene (C ₈ H ₈)	0–100 %LEL
25	C_xH_y	Hydrocarbons ΣC _x H _y (by methane)	0–100 %LEL
26	C_xH_y	Hydrocarbons ΣC _x H _y (by propane)	0–100 %LEL
27	C_xH_y	Hydrocarbons ΣC _x H _y (by hexane)	0–100 %LEL
28	C₆H₅CH₃	Toluene (C ₆ H ₅ CH ₃)	0–100 %LEL
29	C₆H₁₂	Cyclohexane (C ₆ H ₁₂)	0–100 %LEL
30	C₅H₁₀	Cyclopentane (C ₅ H ₁₀)	0–100 %LEL
31	C₂H₆	Ethane (C ₂ H ₆)	0–100 %LEL
32	C₂H₅OH	Ethanol (C ₂ H ₅ OH)	0–100 %LEL
33	C₄H₈O₂	Ethyl acetate (C ₄ H ₈ O ₂)	0–100 %LEL
34	C₂H₄	Ethylene (C ₂ H ₄)	0–100 %LEL
35	C₂H₄O	Acetaldehyde (CH ₃ CHO)	0–100 %LEL
36	C₆H₁₂O₂	Butyl acetate (C ₆ H ₁₂ O ₂)	0–100 %LEL
37	C₉H₂₀	Nonane (C ₉ H ₂₀)	0–100 %LEL
38	C₄H₈O	2-butanone (C ₄ H ₈ O)	0–100 %LEL

TRM-EX-IR — infrared (cell) sensor · CO₂ & hydrocarbons

Nº	CODE	MEASURED COMPONENT	RANGE	UNITS	Nº	CODE	MEASURED COMPONENT	RANGE	UNITS
1	CO ₂	Carbon dioxide (CO ₂)	0-5	%vol	7	C ₅ H ₁₂	Pentane (C ₅ H ₁₂)	0-100	%LEL
2	CO ₂	Carbon dioxide (CO ₂)	0-5000	ppm	8	C ₃ H ₈	Propane (C ₃ H ₈)	0-100	%LEL
3	C ₄ H ₆	1,3-butadiene (C ₄ H ₆)	0-100	%LEL	9	CxHy	Hydrocarbons ΣCxHy (by methane)	0-100	%LEL
4	C ₄ H ₁₀	Butane (C ₄ H ₁₀)	0-100	%LEL	10	CxHy	Hydrocarbons ΣCxHy (by propane)	0-100	%LEL
5	C ₆ H ₁₄	Hexane (C ₆ H ₁₄)	0-100	%LEL	11	CxHy	Hydrocarbons ΣCxHy (by hexane)	0-100	%LEL
6	CH ₄	Methane (CH ₄)	0-100	%LEL					

TRM-IR series — dedicated infrared sensor · SF₆ / refrigerants

Nº	CODE	MEASURED COMPONENT	RANGE	UNITS
1	SF ₆	Sulfur hexafluoride (SF ₆)	0-6000 / 0-12000	mg/m ³
2	R-134a	1,1,1,2-tetrafluoroethane [C ₂ H ₂ F ₄]	0-4240 / 0-8480	mg/m ³
3	R-125	Pentafluoroethane [C ₂ HF ₅]	0-4990 / 0-9980	mg/m ³
4	R-22	Chlorodifluoromethane [CHClF ₂]	0-3600 / 0-7200	mg/m ³
5	R-113	1,1,2-trichlorotrifluoroethane [C ₂ Cl ₃ F ₃]	0-7790 / 0-15580	mg/m ³
6	R-12	Dichlorodifluoromethane [CCl ₂ F ₂]	0-251 / 0-503	mg/m ³
7	R-227ea	1,1,1,2,3,3,3-heptafluoropropane [C ₃ HF ₇]	0-7070 / 0-35350	mg/m ³
8	R-407c	Refrigerant blend R407c*	0-3583 / 0-7165	mg/m ³

* Refrigerant blend R407c (by mass): R32 (CH₂F₂) 23 %, R125 (C₂HF₅) 25 %, R134a (C₂H₂F₄) 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. The list above is representative – contact TREMÓN for components not shown.



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Only TREMON trained and certified personnel are authorised to install, set up, service, test, repair or recondition this system. Use only genuine TREMON spare parts. TREMON recommends a service contract for all maintenance activities.