

Data Sheet

# Gas detection unit

## Accessory

**Controller unit**

Used for detecting and warning of hazardous gas concentrations in industrial refrigeration



The gas detection Controller Unit is used for a centralized monitoring and warning of hazardous gas concentrations. The input signals for the controller are collected from the local gas detection units of the types Basic, Premium and Heavy Duty via RS485 Fieldbus or Analog communication. In total 96 gas detection sensors can be handled via Fieldbus + 4 via Analog directly on the controller (+28 additional possible if expansion modules added).

The Controller Unit comes with 4 alarm relays available for external looped alarm devices. Additional relays and sensor wiring loops is possible by adding Expansion modules to the controller.

Each local gas detection unit is assigned a unique address in the Controller and by continuous communication with the individual GDU's the Controller reacts on alarm signals from the local GDU. The parameter setting and the actual state of each local GDU can be read in the Controller display.

## Features

- For connection of up to 96 sensors via fieldbus + 32 via Analog“(when 7 expansion modules added)
- Easy configuration via intuitive user-interface; helps simplify operator handling and minimize risk of operational setting errors
- Simple commissioning by standard parameter configuration
- Flexible connection to local gas detection units by either Analog or RS485 fieldbus communications
- Fieldbus wiring: Wire length up to 900 meters (2953 ft.) per segment
- 4 relays for external alarm device circuits
- Up to 7 Expansion modules possible; allows additional 7 segments with a total of 7200 meters (23622 ft.) wiring and a total of 32 relays for alarm device circuits
- Automatic self-diagnostics to ensure correct communication and operation
- Relay for communication error
- 6 menu languages
- Password protected settings allowing authorized access only
- Service alerts on display
- Conformity to EN 50545-1
- Enables regulatory compliance with EN 378:2016, ISO 5149:2014

## Portfolio overview

Figure 1: Gas detection Controller unit



Table 1: Portfolio overview

Description	Values
Used for product	Basic, Premium and Heavy Duty
Net weight	0.28 kg
Working temperature	-5 °C – 40 °C (23 °F – 104 °F)
Packing format	Single pack

## Applications

Detecting and warning of hazardous gas concentrations in industrial refrigeration systems such as food and beverage processing areas, cold storages, and on-board ships.

## Media

### **Refrigerants**

The Danfoss Gas Detection Solution provides a high degree of flexibility when designing and building your gas detection system.

The portfolio ranges from basic to heavy duty models complemented by a range of accessories. The gas detection units (GDU) can detect a wide range of refrigerant gases including Ammonia (R717), CO<sub>2</sub> (R744), fluorinated refrigerants (HCFC and HFCs), and Propane (R290). They come with various sensor technologies to match the specific refrigerant, application, and safety requirements of the refrigeration system including electrochemical (EC), semiconductor (SC), Pellistor (P), and infrared sensors.

To provide a strong plug and play solution, all gas detection units come factory preconfigured to match refrigerant and typical PPM setting requirements. Depending on national regulations PPM settings may be subject to change.

### **New refrigerants**

Danfoss products are continually evaluated for use with new refrigerants depending on market requirements.

When a refrigerant is approved for use by Danfoss, it is added to the relevant portfolio, and the R number of the refrigerant (e.g. R513A) will be added to the technical data of the code number. Therefore, products for specific refrigerants are best checked at [store.danfoss.com/en/](https://store.danfoss.com/en/), or by contacting your local Danfoss representative.

## Product specification

### Design

Table 2: Design

<b>Visualization</b>	
LCD	Two lines, 16 characters each, illuminated
Status LED (4)	Operation – fault – 1st alarm – ≥ 2nd alarm
Operation	6 push-buttons
Menu language (selectable)	German, English, Dutch, USA, French, Swedish
<b>Interface fieldbus</b>	
Transceiver	RS 485 / 19200 Baud
<b>Gases</b>	
Digital and analog sensors for toxic, combustible & refrigerant gases	
<b>Physical</b>	
Enclosure	Plastic housing ABS
Colour	RAL 7035
Protection class	IP 40
Weight	0.3 kg (0.8 lb.)
Packaging volumes	Ca. 4.4 l
Mounting	Top DIN rail mounting, installation in distribution box
Dimensions (Controller unit)	(W x H x D) 106 x 110 x 62 mm (4.2 x 4.3 x 2.4 in.)
Dimensions (Controller Solution)	(W x H x D) 298 x 420 x 140 mm (11.7 x 16.5 x 5.5 in.)
<b>Wire connection:</b>	
Power supply	Screw type terminal: 2.5 mm <sup>2</sup> (14 AWG)
Output	2 x spring type terminal: min. 0.5 mm <sup>2</sup> , max. 1.5 mm <sup>2</sup> (22 to 16 AWG)
Input	Spring type: min. 0.5 mm <sup>2</sup> , max. 1.5 mm <sup>2</sup> (22 to 16 AWG)
<b>Interface ModBus RTU RS 485</b>	
Function	Transmission of current and average values, alarm and relay status, and analog output states in MODBus RTU RS 485 protocol to external devices

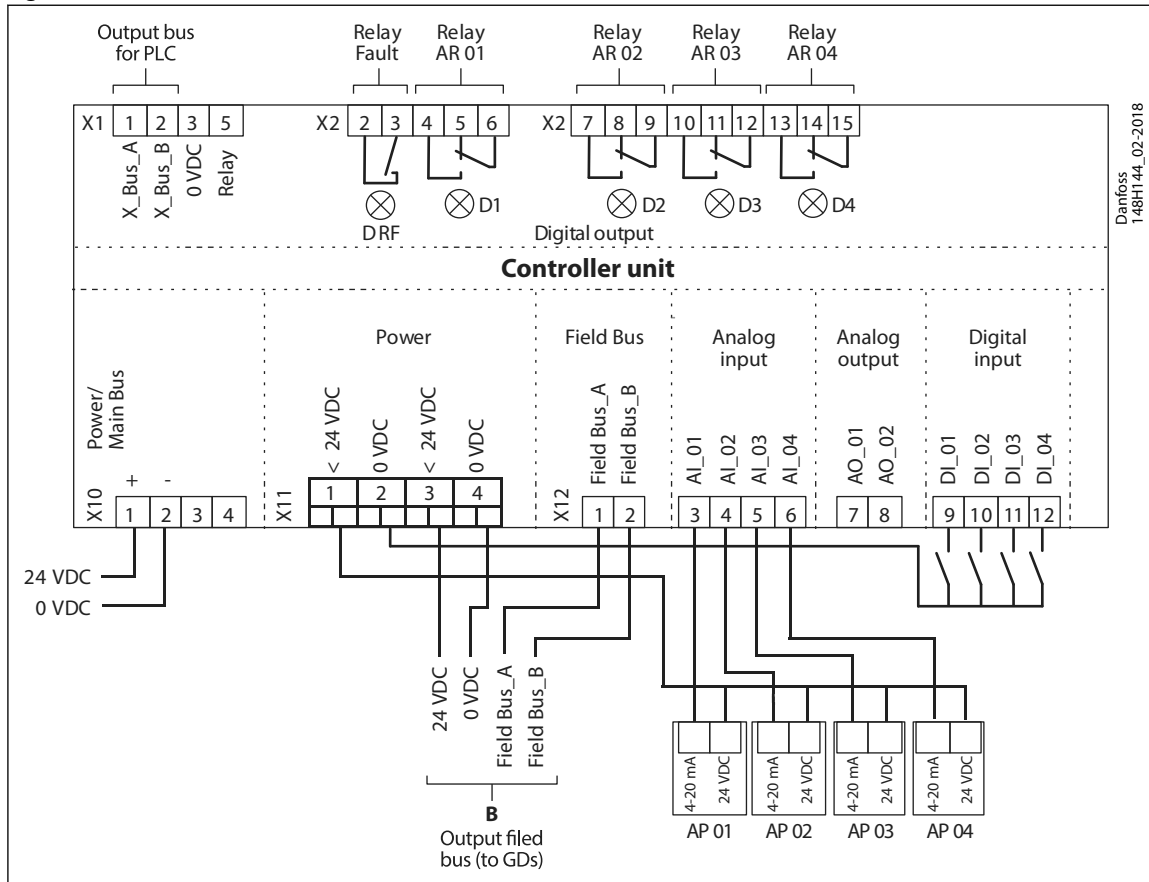
### Environmental conditions

Table 3: Environmental conditions

<b>Humidity</b>	15 – 95 % RH non-condensing
<b>Working temperature</b>	-5 °C – 40 °C (23 °F to 104 °F)
<b>Storage temperature</b>	0 °C – 40 °C (32 °F to 104 °F)

## Electrical connection

Figure 2: Circuit connection



**NOTE:**

RJ45 port available on the controller.

Table 4: Electrical connection

Electrical	Description
<b>Power supply</b>	24 V DC $\pm$ 20 %
<b>Power consumption (24 V DC)</b>	4 W, 150 mA
<b>Analog input (4)</b>	4 – 20 mA, overload and short-circuit- protected, input resistance 200 $\Omega$
<b>Tension for external analog transmitter</b>	24 V DC (same as power supply), max. 100 mA / per sensor
<b>Analog output (2) configurable for each input</b>	Proportional, overload and short-circuit- protected, charge $\leq$ 500 $\Omega$ 4 – 20 mA = measuring range 3.0 < 4 mA = underrange >20 – 21.2 mA = overrange 2.0 mA = fault
<b>Alarm relay (4)</b>	250 V AC, 5 A, potential-free, change-over (SPDT)
<b>Fault relay (1)</b>	250 V AC, 5 A, potential-free, normally open contact (SPST)

### Fieldbus loop

Each GD controller can handle up to 96 sensors and handle any mix of individual Gas detection units of the types Basic, Premium and Heavy Duty.

The max. recommended loop wire length is 900 meter (2953 ft) per segment.

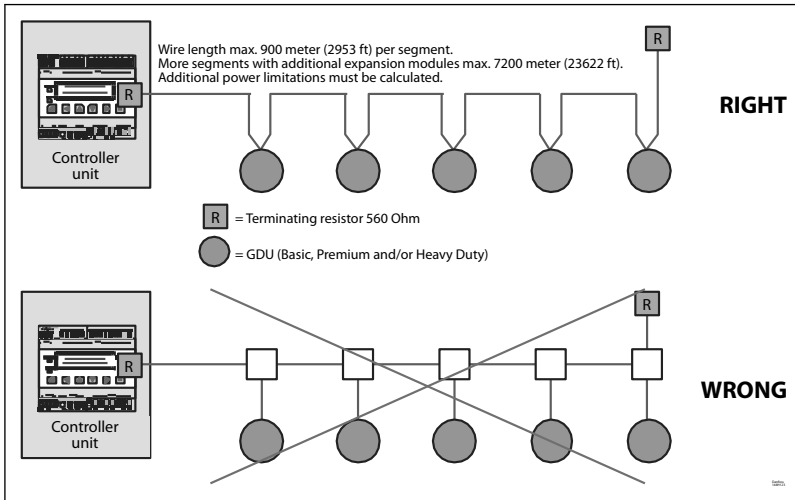
With additional segments (and additional controller expansion modules) the max recommended loop wire length is 7200 meter (23622 ft).

The controller and the last GDU in each segment must be provided with a resistor of 560 Ohm. A Umin of 16 V DC must be secured at any spot in the loop.

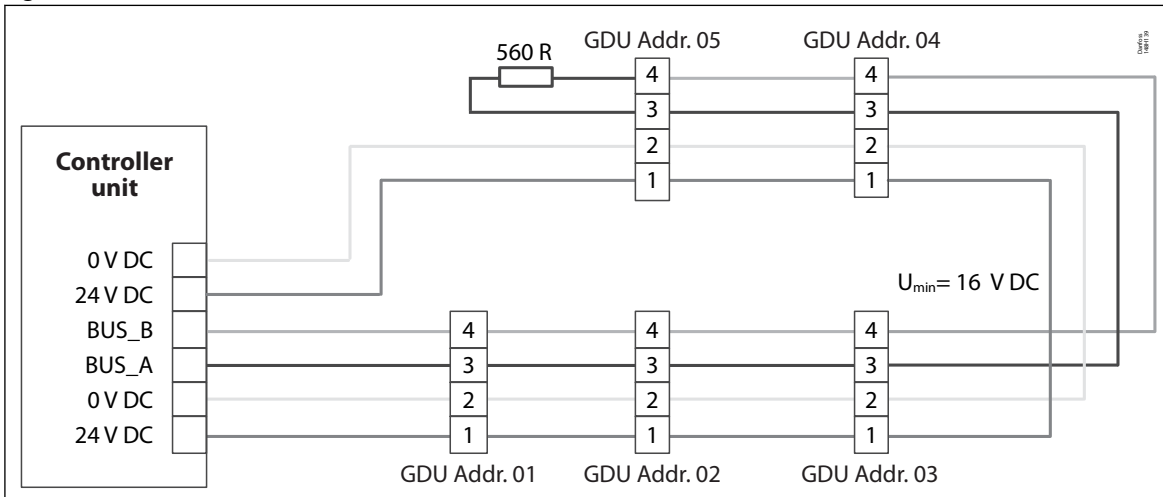
## Gas detection unit, Accessory

Below figure shows how to make proper connections between the controller and each GDU.

**Figure 3: Controller unit connections**



**Figure 4: Connections between the controller and each GDU**





## Ordering

Table 5: Ordering

Description	Code number
Controller unit	148H6231
Controller solution (controller + enclosure + power supply)	148H6221
Controller solution uptime (UPS)	148H6237
Controller expansion module	148H6222
Gateway for controller	148H6228

### Controller solution

The Controller solution is a controller unit already built into a plastic enclosure that is ready for being mounted directly on the wall. It is equipped with a power supply (230/110 V AC to 24 V DC, 6.5 A) and a circuit breaker.

### Controller Solution uptime

The Controller solution uptime is an interruptible power supply (UPS) accessory for the controller solution. It includes a battery pack (7.2 Ah , max 6.5A) in a plastic enclosure for direct mounting on the wall.

### Controller expansion module

The gas detection Controller Expansion module is used for expansion of the cable coverage in terms of number of loops and the total wire length. Each Controller Unit can handle up to 7 Expansion modules allowing additional 7 segments with a total of 7200 meters (23622 ft.) wiring and a total of 32 relays for alarm device circuits.

### Gateway for controller

The gateway is an addition to the controller and used for communicating via Modbus TCP/IP.

## Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at [danfoss.com](https://danfoss.com) or contact your local Danfoss representative if you have any questions.

Table 6: Compliance table

	EMC – Directive 2014/30/EU Low voltage directive 2014/35/EU EN 50545-1, EN 50271
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