

Instructions for use **REGARD 7000**



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1 Safety-related information

- Before using this product, carefully read these instructions for use and those of the associated and connected products (e.g. transmitter, alarm device).
- Strictly follow the instructions for use. The user must fully understand and strictly observe the instructions. The product is only permitted to be used for the intended use; otherwise the protection provided by the device may be impaired.
- Do not dispose of the instructions for use. Ensure that they are retained and appropriately used by the product user.
- Only trained and competent users are permitted to use this product.
- Comply with all local and national rules and regulations associated with this product (e.g. EN/IEC 60079-14).
- Only trained and competent personnel are permitted to inspect, repair and service the product. Dräger recommend a Dräger service contract for all maintenance activities and that all repairs are carried out by Dräger.
- Use only genuine Dräger spare parts and accessories, otherwise, the proper functioning of the product may be impaired.
- Do not use a faulty or incomplete product. Do not modify the product.
- Notify Dräger in the event of any component fault or failure.
- Do not operate in explosion-hazard areas. This device is neither approved nor certified for use in areas where combustible or explosive gas mixtures are likely to occur.
- Follow the directions of EN/IEC 60079-29-2 for measurement of flammable gases or oxygen.
- Follow the directions of EN 45544-4 for measurement of toxic gases or oxygen.

2 Conventions in this document

2.1 Meaning of the warning notes

The following alert messages are used in this document to provide and highlight areas of the associated text that require a greater awareness by the user. A definition of the meaning of each alert message is as follows:

Alert icon	Signal word	Consequences in case of non-observance
	WARNING	Indicates a potentially hazardous situation. If not avoided, it could result in death or serious injury.
	CAUTION	Indicates a potentially hazardous situation. If not avoided, it could result in physical injury. It may also be used to alert against unsafe practices.
	NOTICE	Indicates a potentially hazardous situation. If not avoided, it could result in damage to the product or environment.

2.2 Typographical conventions

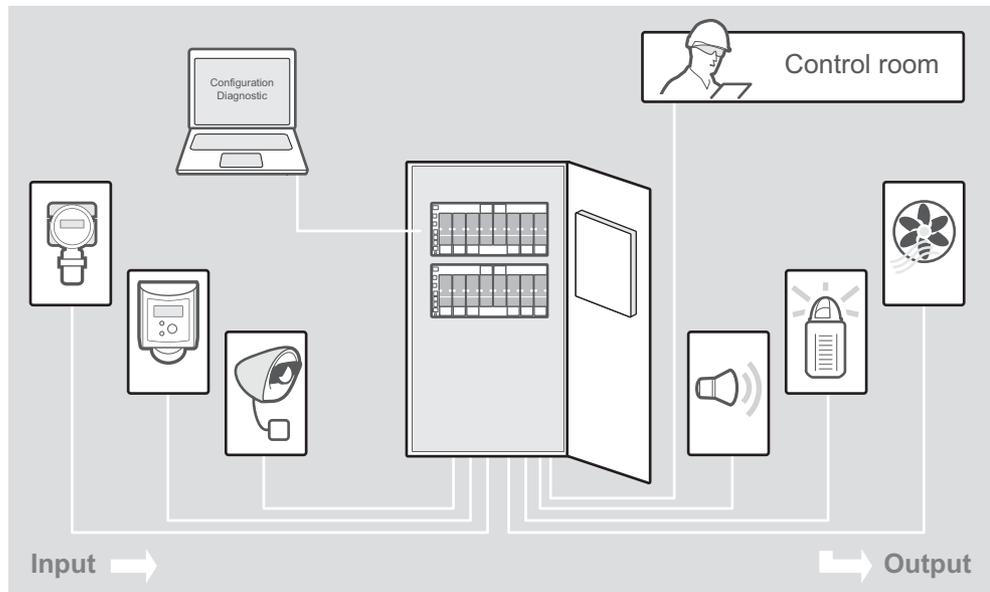
Text	Text in bold identifies labels on the device and text on the display.
	This triangle in warnings identifies the options available for avoiding the hazard.
>	The greater-than symbol identifies a navigation path in a menu.
	This symbol indicates information that may make the use of this product easier.

2.3 Brands

Brand	Brand owner
REGARD®	Dräger
ServiceConnect®	Dräger
HART®	HART Communication Foundation
Unitronic®	Lapp GmbH
PROFIBUS®, PROFINET®	PROFIBUS & PROFINET International (PI)

3 System overview

3.1 System description



REGARD 7000 is a modular control unit for gas and fire alarm systems. The control units consist of one or more Docking Stations, each of which can contain up to 8 modules. The REGARD 7000 is a system with distributed intelligence. Each module has the intelligence required for its function. A REGARD 7000 system can also be wired to create a system of up to 6 remote units (docking stations and modules). The complete system can have a maximum of 24 Docking Stations and can control 1536 channels. Input and output channels may be distributed as required (1 to 1535 up to 1535 to 1).

The modules are either input or output modules. Every module generally has 8 channels. All modules have their own intelligence and operate autonomously. The system is designed so failure of a module only affects the modules dependent on the failed module, i.e. the faulty module only generates a secondary fault in the modules that expect data from the faulty module. Other modules are not affected. In addition, every fault in the system is signalled on each Docking Station via the fault relay (System Fault Relay, SFR). All modules can be replaced during operation without shut-down of the supply voltage.

3.2 Safety design

REGARD 7000 is designed in accordance with the requirements for SIL2 and for SIL3 with the applicable system layout.

REGARD 7000 is designed as a system with distributed intelligence that does not require a master controller (masterless). The modules communicate with one another deterministically (predetermined) using a proprietary safety Ethernet network protocol. All bus devices send their current data in a data packet to all other bus devices once every second. Bus devices that derive actions from this information (e.g. relay modules) expect a valid data package from every module

once every second. The modules accept no more than 2 faulty data packets in succession. If more than 2 faulty data packets in succession are received, a fault is triggered and the fault relay (SFR) in the Docking Station is activated.

Due to the communication without a master device (masterless), there is no component in the system whose failure would trigger a failure of the complete system (Single Point of Failure). The modules are time-synchronised throughout the system by a module that is automatically selected when the system is started. In the event of a fault in this module, the time function is automatically transferred to another module in the system and a fault is signalled via the SFR. All modules not influenced by the faulty module continue to operate.

Special states in the system, such as Inhibit, are also displayed by the special state relay (SSR) at the Docking Station.

The alarm is triggered a maximum of 3.3 seconds after measurement of an alarm condition.

The system continuously monitors the correct function. Every system fault results in drop-out (normally energized) of the respective fault relay on the Docking Station.

Systems with requirements as per SIL3 can be implemented with REGARD 7000 by using a structure with redundant channels.

i Dräger recommends selection of fault-tolerant configurations for safety-relevant applications, such as acknowledgement of alarms using 2 independent switches.

3.3 REGARD 7000 components

System components REGARD 7000	Order number	Software / Firmware version
Docking Station 8-Slot	83 22 286	N/A
Docking Station 4-Slot	83 22 320	N/A
Advanced Dashboard 6RU	83 26 850	1.00.xx - 1.03.xx
Advanced Dashboard PM	83 26 860	1.00.xx - 1.03.xx
Standard Dashboard 3RU	83 27 840	1.03.xx
Adv Dashboard 6RU Basic Unit	83 28 255	1.00.xx - 1.03.xx
Adv Dashboard PM Basic Unit	83 28 260	1.00.xx - 1.03.xx
Std Dashboard 3RU Basic Unit	83 28 250	1.03.xx
4-20 mA Input Module	83 24 001	1.00.xx - 1.01.xx
4-20 mA Input Module / HART	83 27 250	1.01.xx
Digital Input Module	83 24 003	1.00.xx
Relay Module 24 V DC	83 23 250	1.00.xx
Relay Module 240 V AC	83 24 010	1.00.xx
Relay Module 24 V DC complex	83 24 874	1.00.xx
Relay Module 240 V AC complex	83 24 875	1.00.xx
Bridge Module	83 24 870	1.00.xx
Modbus RTU Gateway Set	83 24 872	1.00.xx
Modbus RTU Master	83 28 199	1.00.xx
Long Distance Gateway Set I	83 23 815	N/A
Slotcover	83 23 812	N/A

System components REGARD 7000	Order number	Software / Firmware version
Terminal Block 24 pole AC	83 24 016	N/A
Terminal Block 24 pole DC	83 24 020	N/A
Terminal Block 2 pole	83 24 871	N/A
Terminal Block 16 pole	83 24 017	N/A
Terminal Block 16 pole res	83 28 202	N/A
REGARD 7000 Configuration Software	N/A	≥01.02.xx
REGARD 7000 PC-Software Key	83 27 253	N/A

i Dräger recommends performing a dashboard firmware update when expanding REGARD 7000 with modules with a firmware version > 1.00.xx. The latest version of the dashboard firmware can be downloaded free of charge via the ServiceConnect® web portal (www.serviceconnect.draeger.com). Using dashboard firmware that is not up-to-date means that not all features of the new modules may be fully supported.

3.4 Intended Use

REGARD 7000 is a modular control unit for gas and fire warning systems.

The REGARD 7000 system continuously monitors production facilities for the following conditions:

- The presence of gas and/or vapour concentrations in the ambient air.
- The outbreak of fire.

The REGARD 7000 system has the following functions:

- The power supply of the connected transmitters and sensors.
- The evaluation of all measurement and status signals.
- The actuation of the associated alarm devices.

All measured values and important system parameters can be displayed continuously on one or more dashboards and sent to primary control centres via a gateway module.

3.5 Limitations on use

REGARD 7000 is not designed for use in process control.

The REGARD 7000 network is only permitted to be used for REGARD 7000 communication. Connection to a general IT network is not permitted, for example.

3.6 Approvals

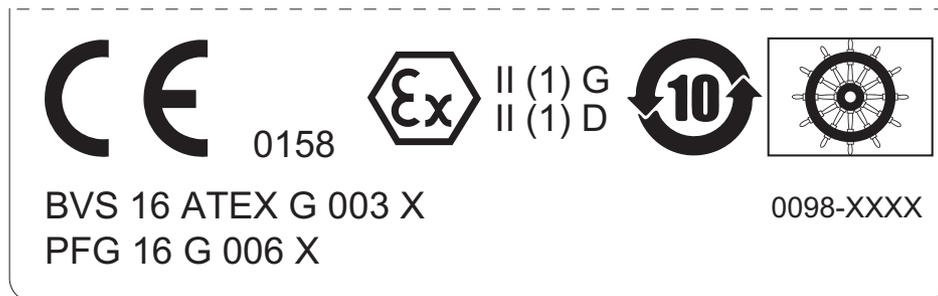
REGARD 7000 is approved under IEC/EN 61508:2010 and EN 50402:2017 for SIL 2 applications or for SIL 3 with the corresponding plant setup. For details of the configuration and system layout for SIL 2 or SIL 3 see the Dräger REGARD 7000 Safety Manual (order no. 90 33 497).

REGARD 7000 is approved for the measurement of

- flammable gases and vapours under ATEX
- oxygen inertisation measurements under ATEX
- oxygen and toxic gases

REGARD 7000 is suitable for use in setting up gas and fire alarm systems in accordance with NFPA 72:2016. The Digital Input modules types and all relay modules can be used for this purpose. The Digital Input module offers the monitoring function according to NFPA 72 Class B; the connecting lines between the relay outputs and the switching elements should be monitored by suitable external devices.

3.6.1 Marking



3.6.2 Approvals granted

Measurement technology for flammable gases and oxygen (inertisation measurement)

Inspection authority:	DEKRA EXAM GmbH
Standards:	EN 60079-29-1:2016
	EN 50104:2010
	EN 50271:2010
Test number:	BVS 16 ATEX G 003 X

Measurement technology for toxic gases as well as the measurement of oxygen deficiency and oxygen enrichment

Inspection authority:	DEKRA EXAM GmbH
Standards:	EN 45544-1:2015
	EN 45544-2:2015
	EN 45544-3:2015
	EN 50271:2010
	EN 50104:2010
Test number:	PFG 16 G 006 X

Functional safety

Inspection authority:	TÜV Rheinland Industrie Service GmbH
Standards:	EN 50402:2017
	IEC/EN 61508-1:2010
	IEC/EN 61508-2:2010

	IEC/EN 61508-3:2010
Certificate:	968/FSP 1374.00/17
Maritime sector	
Inspection authority:	DNV GL SE
Standards:	IEC 60533:2015
	IEC 60945:2002+A1:2008
	IEC 60092-504:2016
Certificate:	MED B 00002Z6 (MED) TAA00001S9 (DNV)

3.6.3

Approved components for functional safety and measuring function for flammable gases, oxygen and toxic gases

The following components have been tested and approved for operation in a safety or measuring function:

Module	Software version
4-20 mA Input Module	≥01.00.01
4-20 mA Input Module / HART®	≥01.01.02
Digital Input Module	≥01.00.01
Relay Module 240 V AC	≥01.00.01
Relay Module 240 V AC complex	≥01.00.01
Relay Module 24 V DC	≥01.00.01
Relay Module 24 V DC complex	≥01.00.01
Long Distance Gateway	N/A
Slotcover	N/A
Docking Station 8-Slot	N/A
Docking Station 4-Slot	N/A
Terminal Block 24 pole AC	N/A
Terminal Block 24 pole DC	N/A
Terminal Block 2 pole	N/A
Terminal Block 16 pole	N/A
Terminal Block 16 pole res	N/A

The following components have been tested and approved for operation in a measuring function:

Module	Software version
Bridge Module	≥01.00.02
Modbus RTU Gateway Set ¹⁾	≥01.00.01
PROFIBUS DP Gateway Set ¹⁾	≥01.00.06
PROFINET Gateway Set ¹⁾	≥01.00.06

1) Not for safety-related evaluation of measured values and alarms.

The following display elements and software components have been tested and approved for operation in a measuring function:

Module	Software version
Advanced Dashboard 6RU	≥01.01.00
Advanced Dashboard PM	≥01.01.00
Standard Dashboard 3RU	≥01.03.00
Adv Dashboard 6RU Basic Unit	≥01.01.00
Adv Dashboard PM Basic Unit	≥01.01.00
Std Dashboard 3RU Basic Unit	≥01.03.00

3.6.4 Approved components according to NFPA 72

The following components have been tested and approved for operation according to NFPA 72:

Module	Software version
Digital Input Module	≥01.00.01
Relay Module 240 V AC	≥01.00.01
Relay Module 240 V AC complex	≥01.00.01
Relay Module 24 V DC	≥01.00.01
Relay Module 24 V DC complex	≥01.00.01
Slotcover	N/A
Docking Station 8-Slot	N/A
Docking Station 4-Slot	N/A

3.6.5 Approved components for plants in the maritime sector

System components REGARD 7000	Order number	Software / Firmware version
Docking Station 8-Slot	83 22 286	N/A
Docking Station 4-Slot	83 22 320	N/A
Advanced Dashboard 6RU	83 26 850	1.00.xx - 1.03.xx
Advanced Dashboard PM	83 26 860	1.00.xx - 1.03.xx
Standard Dashboard 3RU	83 27 840	1.03.xx
Adv Dashboard 6RU Basic Unit	83 28 255	1.00.xx - 1.03.xx
Adv Dashboard PM Basic Unit	83 28 260	1.00.xx - 1.03.xx
Std Dashboard 3RU Basic Unit	83 28 250	1.03.xx
4-20 mA Input Module	83 24 001	1.00.xx - 1.01.xx
4-20 mA Input Module / HART	83 27 250	1.01.xx
Digital Input Module	83 24 003	1.00.xx
Relay Module 24 V DC	83 23 250	1.00.xx
Relay Module 240 V AC	83 24 010	1.00.xx
Relay Module 24 V DC complex	83 24 874	1.00.xx
Relay Module 240 V AC complex	83 24 875	1.00.xx
Bridge Module	83 24 870	1.00.xx
Modbus RTU Gateway Set	83 24 872	1.00.xx
Long Distance Gateway Set I	83 23 815	N/A

System components REGARD 7000	Order number	Software / Firmware version
PROFIBUS DP Gateway Set	83 28 191	≥01.00.06
PROFINET Gateway Set	83 28 196	≥01.00.06
Slotcover	83 23 812	N/A
Terminal Block 24 pole AC	83 24 016	N/A
Terminal Block 24 pole DC	83 24 020	N/A
Terminal Block 2 pole	83 24 871	N/A
Terminal Block 16 pole	83 24 017	N/A
Terminal Block 16 pole res	83 28 202	N/A
REGARD 7000 Configuration Software	N/A	≥01.02.xx
REGARD 7000 PC-Software Key	83 27 253	N/A
Retention staple set, 7 pcs.	83 27 257	N/A

3.6.6 Accessories relevant for approval

Designation	Order no.
Code plate non-specific, 5 units	83 27 046
Docking station stopper, 6 units	83 27 045
Retention staple set, 7 pcs.	83 27 257

3.7 Copyright and licensing agreements

Parts of the software libraries used in the dashboard software are the copyright of other parties. They have been published under LGPLv2.1, MIT or BSD licences. The licence terms, conditions and the source code of the software libraries may be downloaded from Dräger ServiceConnect® (<https://www.serviceconnect.draeger.com>) for a period of at least 3 years after purchase of the software as a supplement to the instructions for use. The access data for Dräger ServiceConnect® is supplied with the REGARD 7000 dashboard.

4 System components

4.1 Docking Station

The Docking Station forms the basis assembly of the REGARD 7000 system. Up to 4 or up to 8 REGARD 7000 modules can be plugged into the Docking Station.

The Docking Station manages the power supply of all its modules and via the modules it indirectly powers the associated transmitters (for transmitters with a max. power consumption of 500 mA; an external power source is required for greater power requirements).

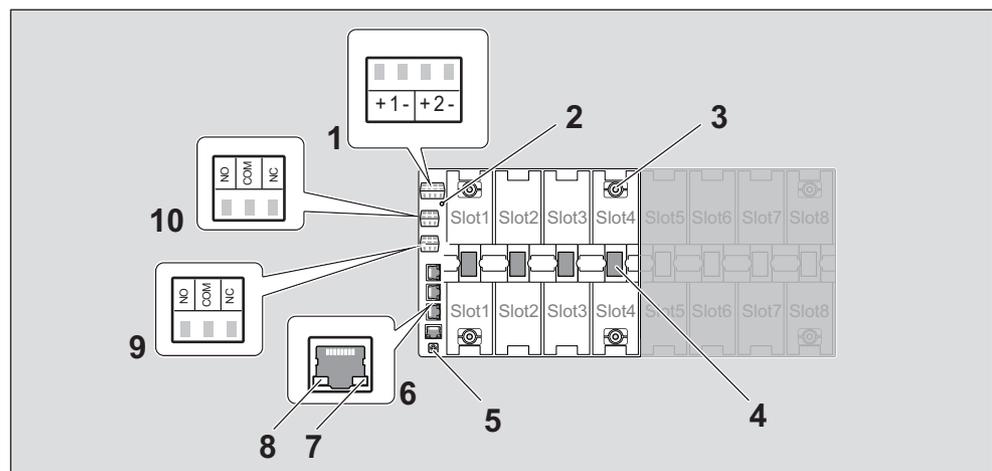
The Docking Station is used for all system communication between the modules and to and from other Docking Stations.

In addition, it forms the beam for accommodating the Terminal Blocks.

4.1.1 Docking Station 4-/8-Slot

Docking Station 4-Slot for up to 4 modules.

Docking Station 8-Slot for up to 8 modules.



- 1 Contact assignment for power supply to the Docking Station
Contacts of the same name are parallel circuits.
- 2 Reset button for Ethernet communication (for Service only).
- 3 Fastening holes (6x)
- 4 Module slots Slot 1 to Slot 8 / Slot 4
- 5 Connector for function earth
- 6 4 Ethernet connections for additional Docking Stations, Dashboard, laptop for configuration. The bottom Ethernet port is the easiest for connecting and disconnecting a laptop.
- 7 Ethernet LED (yellow), shows the status of the Ethernet speed:
 - LED on: 100 Mbit/s
 - LED off: 10 Mbit/s
- 8 Ethernet LED (green), flashes during data transfer.

9 Contact assignment for special state relay (SSR)

In the inactive state the SSR is not operational (energized on alarm). If there is no special state, NC and Common are connected. Activation by a special state.

10 Contact assignment for fault relay (SFR)

In the normal state the SFR is energized and operational (normally energized). In the fault-free operating state (power supply present), NC and Common are connected.

Drop-out in case of fault, e.g.:

- Hardware fault on one or more modules of the Docking Station.
- Unassigned slot on a Docking Station.
- Impermissible supply voltage for the Docking Station.
- Maximum current of the Docking Station exceeded.
- Missing transmitter or fault state of a connected transmitter.
- Short circuit on transmitter connection lines.

NOTICE

Device damage!

If the supply voltage of 30 V is exceeded, the Docking Station may be destroyed.

- ▶ Do not exceed a supply voltage of 30 V.

 Cover unused module slots with a Slotcover.

4.1.2

Technical data Docking Station 4/8 slots

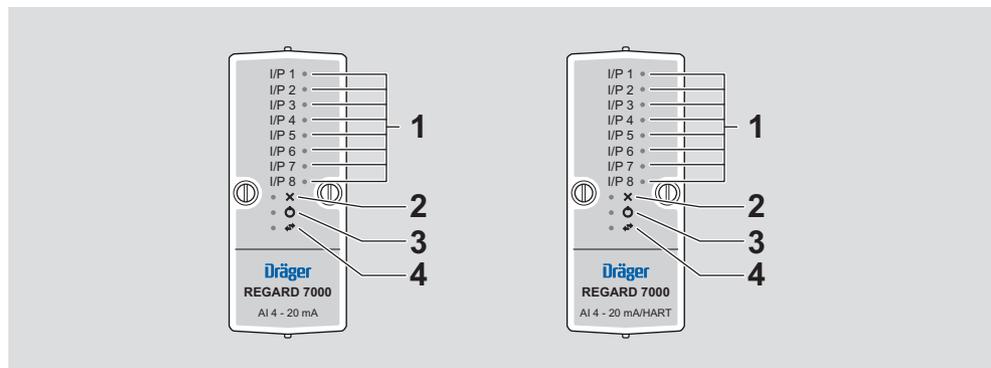
Connection terminals:	Plug contacts for wire cross-sections from 0.08 to 2.5 mm ² .
Operational voltage:	24 V (18 to 30 V) DC
Power input:	Docking Station 4-Slot: max. 11 A (depending on the number of installed modules and connected transmitters) Docking Station 8-Slot: max. 22 A (depending on the number of installed modules and connected transmitters)
Power loss:	max. 15 W at 24 V
SFR output:	min. 5 V, 10 mA, max. 30 V, 2 A switching capacity; a fuse is required to protect the SFR output.
SSR output:	min. 5 V, 10 mA, max. 30 V, 2 A switching capacity; a fuse is required to protect the SSR output.
Number of modules for each Docking Station	Docking Station 4-Slot: max. 4 Docking Station 8-Slot: max. 8

Monitoring functions	<ul style="list-style-type: none"> - input voltage monitoring 18-30 V The SFR is activated for voltage underrun; the power supply is shut down in case of voltage overrun and the SFR is activated, then a restart is required. - Total current monitoring Docking Station 4-Slot: shut-down at >10.2 A (max. 12 A), then a restart is required. Docking Station 8-Slot: shut-down at >20.4 A (max. 22 A), then a restart is required. - Temperature monitoring Shut-down of the Docking Station and activation of the SFR, then a restart is required.
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4.2 Modules

4.2.1 4-20 mA Input Module / HART®

Input module in 2 variants (with or without HART®) for connection of up to eight 4-20 mA transmitters. A 4-20 mA module shows the current values from 4 mA to 20 mA in linear form on the measuring range (0 to the end of the measuring range). From firmware version $\geq 01.01.01$ the current values 4-20 mA can also be mapped to a completely or partially negative measuring range. Regions of measurement range underrun and overrun and special states and warnings of the transmitter can be configured. For further information, see the following chapter: "Port configuration 4-20 mA Input Module / HART®", page 88



- 1 Input 1 to 8 and channel display
Lights if a loop current is flowing.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

Application notes

One module 4-20 mA Input / HART® always provides 8 physical ports. A Port configured with a channel ID forms an input channel. Even so, unconfigured and thus unused Ports occupy the corresponding number of Ports in the overall system.

⚠ WARNING

Missing gas alarm

With supply power to a connected transmitter via the 4-20 mA Input / HART module, note that the current consumption of the transmitter depends on the line length and the cross-section of the transmitter supply lines. In very unfavourable circumstances this may mean that the supply voltage approaches the shut-down limit of the channel and the current monitoring limit will be exceeded with a signal current. In this case a measured signal may result in the shut-down of the channel and as a result a module error that will also be signalled on the Docking Station via the SFR. This will suppress a gas alarm configured in this current range. The same behaviour is also found with the connection of multiple transmitters for the total current monitoring of a module for all channels. In the most unfavourable case this may result in shut-down of the complete module and failure of the associated channels.

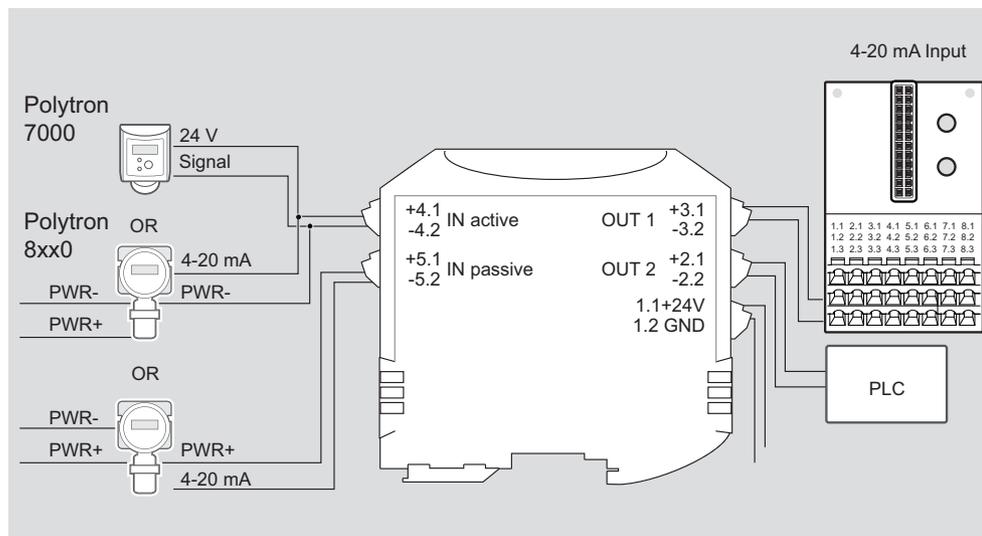
- ▶ When designing the supply currents for the transmitters, the supply voltage per channel must be at least 20 mA below the permissible channel short-circuit detection current (500 mA or 250 mA) and at least 160 mA below the module short-circuit detection current (2 A). In case of doubt, during commissioning the supply current to the single channel and the total supply currents on all channels of the module must be tested to ensure compliance with the above conditions.

Use of signal duplicators

For the use of REGARD 7000 and one additional signal receiver, 4-20mA signal duplicators can be used.

Dräger has qualified the following components for this purpose:

Manufacturer	Order no.	Order no.
Phoenix Contact	MACX MCR-EX-SL-RPSSI-2I	28 65 36 6
Phoenix Contact	MACX MCR-EX-SL-RPSSI-2I-SP	29 24 23 6



As an alternative, these components offer an active (terminals 4.1 and 4.2) or passive (terminals 5.1 and 5.2) input for field devices in 2-wire or 4-wire operation and two active outputs (terminals 2.1 and 2.2 or 3.1 and 3.2). The connection is made on terminals x.2 and x.3 of REGARD 7000 Terminal Blocks. The HART® communication between the transmitter and the module 4-20 mA Input HART is not affected by components qualified by Dräger.

⚠ WARNING

Missing gas alarm

When using 4-20mA signal duplicators, in particular for applications relating to functional safety or measuring functions for flammable gases, oxygen or toxic gases, the following conditions should be ensured during the commissioning process:

- ▶ The anticipated ambient conditions match those in the specification of the 4-20 mA signal duplicator.
- ▶ The transmission properties (measuring errors) of the 4-20 mA signal duplicator are suitable for use.
- ▶ Even values smaller than 4 mA or greater than 20 mA are forwarded correctly.

HART® functionality

HART® functionality includes the following features:

- Display of device/channel assets
Device errors and device warnings (e.g. Beam Block error, temperature warning) from the transmitter are exported and displayed. This information is helpful for early detection of maintenance activities that are becoming due.
- Transmitter diagnostics
With transmitter diagnostics activated, consistency between the transmitter parameters (configurable) and the parameter values set in the 4-20 mA Input HART module is checked, and any discrepancies are displayed.
- Wizard for configuration synchronisation
The wizard can be used to transfer the transmitter parameters to the 4-20 mA Input HART module.

The 4-20 mA Input HART module does not support HART® Multidrop operation. The polling address of the transmitter must be set to "0".

The 4-20 mA Input HART module is set as Primary Master. This setting cannot be changed. If an additional Master is to be used (e.g. HART® manual control unit), this must be configured as the Secondary Master.

The HART® functionalities of the 4-20 mA Input HART module are supported by the following transmitters:

- Dräger PIR 7x00
- Dräger Polytron 7000
- Dräger Polytron 8x00
- Dräger Pulsar 7x00

i Future Dräger transmitters with HART® communication will also be supported.

Technical data

Number of input channels:	max. 8
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Transmitter supply voltage:	Typically 24 V, depending on the supply voltage of the Docking Station.
Transmitter supply current:	With assignment of max. 4 inputs: Max. 500 mA per channel With assignment of 4 to 8 inputs: Max. 250 mA per channel Total transmitter output current per module max. 2 A. If the 2 A is exceeded, the transmitters must be supplied externally.
Signal input current range:	0 to 24 mA (short-circuit detection at 38 mA)
Input resistance:	262 ohm
Measurement accuracy:	$\pm 0.05 \text{ mA} \pm 0.002 \text{ mA/K}$ [0 ... 4 mA] $\pm 1.25 \% \pm 0.05\%/K$ [4 ... 24 mA]
Power input:	max. 2.1 A
Power loss:	Max. 5 W at 24 V
Deviation with adjustable time parameters:	Max. $\pm 1 \%$
Monitoring functions:	<ul style="list-style-type: none"> – wire break detection (loop current < 0.1 mA) – Fault detection (loop current > 38 mA; this value should be included when calculating the maximum line resistances) – Short circuit detection (loop current > 500 mA; channel shuts down if this is exceeded) – Total current monitoring (sum of loop currents on all channels > 2000 mA; module shuts down if this is exceeded)
Terminal Block:	24-pin, DC

4.2.2 Modbus RTU Master Module

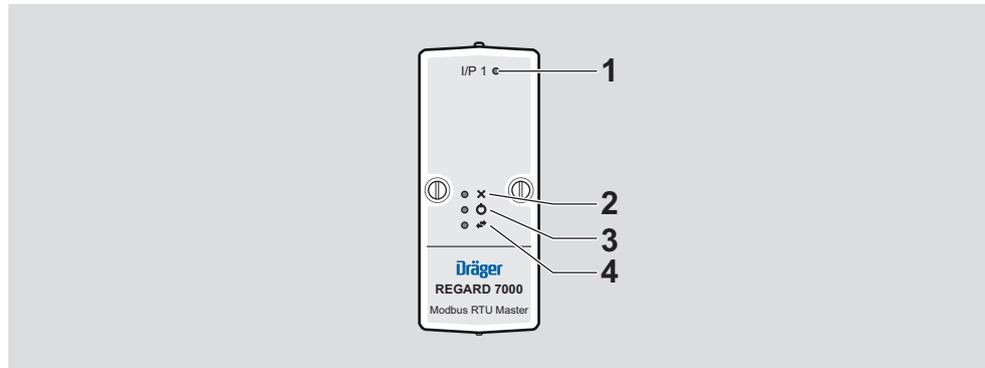
Input module for connecting up to 32 Modbus RTU Slaves. The input module reads the measured values and the status information from the Modbus RTU Slaves.

The connection of the following transmitters is supported:

- Dräger Polytron 8xx0
- GS01 via an ISA100 Gateway
- ISA100 UAPMO via an ISA100 Gateway

For further information, see the following chapter: "Module and port configuration Modbus RTU Master Module", page 95.

The Modbus RTU master module has not been tested and approved for operation in a safety and measuring function.



- 1 Lights up green if there is communication with a Modbus RTU Slave. Does not light if there is no or only faulty communication.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

Application notes:

The Modbus RTU master module provides a 2-wire Modbus RTU segment and permits the connection of up to 32 Modbus RTU Slaves that are mapped in the module as 32 virtual Ports. A Port configured with a channel ID forms one input channel. Even so, unconfigured and thus unused Ports occupy the corresponding number of Ports in the overall system.

The number of Modbus RTU Slaves that can be connected depends on the baud rate of the bus and on the response times of the individual Modbus RTU Slaves. The dimensioning of the bus is the responsibility of the operating firm.

The following maximum configurations have been tested for the pre-configured Modbus RTU Slaves:

- max. 16 Polytron 8xx0 units with 9600 baud
- max. 32 GS01/ISA100 UAPMO via ISA100 Gateway with 38400 baud

Dräger has qualified the following component for GS01/ISA100 UAPMO:

Manufacturer	Order no.	Modbus Mapping Type	Read Parameter Assignment	Firmware
Yokogawa	YFGW410	Normal Mapping	Input Registers	> R1.03.06

The 3-pin terminal block has a terminating resistor that must be switched on via a sliding switch.

Differences in potential between the bus subscribers are compensated via the ground connection.

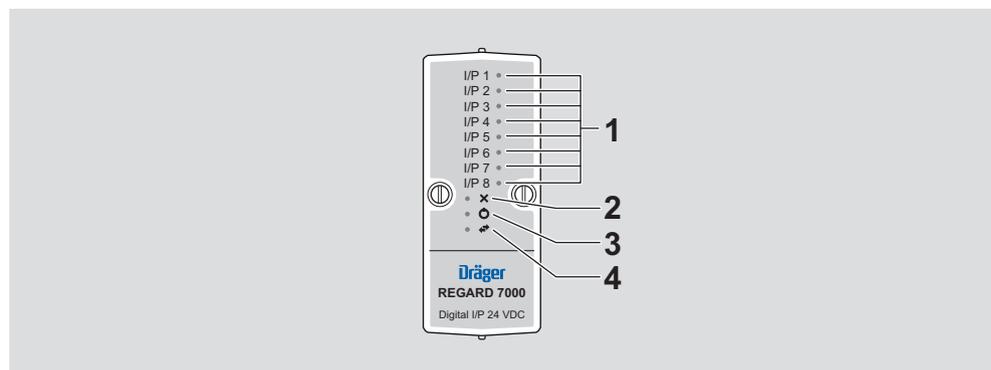
 Dräger recommended the use of shielded twisted-pair wiring (cables with twisted lead pairs).

Technical data

Power input:	Typ. 160 mA at 24 V
Power loss:	Max. 4 W at 24 V
Number of channels:	Max. 32 on one segment
Transfer rate [baud]:	Adjustable: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 625000
Cable length:	<57,600 baud max. 1200 m <230,400 baud max. 500 m <625,000 baud max. 200 m
Cable type:	STP (shielded twisted pair), e.g. LAPP Unitronic® Bus LD
Parity value:	Adjustable: None, even, uneven
Stop bit:	Adjustable: 1, 1.5, 2
Terminal Block:	3-pin

4.2.3**Digital Input Module**

Digital Input module for connecting up to 8 digital input signals.



- 1 Input 1 to 8 and channel display
Lights if a loop current is flowing.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

Application notes

A Digital Input module always provides 8 physical Ports. A Port configured with a channel ID forms one input channel. Even so, unconfigured and thus unused Ports occupy the corresponding number of Ports in the overall system.

One or more buttons, switches, fire and/or smoke alarms can be connected and queried at a digital input. Closed current loop and alarm current can be freely configured in wide ranges per channel. The switching behaviour can be configured rising or falling. For further information, see the following chapter: "Port configuration Digital Input Module", page 100.

i The following examples only apply when using the 16-pin Terminal Block. When using the 16-pin Res Terminal Block, simplified connection of buttons or key switches to the digital input module is possible. On this Terminal Block, the resistance R_s (see figures) is already integrated. The EOL resistance does not apply.

For further information, see the following chapter: "Terminal Block 16 pole Res", page 43

i To ensure reliable detection of the switch/button actuation, select the threshold current such that there is a sufficient distance (>4 mA) to the boundary of the next current state.

Switching behaviour falling:

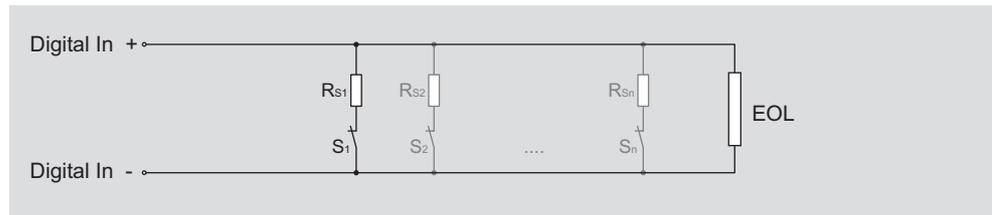
The digital input is activated if one or more switches are opened (depending on the configuration of the switching threshold).

⚠ WARNING

Missing alarm

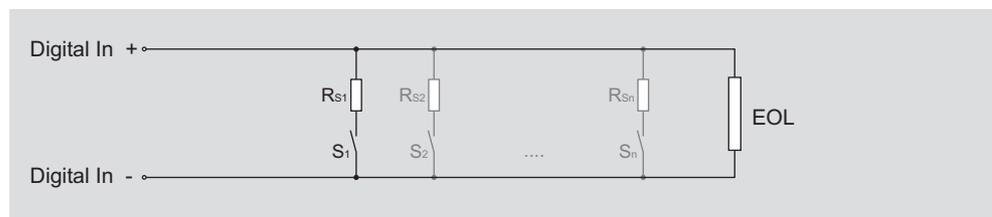
If the absolute value of the current threshold is greater than 50% of the static current, activation of the input causes tripping of the wire break detection. An alarm is not triggered.

- The total of currents through the switch must be less than 50% of the static current.



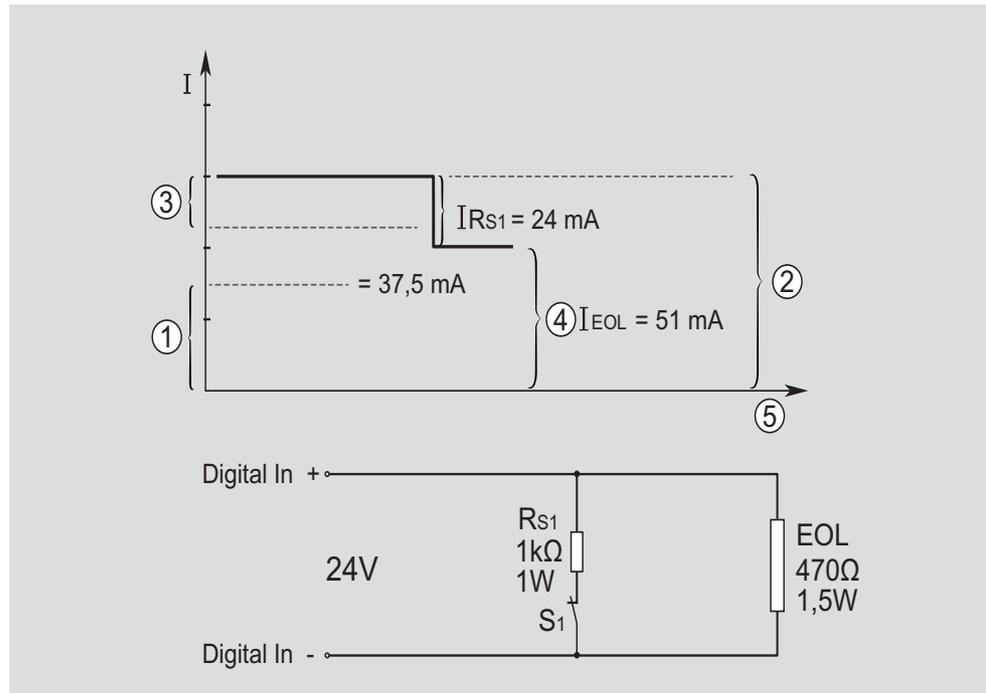
Switching behaviour rising:

The digital input is activated if one or more switches are closed (depending on the configuration of the switching threshold).



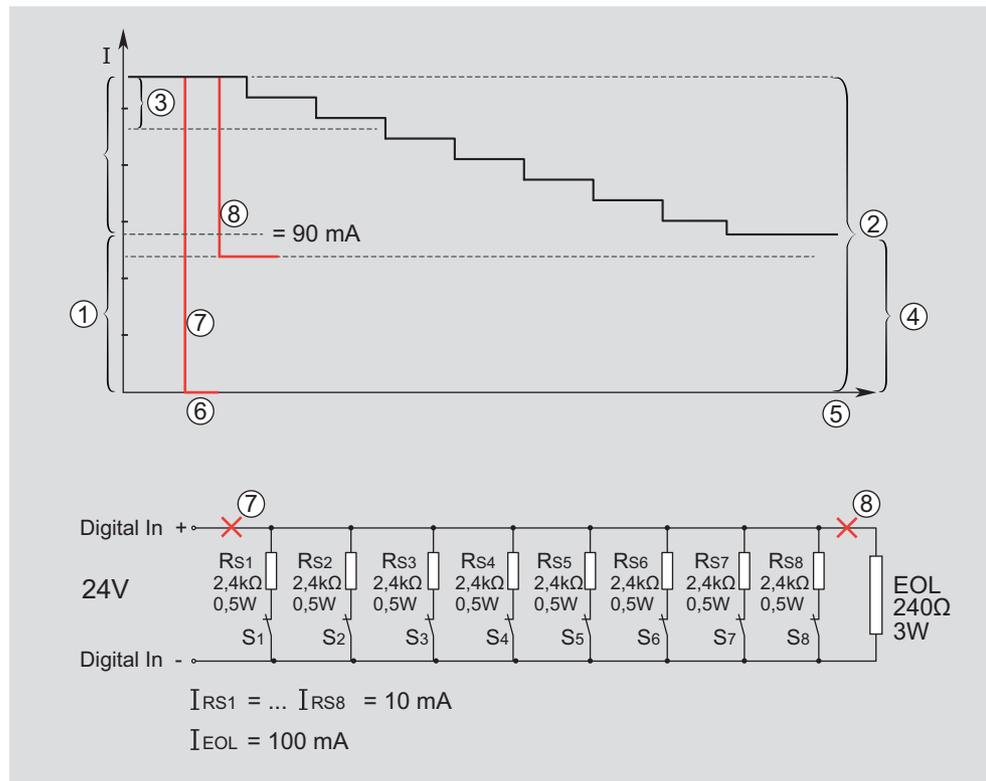
i When dimensioning the resistors, the supply voltage of the REGARD 7000 System should be taken into account as neither the Docking Stations nor the modules perform 24 V voltage regulation. A change of the supply voltage has a linear effect on the currents. This does not affect the configured switching and static currents. For further information, see the following chapter: "Port configuration Digital Input Module", page 100

Example of falling application 1 (1 switch or button)



- 1 Wire break current (0.5 x static current)
- 2 Static current
- 3 Current threshold (negative, in this example -20 mA)
- 4 Current through end-of-line resistor
- 5 Current states

Example of a falling application 2 (8 switches/buttons)



- 1 Wire break current ($0.5 \times$ static current)
- 2 Static current = total of all currents ($I_{RS1} + I_{RS2} \dots + I_{RS8} + I_{EOL} = 180\text{ mA}$)
- 3 Current threshold (negative, in this example -25 mA)
- 4 Current through end-of-line resistor
- 5 Current states
- 6 Fault states
- 7 Fault state, current behaviour with wire break at position 7
- 8 Fault state, current behaviour with wire break at position 8

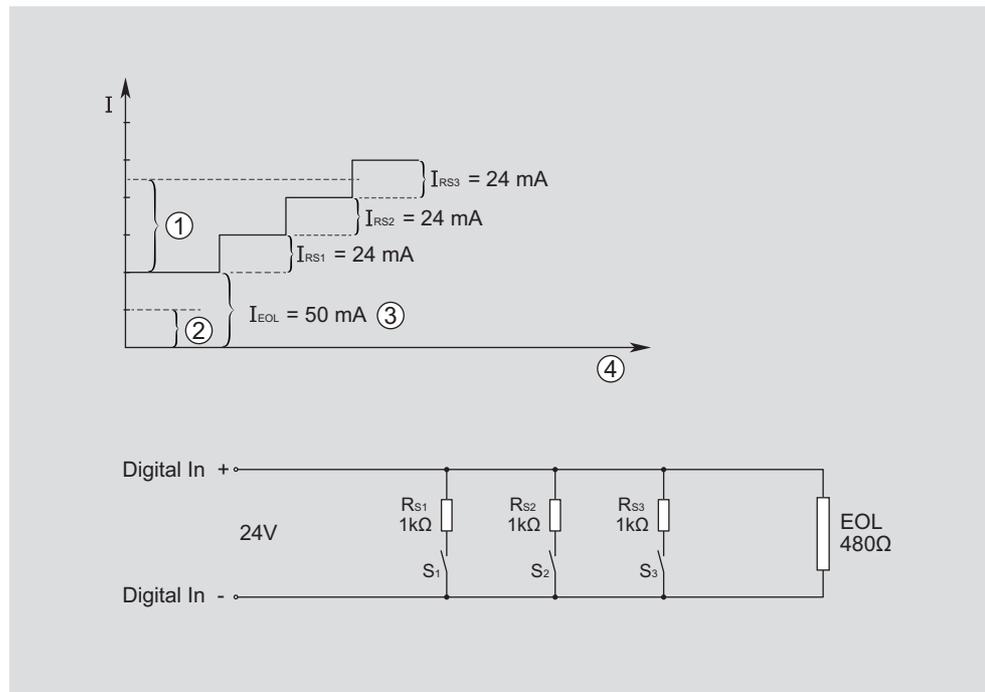
Example 2: Switching behaviour depending on the current threshold

The logical behaviour of the switches at the digital input (S_1 to S_n) is different depending on the selection of the current threshold.

An example of the logical behaviour for a system with 8 switches is described below.

- | | |
|--------------|--|
| Case 1: | Current threshold set to -5 mA .
Logical state of digital input: If 1 switch is open, the condition is met (1 of 8). |
| Situation 2: | Current threshold set to -25 mA .
Logical state of digital input: If 3 switches are open, the condition is met (3 of 8). |
| Situation 3: | Current threshold set to -75 mA .
Logical state of digital input: If 8 switches are open, the condition is met (8 of 8). |

Example of rising application



- 1 Current threshold
- 2 Wire break current (0.5 x static current = 25 mA)
- 3 Static current
- 4 Current states

Switching behaviour depending on the current threshold

The logical behaviour of the switches at the digital input (S_1 to S_n) is different depending on the selection of the current threshold.

An example of the logical behaviour for a system with 3 switches is described below.

Case 1: Current threshold set to 15 mA.
Logical state of digital input: If 1 switch is closed, the condition is met (1 of 3).

Situation 2: Current threshold set to 35 mA.
Logical state of digital input: If 2 switches are closed, the condition is met (2 of 3).

Situation 3: Current threshold set to 60 mA.
Logical state of digital input: If 3 switches are closed, the condition is met (3 of 3).

Technical data

Number of input channels:	max. 8
Channel output voltage:	Typically 24 V, depending on the supply voltage of the Docking Station.

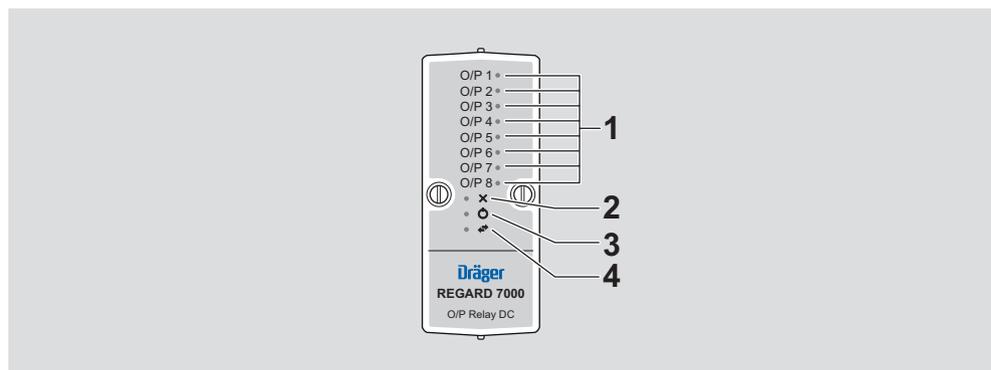
Supply current of the connected input elements:	Max. 400 mA per channel, with assignment of max. 4 inputs. max. 250 mA per channel, with assignment of 4 to 8 inputs. Total supply current max. 2 A.
Static current through EOL resistor:	Configurable to 0 mA (wire break detection disabled) and in the range from 5 to 400 mA.
Switching threshold:	Configurable in the range Rising: 3 to 400 mA Falling: -3 to -400 mA Accuracy: ± 2 % of the measured value
Power input:	max. 2.1 A
Power loss:	Max. 5 W at 24 V
Deviation with adjustable time parameters:	Max. ± 1 %
Monitoring functions:	<ul style="list-style-type: none"> – wire break detection (0.5 x static current) – short-circuit detection (loop current < 450 mA) – total current monitoring (total of loop currents of all channels > 2000 mA)
Terminal Block:	16-pin, DC, 16-pin Res, DC

4.2.4

Relay Module 240 V AC / 240 V AC complex

Output module in 2 types with 8 independent relay outputs each for switching mains power loads.

The 240 V AC complex type offers more comprehensive configuration options for switching conditions for a relay contact.



- 1 Relay display
Lights if current is flowing through the relay coil.
- 2 Fault display
Lights if there is a module or channel error.

- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

Application notes

A Relay 240 V AC / 240 V AC complex module always has 8 logical Ports. A configured Port forms one output channel. Even so, unconfigured and thus unused Ports occupy the corresponding number of Ports in the overall system.

⚠ WARNING

Risk of electric shock!

Live wires with a voltage of 240 V are connected to the Relay 240 V AC module.

- ▶ To guarantee electrical safety, the Relay 240 V AC module with the associated Docking Station must be operated in an enclosed casing only (e.g. switch cabinet or switch box).
- ▶ Live terminals become accessible after the cabinet is opened. Shut off the mains power as necessary when working on the cabinet installation.
- ▶ The connection lines used must have basic insulation as a minimum.

Technical data

Number of output relays:	8 each with a potential-free switching contact
Switching voltage:	100 to 240 V AC, 50 to 60 Hz
Switching current:	10 mA to 2 A; cosine phi ≥ 0.4
Power consumption:	max. 100 mA (no relays activated) max. 200 mA (8 relays activated)
Power loss:	max. 5 W at 24 V
Contamination level:	2
Overvoltage category:	II
Update rate of switching outputs:	0.5 s
Deviation on adjustable time parameters:	Max. ±1 %
Terminal Block:	24-pin, 240 V AC

i The requirements of the Low-Voltage Directive must be followed for wiring the relay output module.

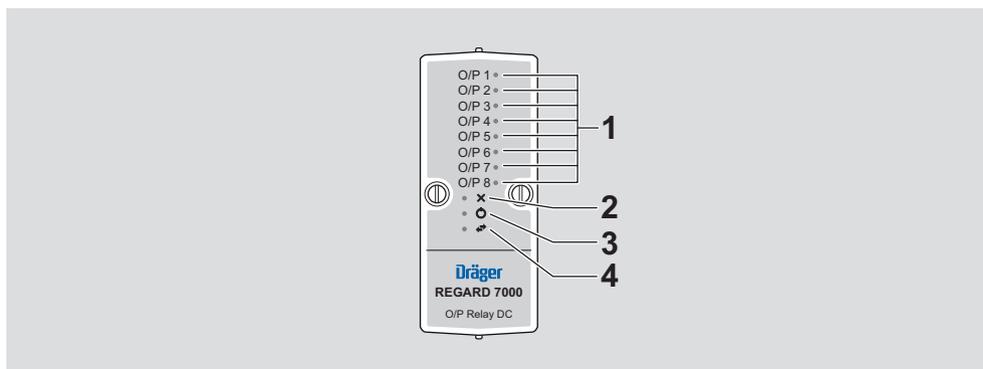
It must be possible to switch off all mains power supply lines on the Relay 240V AC to de-energised via a circuit breaker that is marked accordingly and easily accessible from the outside (e.g. a branch line from the building installation). Dräger recommends providing a shut-down option for the 240V AC lines on the relay module that is separate from the power supply to the REGARD 7000 power supply unit.

The Relay 240 V AC module is not approved for switching 24 V DC loads.

4.2.5 Relay Module 24 V DC / 24 V DC complex

Output module in 2 types with 8 independent relay outputs each for switching 24 V direct current loads.

The 24 V DC complex type offers more comprehensive configuration options for switching conditions for a relay contact.



- 1 Relay display
Lights if the relay coil is activated.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

Application notes

A Relay 24 V DC / 24 V DC complex module always has 8 logical Ports. A configured Port forms one output channel. Even so, unconfigured and thus unused Ports occupy the corresponding number of Ports in the overall system.

Technical data

Number of output relays:	8 each with a switching contact
Switching voltage range: 5 to 30 V DC	Switching current: 10 mA to 2 A
Switching voltage range: >30 to 50 V DC	Switching current: 10 mA to 1.2 A
Power consumption:	max. 100 mA (no relays activated) max. 200 mA (8 relays activated)
Power loss:	5 W at 24 V
Update rate of switching outputs:	0.5 s
Deviation on adjustable time parameters:	Max. ± 1 %
Terminal Block:	24-pin, 24 V

 The Relay 24 V DC module is not approved for switching 240 V AC loads.

4.2.6 Gateway Module

Gateway module for output of system data via a fieldbus-specific interface to higher level systems, such as to a DCS (Distributed Control System) or SCADA (Supervisory Control and Data Acquisition) system.

The gateway module is designed for provision of data for visualisation and documentation of system behaviour. The module can be used to acknowledge channels or set them to the Inhibit status. The evaluation of the transferred data for safety-related switch operations is not permitted.

The following fieldbus gateway sets are available:

Modbus RTU Gateway set	Order no. 83 24 872
1x Gateway Module	Order no. 83 28 200
1x Terminal Block 2-pin / 3-pin	Order no. 83 24 871
1x Modbus RTU Gateway	Order no. 83 24 873
PROFIBUS DP Gateway Set	Order no. 83 28 191
1x PROFIBUS DP Gateway Module	Order no. 83 28 190
1x Terminal Block 2-pin / 3-pin	Order no. 83 24 871
1x PROFIBUS DP Gateway	Order no. 83 28 188
PROFINET Gateway Set	Order no. 83 28 196
1x PROFINET Gateway Module	Order no. 83 28 195
1x Terminal Block 2-pin / 3-pin	Order no. 83 24 871
1x PROFINET Gateway	Order no. 83 28 193

 For each fieldbus-specific gateway, the corresponding gateway module must be used.

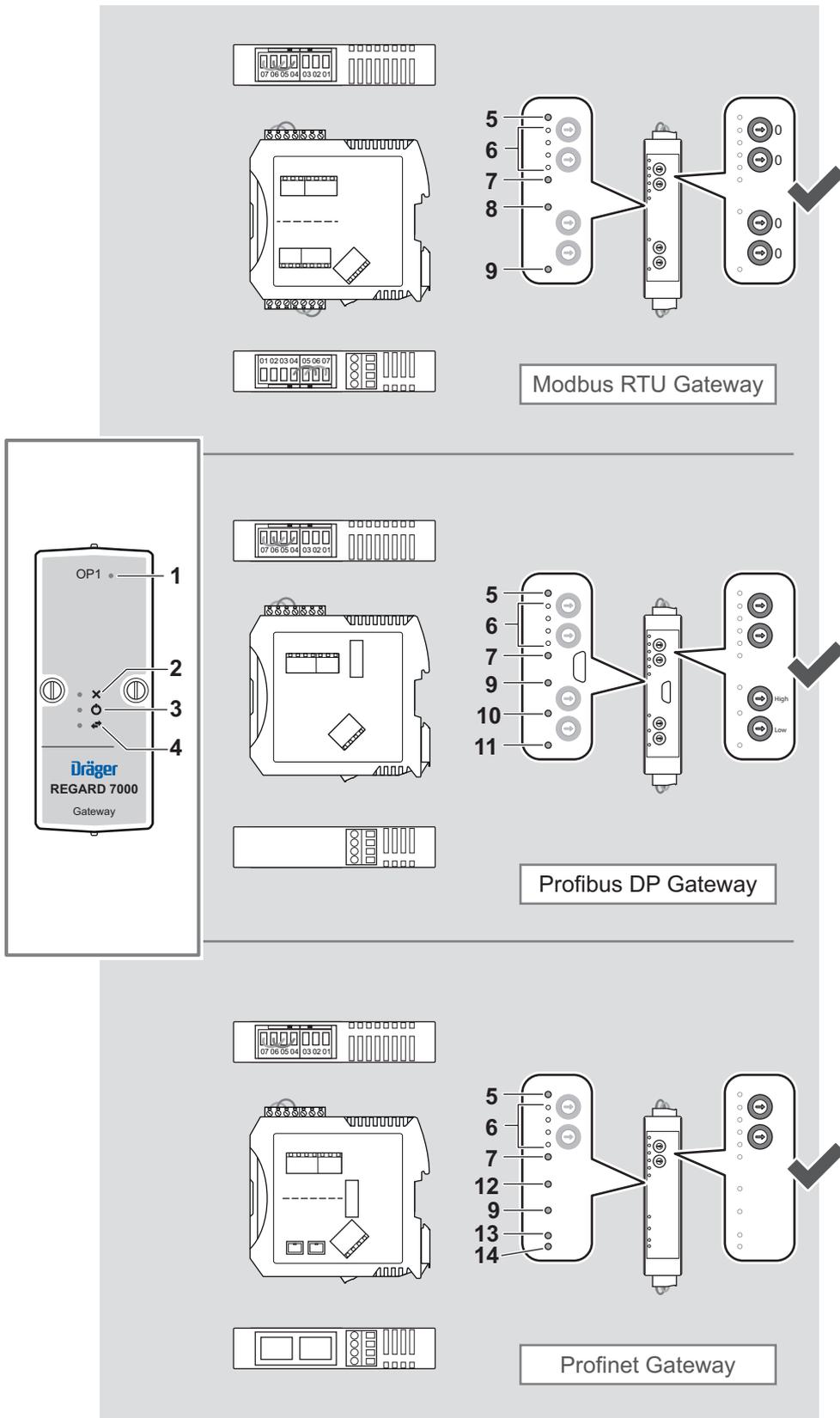
CAUTION Malfunctions

The fieldbus-specific gateways are configured and set together with the gateway modules for the application. Changes to the configuration and settings will result in malfunctions.

- ▶ Check that the setting is correctly set before commissioning.
-

 The total bit rate can be increased accordingly with the installation of multiple gateway modules.

 Dräger recommended the use of shielded twisted-pair wiring (cables with twisted lead pairs).



- 1 Lights up green if there is valid communication with the fieldbus-specific gateway.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.
- 5 Power/State
Lights when the module is under power.
- 6 LEDs for the application without significance.
- 7 State
Lights up when a correctly configured and activated Dräger Gateway Module is connected.
Does not light up if no Dräger Gateway Module has been found or the configuration is not correct.
- 8 Bus State (Modbus)
Lights if a fieldbus master is connected and is communicating actively.
Does not light if the fieldbus master is not communicating actively for more than 1 s.
- 9 Bus Power
Lights when the module is under power.
- 10 Bus (PROFIBUS)
This LED goes out in the data exchange status.
- 11 State (PROFIBUS)
green light: PROFIBUS in data exchange status
flashing green: Gateway waits for PROFIBUS configuration data
flashing green/red: Gateway waits for PROFIBUS parameter data
red light: general PROFIBUS error
- 12 Bus State (PROFINET)
off: the gateway starts up
green light: Connection to IO controller present, data exchange active
flashing green: PROFINET initialises. Wait for connection with IO controller
flashing red: PROFINET flash test
- 13 Link/Act. P1 (PROFINET)
This LED is lit when the gateway on port 1 (X3 P1) is on a functional network (link pulses are received) and flickers during network data traffic.
- 14 Link/Act. P2 (PROFINET)
This LED is lit when the gateway on port 2 (X3 P2) is on a functional network (link pulses received) and flickers during network data traffic.

High and Low rotary encoding switches (applies to PROFIBUS only)

In position 0 (zero), the PROFIBUS DP gateway adopts the slave ID that was configured via the REGARD 7000 configuration software. The other positions set the slave ID directly. In this situation, the slave ID that was configured via the REGARD 7000 configuration software is ignored.

Technical data

Number of channels:	1 channel, bidirectional. A gateway module always occupies one port in the total system.
Supply voltage Modbus RTU, PROFIBUS, PROFINET Gateways and Gateway Module:	24 V (18 to 30 V) DC
Power input Gateway Module:	Typ. 160 mA at 24 V
Power loss Gateway Modul:	Max. 4 W at 24 V
Power input	
Modbus RTU Gateway:	Typ. 80 mA at 24 V
PROFIBUS DP Gateway:	Typ. 120 mA at 24 V
PROFINET Gateway:	Typ. 120 mA at 24 V
Power loss	
Modbus RTU Gateway:	Max. 2.5 W at 24 V
PROFIBUS DP Gateway:	Max. 2.9 W at 24 V
PROFINET Gateway:	Max. 2.9 W at 24 V
Bit rate	
Modbus RTU Gateway:	Adjustable: 9600 to 921,600 Baud
PROFIBUS DP Gateway:	Adjustable: 9.6 kBit/s 19.2 kBit/s 93.75 kBit/s 187.5 kBit/s 500 kBit/s 1.5 Mbit/s 3 MBit/s 6 MBit/s 12 Mbit/s
PROFINET Gateway:	100 Mbit/s
Cable length between REGARD 7000 gateway O/P and REGARD 7000 Modbus RTU gateway	max. 5 m
Cable type:	STP (shielded twisted pair), e.g. LAPP Unitronic® Bus LD
Cable length on fieldbus side:	

Modbus RTU Gateway:	<57,600 baud max. 1200 m <230,400 baud max. 500 m <921,600 baud max. 120 m
PROFIBUS DP Gateway:	93.75 kBd max. 1200 m 187.5 kBd max. 1000 m 500 kBd max. 400 m 1.5 MBd max. 200 m >1.5 MBd max. 100 m
PROFINET Gateway:	100 m
Terminal Block:	2-pin / 3-pin
Galvanic isolation between REGARD 7000 and fieldbus-side via fieldbus-specific gateway	

4.2.7 Long Distance Gateway

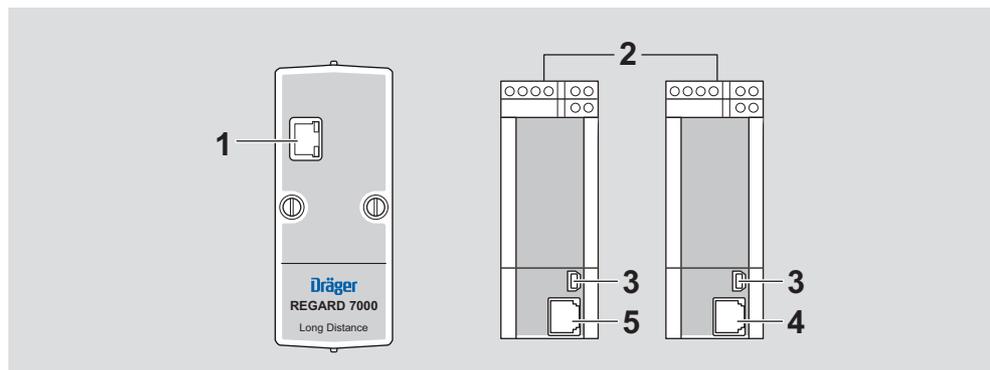
Module for connecting spatially remote Docking Stations, comprising a Long Distance Gateway Port and 2 bidirectional Ethernet-to-DSL converters.

⚠ CAUTION

Malfunctions

The Ethernet-to-DSL converters are configured and set for the application with the Long Distance Gateway Port. A change to the configuration will result in malfunctions.

► Do not make any changes to the Ethernet-to-DSL converter via the USB port.



- 1 RJ45 bushing for connecting the Long Distance Gateway Ports to the Ethernet-to-DSL converter.
- 2 Ethernet-to-DSL converter
- 3 USB port for configuration (for service only)
- 4 RJ45 bushing for connecting the Docking Station of the satellite system.
- 5 RJ45 bushing for connecting the Long Distance Gateway Port.

Application notes

When installing and wiring the Long Distance Gateway modules to one another, sufficient overvoltage and lightning protection must also be installed.

The converters can be connected with the 2-wire or 4-wire method.

To connect the converter with the 2-wire method:

1. Connect DSL port A (device 1) to DSL port B (device 2). The polarity of the connections is irrelevant: (a)-(a) / (b)-(b) or (a)-(b) / (b)-(a).

To connect the converter with the 4-wire method:

1. Connect two devices by cross connection: DSL port A (device 1) - DSL port B (device 2) and DSL port B (device 1) - DSL port A (device 2). The polarity of the connections is irrelevant: (Aa)-(Ba) / (Ab)-(Bb) or (Aa)-(Bb) / (Ab)-(Ba).
 ⇒ Wait for the green LINK DSL LEDs to remain steady. The automatic 4-wire detection requires up to 2 minutes to set up the connection.

The current transmission quality at the currently assigned port can be checked at the 3 (DO) and 4 (DIO) ports:

- Poor transmission quality at port A: 3 (DO) = 24 V
- Poor transmission quality at port B: 4 (DIO) = 24 V

To be able to use the signals at the DO and DIO output ports, each of the ports must be connected to GND (0 V) with a load resistance with a value in the range from 1 kOhm to 10 kOhm.

If a 4-wire connection is used, data communications are automatically picked up by the remaining wire pair if one wire pair fails. A 4-wire connection does not increase the maximum wire length between 2 converters.

If there are multiple wire breaks between the DSL converters in 2-wire operation, the fault LED on the converter lights. The transmission rate is reduced to 64 kB. This results in a communication error on the REGARD 7000. Remedy: Restart both DSL converters by disconnecting and reconnecting the DSL converter power supply. If necessary, check the connection between the DSL converters.

 Dräger recommended the use of shielded twisted-pair wiring (cables with twisted lead pairs).

 Depending on the earthing concept of the individual system, the shielding can be connected to the mass connection of the cabinet or even not applied. Applying the shielding on both sides can result in earth loops and signal errors.

Technical data

Supply voltage:	24 V (18 to 30 V) DC
Power input Long Distance Gateway Port:	Typ. 4 mA at 24 V
Power loss Long Distance Gateway Port:	max. <0.1 W at 24 V
Power input Converter:	Typ. <180 mA per converter at 24 V
Power loss Converter:	max. 5 W at 24 V per converter
Bit rate:	5 Mbit/s for 2-wire DSL connection 10 Mbit/s for 4-wire DSL connection

Galvanic isolation:	Ethernet to DSL
Max. wire length between pair of converters:	1200 m for 28 AWG line 1700 m for 25 AWG line 2150 m for 23 AWG line 3200 m for 21 AWG line 4000 m for 16 AWG line

For connecting Docking Stations that are physically remote, an optical fibre connection (OF connection) can be used.

Dräger has qualified the following components for this purpose:

Manufacturer	Order no.	Fibre type	Max. distance	Tested log variant
EKS	EL100-2MA/6TX-2FX-SM-SC	Single Mode	30 km	MPR
Hirschmann	SPIDER-PL-40-01T1O69999 TWW with SFP-GIG-LX/LC	Single Mode	20 km	-
Phoenix Contact	FL MC EF 1300 MM ST	Multi Mode	10 km	-

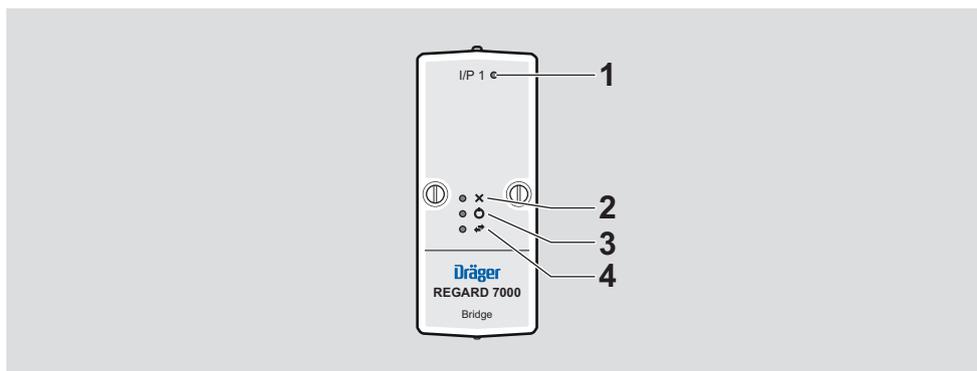
With FO converters from the firm EKS, there is also the option for redundant implementation of the FO connection. If an OF connection is damaged, with a redundant implementation the system switches over automatically to the other connection.

The connection to the Docking Stations is implemented on one of the three Ethernet connections on the Docking Stations being connected. For further information, see instructions for use of the FO converter.

4.2.8 Bridge Module

An existing REGARD with up to 99 channels can be integrated into the REGARD 7000 with the bridge module. More information:

- "Compatible REGARD components"
- "Special features of operation of the REGARD 7000 in combination with a REGARD"



- 1 Lights green if there is valid communication with the REGARD RS485 bus. Does not light if there is no or only faulty communication.
- 2 Fault display
Lights if there is a module or channel error.
- 3 LED
Lights when the module is under power.
- 4 Data transfer display
Flashes when the module is communicating.

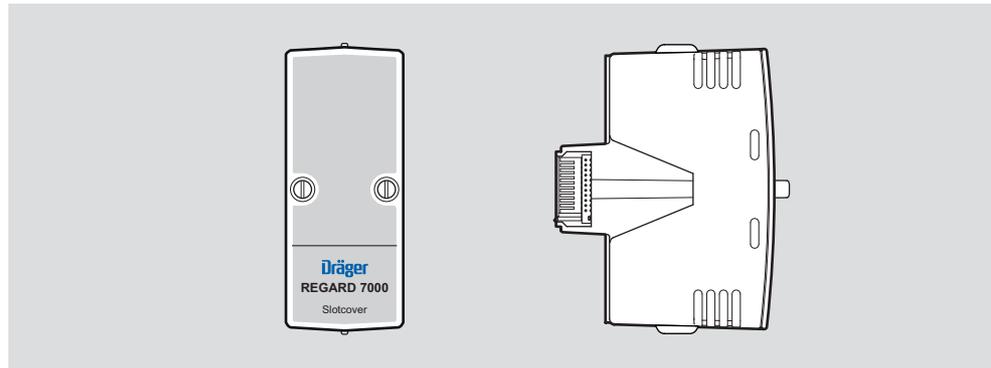
 Dräger recommended the use of shielded twisted-pair wiring (cables with twisted lead pairs).

Technical data

Power input:	Typ. 160 mA at 24 V
Power loss:	max. 4 W at 24 V
Number of channels:	1 channel, bidirectional. A bridge module always occupies 99 ports in the total system.
Bit rate:	4800 baud
Cable length:	max. 100 m
Cable type:	STP (shielded twisted pair), e.g. LAPP Unitronic® Bus LD
Terminal Block:	2-pin

4.2.9 Slot cover

Slot cover for assignment of unused slots in a docking station.



i The docking station monitors the assignment of all module slots. Unused slots in a docking station must be assigned with a slot cover. An unassigned slot in a docking station will cause activation of the SFR.

4.3 Terminal block

The terminal blocks are intended for electrical connection of the input and output signals to the modules. A terminal block can be positioned above or below the module as required.

i Placement above **and** below a single module is not permitted.

The terminal blocks have an opening for a module-specific code plate. The code plate must be inserted into the terminal block in the applicable module slot. This ensures that only modules of the same type can be plugged into the module slot.

The code plate is supplied with the modules. The 240 V AC / 240 V AC complex module relay is an exception. In these modules the code plates are supplied with the terminal block 240 V (must be ordered separately).

NOTICE

Damage to the module!

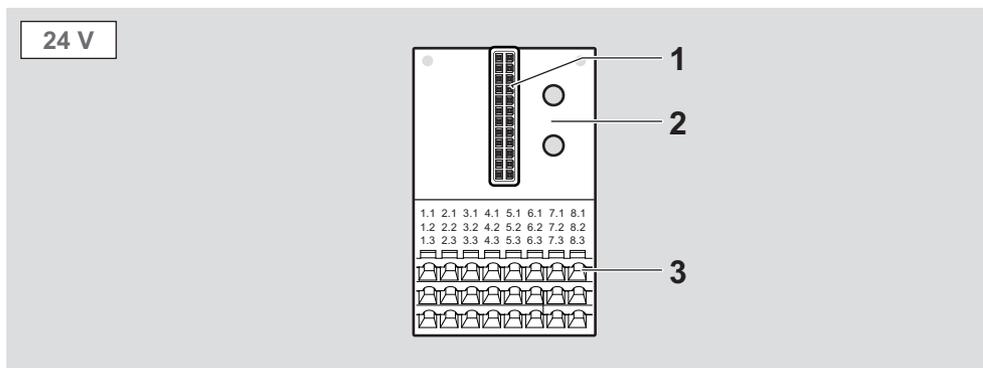
If a code plate is not used and the module is plugged into an incorrect slot, the module may be damaged.

- ▶ Always use the correct code plate for the module.
-

Dräger recommends placing the terminal blocks for 24 V and signal lines on one side of the module and the terminal blocks for switching 240 V AC on the opposite side for spatial separation of the low-voltage signals and mains voltage signals in the switch cabinet.

4.3.1 Terminal Block 24 pole DC

Terminal Block for connecting input and output signals (24 V) to a 4-20 mA Input / HART or Relay 24 V DC module.



- 1 Connection plug to module
- 2 Slot for code plate. Designed to prevent confusion of different module types. It is supplied with the module. Insert the coding plate into the corresponding Terminal Block once the module position has been specified.
- 3 Terminal Block for 8x3 contacts

Contact assignment Terminal Block 24 pole DC (depending on the connected module type):

	Relay	4-20 mA
X.1	NO	+
X.2	NC	S
X.3	COM	-

X	=	Port 1 to 8
NC	=	Normally Closed
NO	=	Normally Open
COM	=	Common, middle contact COM relay
S	=	Signal
+	=	Direct voltage supply: 18 to 30 V DC
-	=	Common reference potential

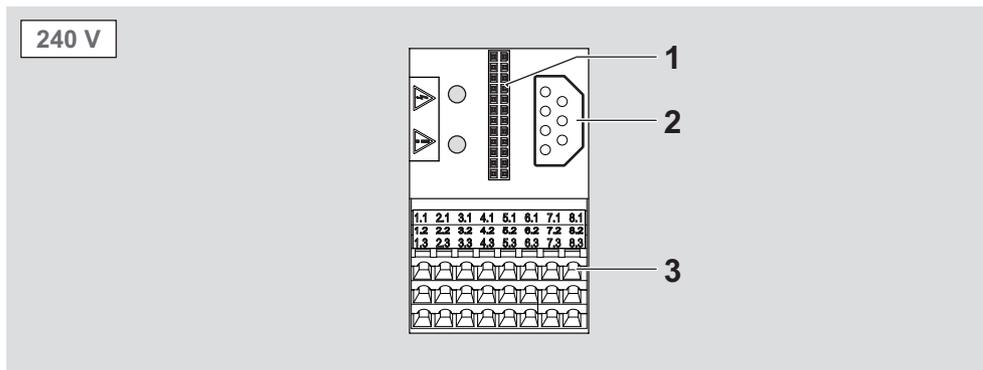
Technical data

Terminal type:	plug-in terminal
Cable core cross-section:	0.5 mm ² to 2.5 mm ²

4.3.2 Terminal Block 24 pole AC

Terminal Block for connecting the output signals to a Relay 240 V AC module. The Terminal Block 24 pole AC is supplied with a code plate to prevent accidental connection of an incorrect module. The code plate only fits the modules of the Relay 240 V AC type.

 The code plate must not be removed from the Terminal Block.



- 1 Connection plug to module
- 2 Code plate for prevention of confusion of different module types. It has been specified by the module position in which it is inserted in the applicable Terminal Block.
- 3 Terminal Block for 8x3 contacts

Contact assignment Terminal Block 24 pole AC:

	Relay
X.1	NO
X.2	NC
X.3	COM

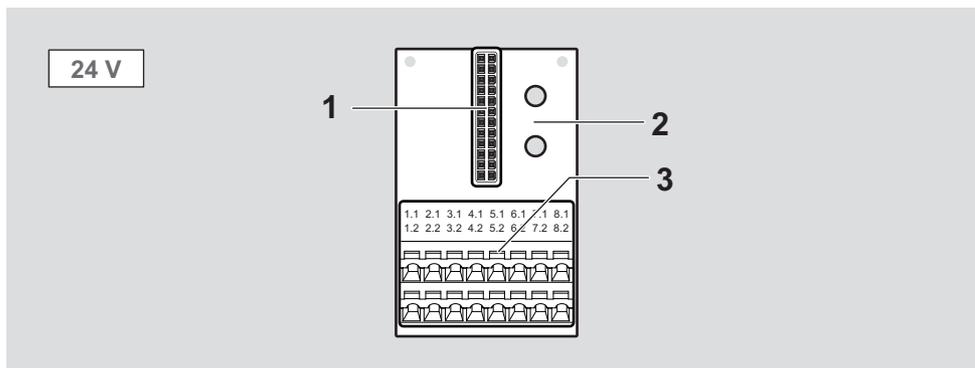
X	=	Port 1 to 8
NC	=	Normally Closed
NO	=	Normally Open
COM	=	Common, middle contact COM relay

Technical data

Terminal type:	plug-in terminal
Cable core cross-section:	0.5 mm ² to 2.5 mm ²

4.3.3 Terminal Block 16 pole

Terminal Block for connection of input signals (24 V) to the Digital Input module.



- 1 Connection plug to module
- 2 Slot for code plate for prevention of confusion of different module types. It is supplied with the module. It has been specified by the module position in which it is inserted in the applicable Terminal Block.
- 3 Terminal Block for 8x2 contacts

Contact assignment Terminal Block 16 pole:

		Digital In
X.1		+
X.2		-
X	=	Port 1 to 8
+	=	Direct voltage supply: 18 to 30 V DC
-	=	Common reference potential

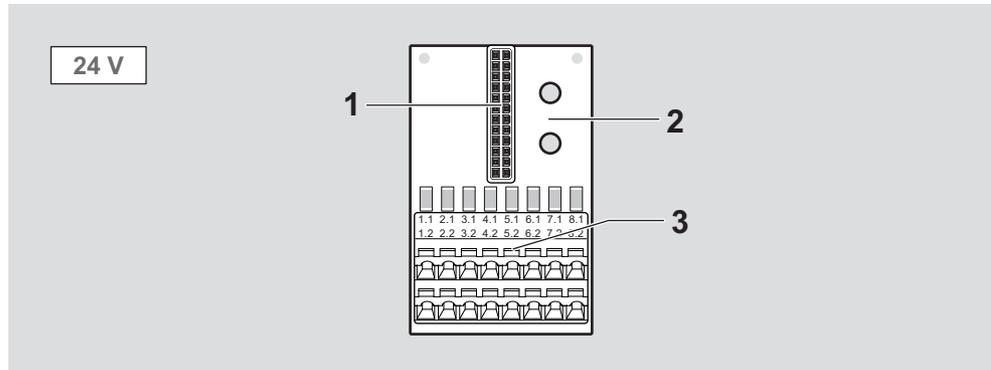
Technical data

Terminal type:	plug-in terminal
Cable core cross-section:	0.5 mm ² to 2.5 mm ²

4.3.4 Terminal Block 16 pole Res

i For applications of functional safety or measuring function for flammable gases, oxygen or toxic gases, the use of this Terminal Block is only permitted for inputs in Inhibit operating mode or acknowledgement.

Terminal Block for connecting input signals (24 V) to the Digital Input module. The Terminal Block 16 pole Res is equipped with series resistors of 1 KOhm. This provides the option of actuating the inputs of the Digital Input module only by connecting a switch/button.



- 1 Connection plug to module
- 2 Slot for code plate for prevention of confusion of different module types. It is supplied with the module. To be inserted into the corresponding Terminal Block once the module position has been set.
- 3 Terminal Block for 8x2 contacts

Application notes

The corresponding input channel on the Digital Input module must be configured as follows:

Parameter	Setting
Detector activation direction	Rising
Current threshold	9.0
Wire break detection enabled	<input type="checkbox"/> (disabled)

Contact assignment Terminal Block 16 pole Res:

	Digital In
X.1	+
X.2	-
X	= Port 1 to 8
+	= Direct voltage supply: 18 to 30 V DC
-	= Common reference potential

Technical data

Terminal type:	plug-in terminal
----------------	------------------

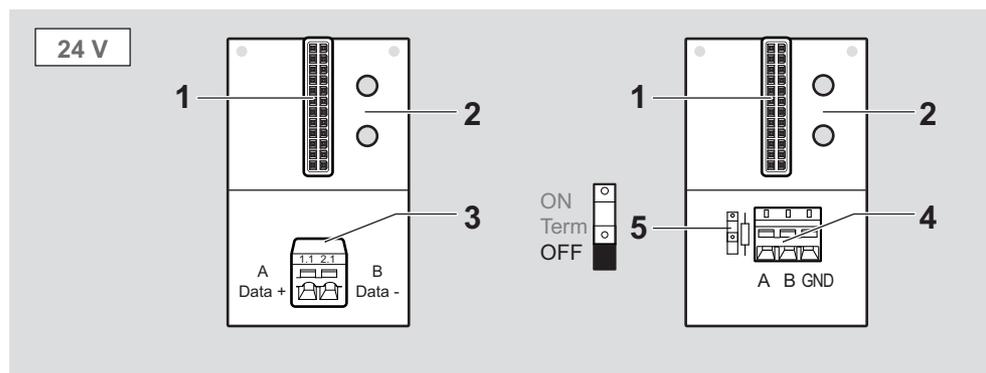
Cable core cross-section:	0.5 mm ² to 2.5 mm ²
---------------------------	--

4.3.5 Terminal Block 2 pole / 3 pole

The Terminal Block can be used for the following applications:

- for connecting a REGARD 7000 via a bridge module to a REGARD
- for connecting a gateway module to a UNIGATE[®] converter module for connection to a SCADA/DCS system
- for connecting a Modbus RTU master module to Modbus field devices

The Terminal Block 3 pole has an end-of-line resistor that can be switched on or off via the sliding switch. The termination is used to suppress signal reflections on the bus line.



- 1 Connection plug to module
- 2 Slot for code plate for prevention of confusion of different module types. It is supplied with the module. To be inserted into the corresponding Terminal Block once the module position has been set.
- 3 Terminal Block for 2 contacts
- 4 Terminal Block for 3 contacts
- 5 Sliding switch resistor

Technical data

Terminal type:	plug-in terminal
Cable core cross-section:	0.5 mm ² to 2.5 mm ²
Resistance: (Terminal Block 3 pole only)	120 Ohm

4.4 Dashboard

Install the Dashboard on a clean, smooth surface to guarantee protection class IP 65. Before installing the Dashboard in a panel or a subframe of an industrial switch cabinet, check that the seal on the back of the front panel is in good condition. The seal must not be damaged, faulty or dirty. The floor of the switch cabinet must as a minimum conform to UL 94-5VB flammability class. Do not place any flammable materials under the Dashboard.

4.4.1 Add-on functionalities

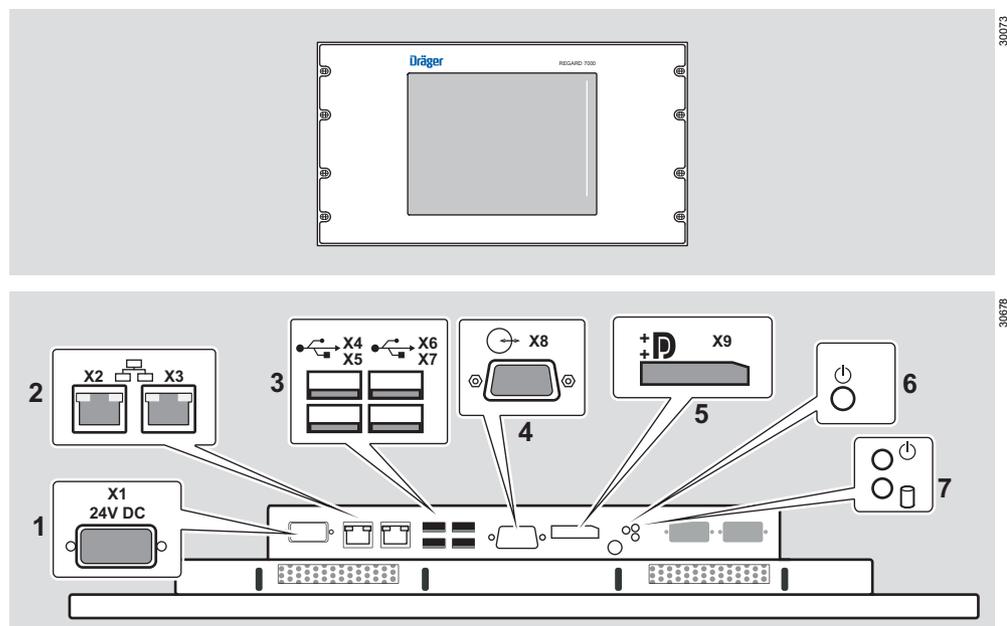
The operation of REGARD 7000 via a dashboard can be supplemented using licensable additional functions in the form of add-on licences.

For further information, see the following chapter: "Display and install add-on licences", page 119

4.4.2 Advanced Dashboard 6RU

Dashboard with 30.7 cm (12.1 inch) screen diagonal for installation in a switch cabinet. Touchscreen for operation of the system and viewing data.

The hole in the front panel of the Dashboards allows direct installation in a 19-inch rack. The Dashboard occupies 6 height units.



- 1 24 V DC power supply
- 2 Ethernet ports
(port X2 = Docking Station, port X3 = not used)
- 3 USB ports (for USB storage media)
- 4 RS-232 serial port (not used)
- 5 Display port (not used)

- 6 On/Off button
(long press = hard shut-down (shut down Dashboard in normal operation with the control software), short press = switch-on)
- 7 Operating display (yellow = standby, green = operation)
Mass storage device access (yellow = access)

Technical data

Operational voltage:	24 V (19.2 to 28.8 V) DC
Power input:	Typ. 1.0 A at 24 V DC

4.4.3 Advanced Dashboard PM

Dashboard with 30.7 cm (12.1 inch) screen diagonal for installation in a switch cabinet. Touchscreen for operation of the system and viewing data.



Ports as on the Advanced Dashboard 6RU, also a USB port in the front panel.

Technical data

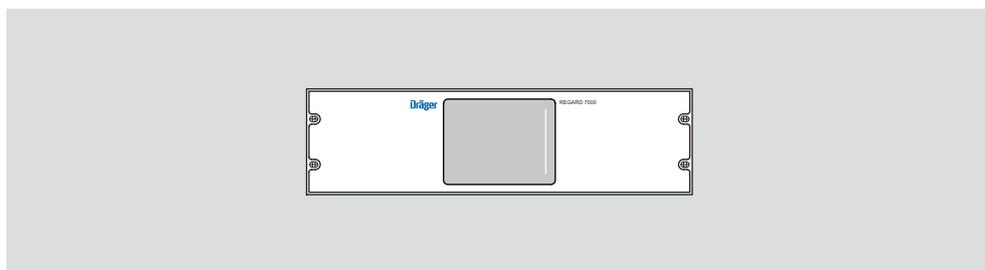
Operational voltage:	24 V (19.2 to 28.8 V) DC
Power input:	Typ. 1.0 A at 24 V DC

4.4.4 Standard Dashboard 3RU

Dashboard with 16.5 cm (6.5 inch) screen diagonal for installation in a cabinet. Touchscreen for operation of the system and viewing data.

The hole in the front panel of the Dashboards allows direct installation in a 19-inch rack. The Dashboard occupies 3 height units.

The Dashboard is supplied with a pen for operating the touchscreen.



Ports as for Advanced Dashboard 6RU.

Technical data

Operational voltage:	24 V (19.2 to 28.8 V) DC
Power input:	Typ. 0.7 A at 24 V DC

5 Installation & commissioning

5.1 System design

The gas and fire alarm system is generally designed by a Dräger System Centre or an engineering bureau. They design the overall system and prepare the documentation for the complete system. The system documentation contains the plans for setting up the REGARD 7000 system and installation of all gas transmitters, fire detectors, alarm devices etc.

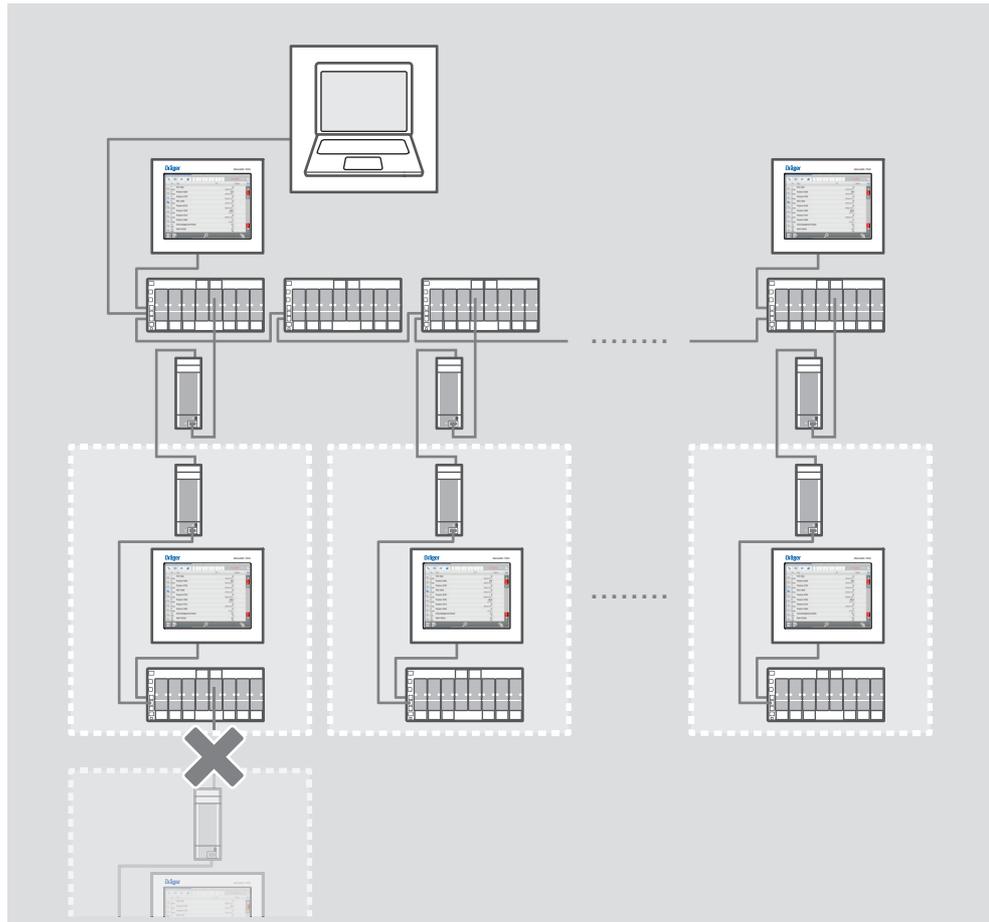
5.2 System structure

REGARD 7000 forms the central control unit for the complete gas and, if applicable, fire alarm system. REGARD 7000 is designed for installation in a switch cabinet. The REGARD 7000 Docking Station is bolted to a corresponding mounting plate in the cabinet (see assembly instructions Docking Station). Depending on the plant, up to 24 4/8 slot Docking Stations can be wired into a system. A Dashboard for system operation can be installed both into the cabinet door (Advanced Dashboard PM) and into a cabinet rack (Standard Dashboard 3RU and Advanced Dashboard 6RU) (see the assembly instructions for the Dashboards).

Only trained service personnel (e.g. employees of Dräger Service) are permitted to install the gas alarm system subject to the relevant local regulations.

i The assembly and installation instructions must be followed to ensure compliance with the requirements of the EMC Directive.

5.2.1 System limits



31438

The following limits apply to a system:

- Max. 24 docking stations
- Max. 192 modules
- Max. 16 dashboards
- Max. 200 bus devices (dashboards, modules and configuration PC)
- Max. 1 configuration PC
- Max. 6 satellite systems
- Max. 6 long-distance gateway modules
- Max. 4 docking stations per satellite system
- Max. 6 bridge modules
- Max. 1536 ports in the system

5.2.2 Prerequisites for the system structure

- Plan the structure to ensure that the REGARD 7000 can be protected from unauthorised access. The system operator is responsible for access to the REGARD 7000.
- Before handling electronic system components, make sure that the persons handling them are earthed to prevent damage to the components. A person can be safely earthed by, for example, an ESD armband (electro static discharge).
- An interference-resistant earth connection and/or equipotential bonding connection must be available for connection of the different system components.
- Use one of the following power supply units for supplying power to the REGARD 7000 from the AC mains supply:
SELV power supply unit (separated or safety extra low voltage) corresponding to IEC 60950-1
PELV power supply unit (protective extra low voltage) corresponding to IEC 61140
- Dräger recommends SELV power supply units for larger systems with earth potential subject to faults.
- Dräger recommends galvanic isolation of the power supply of the Dashboard(s) from the power supply of the Docking Stations and the use of SELV power supply units to avoid earth loops in the power supply.
- Use a DC-DC converter with galvanic isolation between the input and output side for the power supply of the REGARD 7000 from the DC mains.
- When installing the Dashboards and the modules make sure that the ventilation slots of the device and the modules are not covered and that the device and modules are fully ventilated during operation.
- If necessary, install adequate active cooling in the switch cabinet to protect the components in the switch cabinet from overheating.
- REGARD 7000 has been tested for vibration resistance in accordance with the relevant standards. When selecting the installation site, ensure that vibrations such as are common in a control room are not exceeded.
- Unless otherwise specified, only devices or parts that conform to the requirements of a SELV current circuit (safety extra-low voltage) as per IEC 60950-1 may be connected to the available interfaces.
- Dräger recommends installation of control and transmitter lines separately from power supply lines.
- External equipment (e.g. horns, fans, contactors) must conform to the applicable EMC guidelines and must have interference suppression.
- Dräger recommends the use of shielded cables for connecting transmitters.
- Depending on the earthing concept of the individual system, the shielding should be connected to the functional earth of the Docking Station or to the earth connection on the transmitter. Fitting the shielding on both sides can result in earth loops and signal faults.
- REGARD 7000 does not support dynamic status signals from transmitters. Transmitters must be configured for static status signals (see instructions for use of the transmitters).
- Use shielded Cat 5e cables for all Ethernet connections in the REGARD 7000 system. The maximum cable length is 100 m.

- Dräger recommends keeping the REGARD 7000 Ethernet network separate from process, automation and office networks.
- For applications of functional safety or measuring function for flammable gases, oxygen or toxic gases, evaluate the SFR and the SSR on all Docking Stations.
- It is the operator's responsibility to ensure that short circuits and interruptions in the wiring of the SFR are either detected or result in a safe shutdown.
- Dräger recommends protecting the outputs of the power supply units used against overload.

5.2.3 Additional requirements for plants with measuring function for flammable gases, oxygen or toxic gases

- The REGARD 7000 system and the system components must be protected from unauthorised access (e.g. with a lockable switch cabinet).
- The design of the system must also take into account the response times of all components in the alarm chain (transmitter setting times $t_{20}/t_{50}/t_{90}$, reaction time of evaluation system).
- The maximum power resistance for operating 3-wire transmitters is calculated using the following formula:

$$R_L < (262 \text{ Ohm} \times 3.6 \text{ mA}) / (P_T / U_T + 24 \text{ mA} - 2 \times 3.6 \text{ mA})$$

R_L $R_{Leitung}$ = resistance of a line (outgoing and incoming lines) to the transmitter, whereby it is assumed that the resistance of the outgoing and incoming lines are identical.

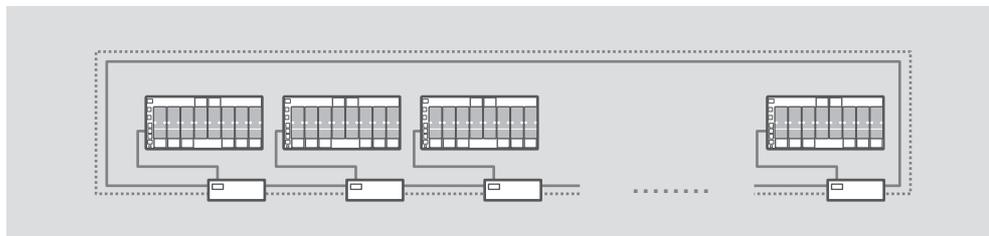
P_T $P_{Transmitter}$ = typical power consumption of the transmitter according to the instructions for use

U_T $U_{Transmitter}$ = supply voltage present at the transmitter

The configurable value for Underrange Minimum should be set to $\geq 3.6 \text{ mA}$.

- The maximum line resistance when operating 2-wire transmitters depends on the connected transmitter type, but must be a maximum of 300 Ohm per line.

5.2.4 System structure variants



To increase the security of the communication between all Docking Stations of a REGARD 7000 system even further, there is the option to connect the individual Docking Stations via a ring structure/double ring structure.

Dräger has approved the FL Switch 3005 of the firm Phoenix Contact. To do this, all affected FL Switches 3005 should be configured for using the RSTP (Rapid Spanning Tree Protocol). For further information, see the instructions for use of the FL Switch 3005.

The design of a single ring structure covers a line break at any point in the ring (single errors).

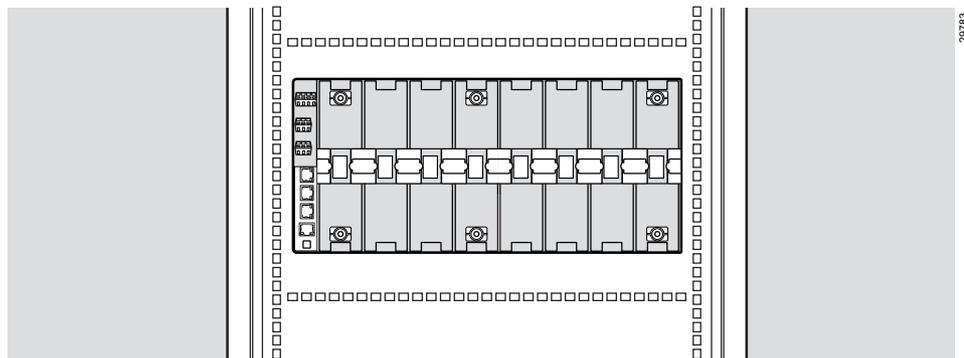
The design of a double ring structure covers a line break at any point in the corresponding ring (double errors). In both cases, the REGARD 7000 signals a communication error; the measuring function is retained.

i These structure variants have not been checked by the DEKRA EXAM. In plants conforming to PFG 16 G 006 X or BVS 16 ATEX G 003 X these structure variants are still permitted.

5.2.5 Assembly and installation

The following steps describe the basic assembly of the REGARD 7000 system:

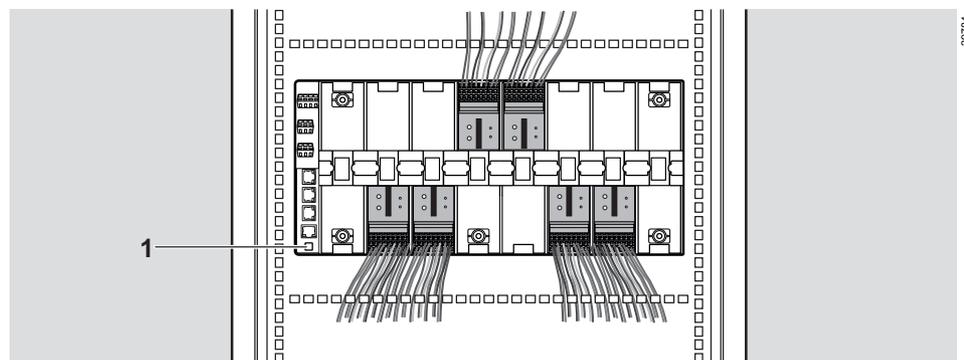
1. Install the Docking Station in the cabinet horizontally on the mounting plate (see assembly instructions for Docking Station).



2. Insert Terminal blocks according to the planned module installation (see assembly instructions for Terminal Block).

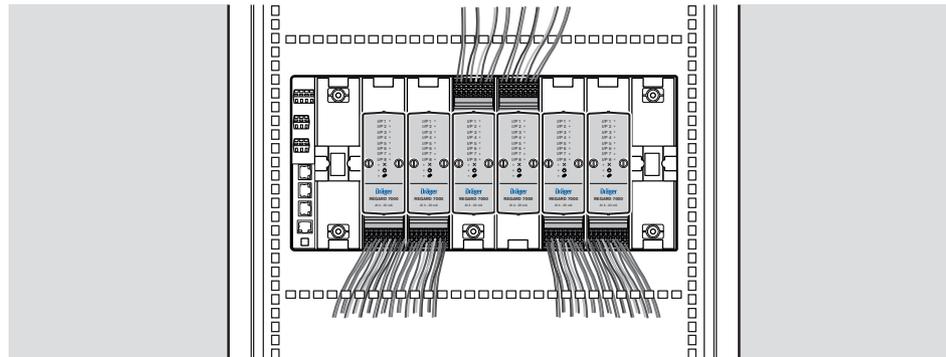
i After configuration of the system, modules of the same type must not be exchanged, because after configuration every module is linked to a specific slot in the Docking Station.

3. Wire Terminal blocks according to the system diagram.



i The Docking Station has a connection for functional earth (1). This connection must generally be attached to the earth potential of the switch cabinet and shields the Ethernet and signal lines. An only one-sided contact of the earth shield may make sense for widely distributed systems. This depends on the earth design and equipotential bonding in the system.

4. Insert modules as specified by the system design.



Note the following:

Modules may be replaced during operation. Modules can also be exchanged between Docking Stations within the overall system.

- If a module is exchanged between Docking Stations, the Docking Stations in question must be connected to the network.
- The module must be configured at the new slot.

i If the Docking Stations are disconnected from the network when exchanging modules, fault states may be generated, which can only be corrected by shutting down and restarting the entire system.

- ▶ New module with factory settings: Insert the module in the slot and configure it. When the configuration is sent the module is linked to the slot.
- ▶ Module previously configured at another slot: The module is still configured for the previous slot. Configure module and send the configuration. The module is now linked to the new slot.

i An unconfigured module generates a fault when the system is started, which is deleted by a valid configuration.

5. Configure REGARD 7000 system with the Dashboard.

5.3 Commissioning

5.3.1 Requirements for commissioning

- The system has been installed and inspected in accordance with the system documentation.
- All general conditions for trouble-free operation have been met.

5.3.2 Preparation for operation

Power is switched on to the system and, if applicable, transmitters.

5.3.3 Switching on REGARD 7000

1. Switch on power to the REGARD 7000 system.
 - ⇒ The dashboard displays the start screen.
 - ⇒ The modules start and the communications LEDs on the modules and the assigned Ethernet ports start flashing as communication starts.
 - ⇒ During the start phase the SSR and, if faults are detected, also the SFR on the docking station are activated.
 - ⇒ All connected transmitters are powered up and start.
 - ⇒ All modules are activated in a random order when the system is started. This distributes inrush current peaks of the connected transmitters evenly and ensures that the system starts without trouble.

 After switching on the REGARD 7000 system, different special states may be encountered depending on the system structure, system size and system configuration. They clear without intervention, but in some cases may be latching. The latched states can be manually acknowledged from the dashboard.

5.3.4 Configuring the REGARD 7000

Configure the REGARD 7000 system for the desired functions.

 Dräger recommends backing up the configuration to a USB storage medium after configuration of the system. For further information, see the following chapter: "Save or import configurations", page 85 This ensures that the system configuration can be restored quickly in case of fault.

6 Control

The system is operated primarily with one or more dashboards in the system.

 Direct operation at the modules is not possible.

6.1 Log user in or out

The following users are default settings:

User	Password	Role
administration	1111	Administration
configuration	2222	Configuration
maintenance	3333	Maintenance
view only	4444	View only
operation	5555	Operation

To log in a user on a REGARD 7000 system with the Dashboard:

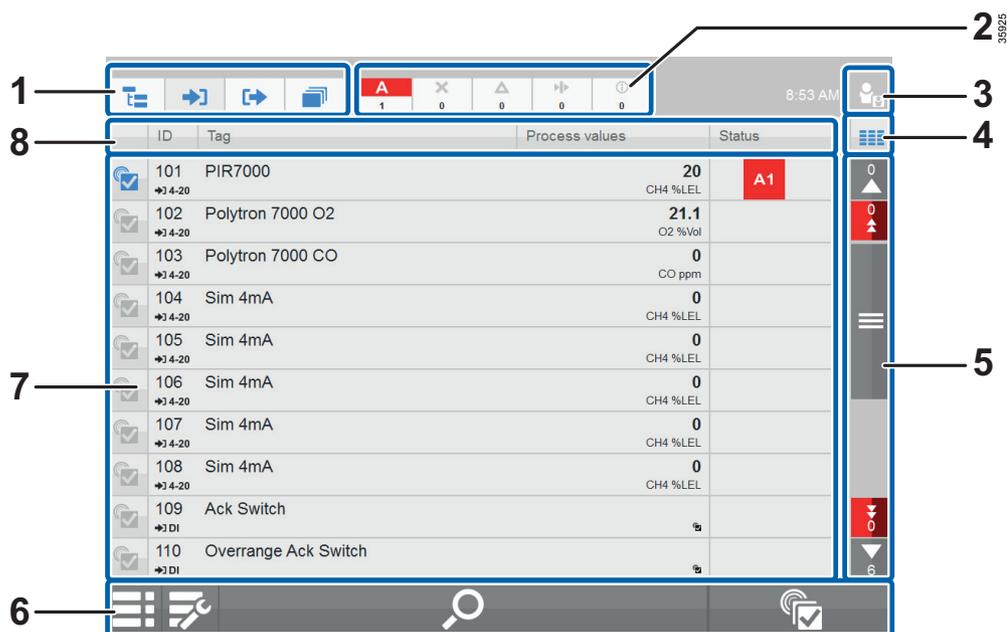
1. Select the desired user in the **Select user** dropdown list.
 2. In the **Enter password** input field enter the password using the numeric pad and confirm with .
- ⇒ The channel list is displayed.

 Dräger recommends changing the passwords of the default users after initial start-up.

To log out a user:

1. Select and confirm  > **Logout**.

6.2 Screen structure (list view)



- 1 Display selection list
- 2 Progress bar
- 3 Log user in or out
- 4 List view/column view
- 5 Navigation bar
- 6 Menu bar
- 7 Channel list
- 8 Header bar

6.3 User roles

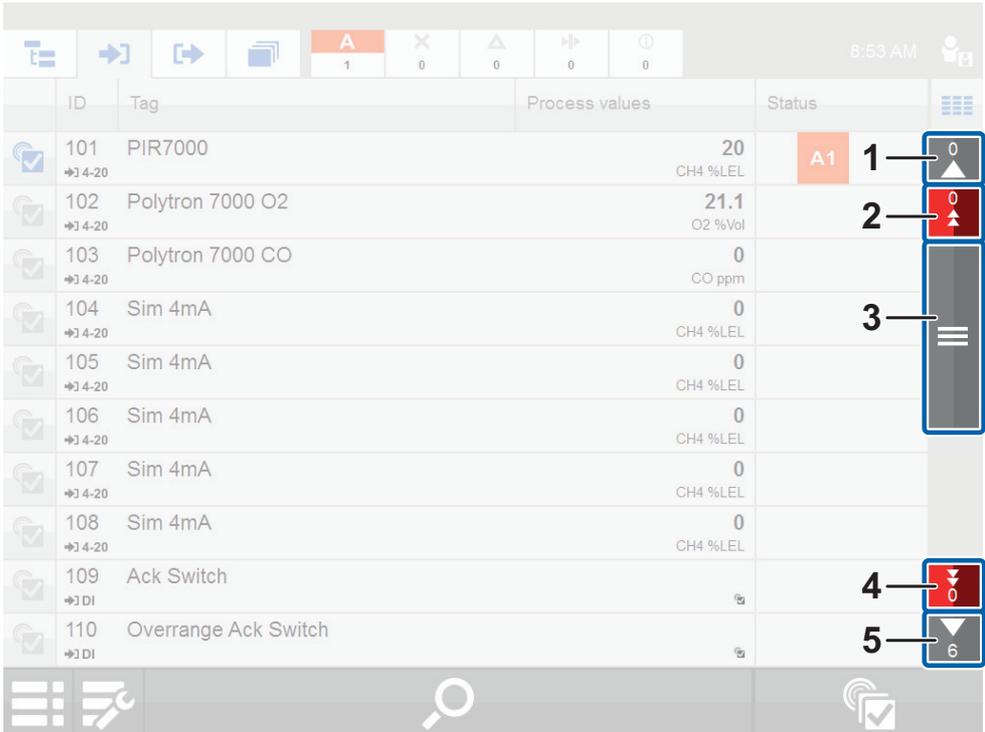
Icon	Role	Description
	View only	Observe the information in the following chapter: "View role", page 76
	Operation	Observe the information in the following chapter: "Operation role", page 76
	Maintenance	Observe the information in the following chapter: "Maintenance role", page 77
	Configuration	Observe the information in the following chapter: "Configuration role", page 83
	Administration	Observe the information in the following chapter: "Administration role", page 117

6.4 List and column view

Two types of view can be selected for displaying the input and output channels.

Icon	Function	Description
	List view	Display list view (display of up to 10 channels).
	Column view	Display column view (display of up to 40 channels).

6.5 Navigation bar



- 1 Button for scrolling up the channel display. The number in the field shows the number of channels above the top channel display.
- 2 Button for scrolling up the channel display to the next channel in the alarm state. The number in the field shows the number of channels in alarm state above the top channel display. The button is only displayed if there are channels in alarm state.
- 3 Button for scrolling the channel display through all channels available in the list view.
- 4 Button for scrolling down the channel display to the next channel in the alarm state. The number in the field shows the number of channels in alarm state below the bottom channel display. The button is only displayed if there are channels in alarm state.
- 5 Button for scrolling down the channel display. The number in the field shows the number of channels below the bottom channel display.

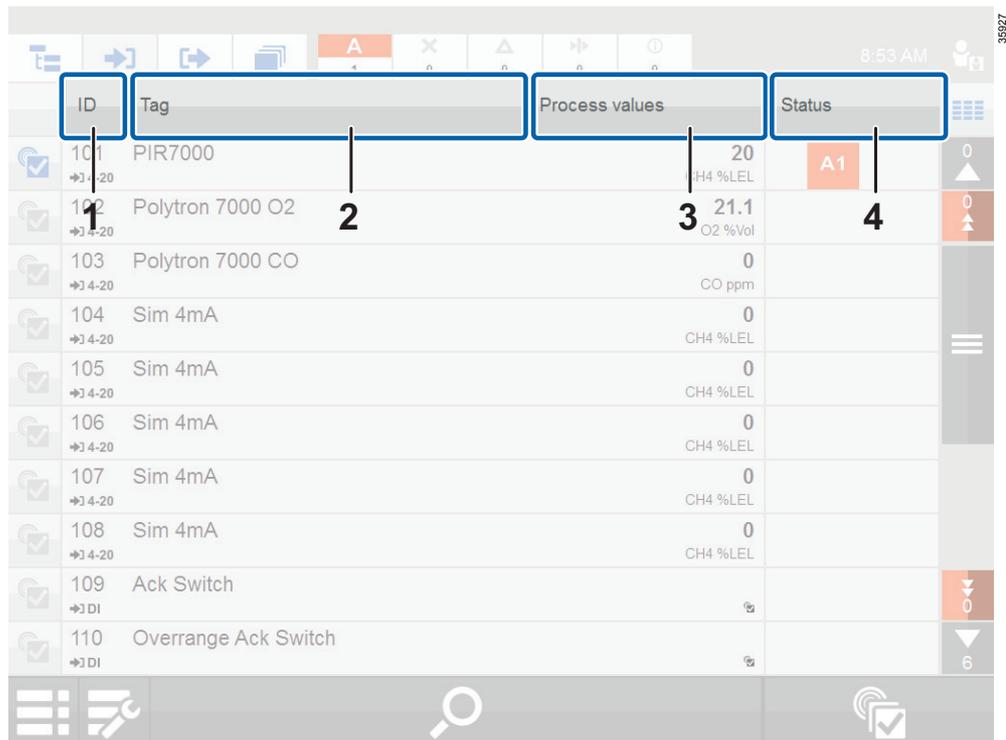
The buttons for scrolling to the channels in alarm state are only displayed if there are channels in the alarm state.

With the automatic scroll function activated, the channel display is automatically scrolled 60 s after the last operation, if more channels are present in the view than can be displayed on the dashboard. For further information, see the following chapter: "Dashboard settings", page 116

6.6 Navigation buttons

Icon	Function	Description
	Detail selection	Call a more detailed level.
	Cancel	Cancel the current action.
	Filter	Apply the defined filter criteria to the display.
	Delete filter	Delete filter criteria.
	Sort field	Select the sort field (ascending).
	Sort field	Select the sort field (descending).

6.7 Title bar of the channel display (list view)



- 1 ID: ID of the displayed channel
- 2 Tag: Name of the displayed channel. The name of the channel can be selected as desired during system configuration.
- 3 Process values: Depending on the module type, various process information such as measured value, gas type and measurement unit or alarm, alarm type are displayed.
- 4 Status: Status of the displayed channel

 Only channels of functional modules are displayed on the system. If modules are removed from the system, the display of the affected channels also disappears.

6.8 Buttons on the menu bar

Icon	Function	Description
	Menu	Open main menu.
	Function menu	Open functions. The available functions are context-dependent.
	Search, filter	Search and filter functions.

Icon	Function	Description
	Acknowledgement of all channels	Select this button to acknowledge all acknowledgeable events in the system.

The "Acknowledgement of all channels" function acknowledges all undisplayed channels as necessary.

6.9

Buttons of the display selection bar

Icon	Function	Description
	View system components	Display overview of all Docking Stations present on the system (only available for the user roles Maintenance , Configuration and Administration).
	Selection of input channels	Display input channels.
	Selection of output channels	Display output channels.
	Group view	Display defined groups of channels.

In the system components view, only Docking Stations fitted with at least one active module are displayed, as the Docking Station does not have its own intelligence. The Long Distance Gateway is a passive module. For example, a Docking Station with 6 Long Distance Gateways and 2 Slotcover is not displayed.

6.10

Displays of progress bar

The progress bar shows the most important system information. The field in question displays whether the status alarm, malfunction, warning, Inhibit or information is active and on how many channels. If one of these states is active, press the applicable button to reduce the channel display to the relevant channels.

0	2	0	2	0

Number and selection of input channels in alarm state

Number and selection of channels with a fault

Number and selection of channels with a warning

Number and selection of channels in inactive state

Number and selection of channels with information

6.11 Generally used icons

Icon	Description
	The channel is in the Inhibit state. This is used, for example, during a calibration to suppress activation of an alarm element in spite of a pending alarm condition.
	The channel remains in the Inhibit state for 321 seconds.
	Information is available on the channel.
	A warning is on the channel.
	A fault is on the channel.
	There is a communication error (Comfail) on the channel.
	There is additional information on the channel as well as the displayed channel information.
	The channel has multiple faults.
	The channel is in a test or simulation mode.
	The channel is in a test or simulation mode.
	The measured value of the channel exceeds the full scale deflection (over range)
	Signals the open input of a digital input channel.
	Signals the closed input of a digital input channel.
	The relay coil of the associated output channel is activated.
	The relay coil of the associated output channel is not activated.
	A delay time for activation of the channel is active on the channel.
	A delay time for deactivation of the channel is active on the channel.
	An acknowledgement can be implemented via or on this channel.

Icon	Description
	There is a complex configuration on the channel.
A1	The channel has a first alarm.
A8 ⊕	The channel has an eighth alarm and there are additional alarms on the channel.

6.12 Channel view of the module types

Icon	Description
 4-20	4-20 mA Input Module (Input)
 4-20H	4-20 mA Input Module / HART (Input)
 DI	Digital Input Module (Input)
 RLY	Relay Module 24 V DC (Output) Relay Module 240 V AC (Output)
 RLY ⚙	Relay Module 24 V DC complex (Output) Relay Module 240 V AC complex (Output)
 BRDG	Bridge Module (Input)
 MOD	Modbus RTU Master Module (Input)
 MOD	Gateway Module (Output)
 PB	PROFIBUS DP Gateway Module (Output)
 PN	PROFINET Gateway Module (Output)

6.13 Icons in the measured value and status field of the channel display with 4 to 20 mA input channels

Icon	Description
	A second alarm and additional alarms are pending. A fault is pending and the input channel is in the Inhibit state.

Icon	Description
	An over range, a second alarm, additional alarms and a warning are pending.
	A first alarm, information and a communication error are pending.
	The input channel remains in the inhibit state for 321 s. A second alarm, additional alarms, information and multiple faults are pending.

6.14

Icons in the measured value and status field of the channel display with relay output channels

Icon	Description
	The alarm trigger condition is present, the output is not active yet because a switching delay is configured and is active.
	The output is configured to an extended voting alarm, the alarm condition is pending and the relay coil is activated.
	The output is configured to an A8 voting alarm, the alarm condition is pending and the relay coil is not activated.
	The output is configured to a common fault, it is in test mode and the relay coil is activated.
	The output is configured to a communication error (Comfail), the alarm condition is pending, the relay coil is not activated and the channel is in the Inhibit state.
	The output is configured to an voting warning, the alarm condition and information are pending and the relay coil is activated.
	The output is configured to common information, the alarm condition and a communication error are pending and the relay coil is not activated.
	The alarm trigger condition is no longer present, the output is still active because a shut-down delay is configured and is active.
	The output is not activated, a fault and other special states are pending.

6.15 Icons in the measured value and status field of the channel display with Modbus output channels

Icon	Description
	A Modbus communication is pending.
	PROFIBUS communication is present.
	PROFINET communication is present.

6.16 Icons in the measured value and status field of the channel display with bridge channels

Icon	Description
	A first alarm is pending.

6.17 Display prioritisation

 Prioritisation is automatic depending on the importance for the user.

The display of channel states in the system is prioritised as follows (list with descending priority):

Icon	Description
	Channel in Inhibit state
▼	
	Channel in fault state
▼	
	Input channel in alarm state
▼	
	Output channel in alarm state
▼	
	Communication error (Comfail) on the channel
▼	

Icon	Description
	Channel in warning state
	
	Channel has information

 If an alarm is issued before an error occurs on the channel, this condition will be frozen during the error. Once the error has been rectified, the alarm condition will be displayed again, and updated as appropriate.

6.18 Status signalling with the presentation of channel states

All states shown on a channel can have the following active states:

Input:

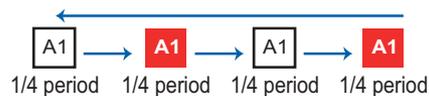
- Active: The condition for the channel state is met.
- Latching: The condition was previously met but is currently no longer met.
- Acknowledged: The condition was met and was acknowledged by the user.

The state conditions are shown on the display by the following blink patterns. The blink patterns are applicable for all channel states.

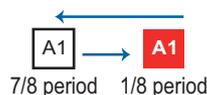
Output:

- Active: The condition for the channel state is met.
- Latching: The condition was previously met but is currently no longer met.
- Pre-acknowledged: The condition is met, was acknowledged by the user but the relay is in the alarm state.
- Silent: The condition is met, was acknowledged by the user and the relay is not in the alarm state.

Examples of gas alarm blink patterns:



Active, the condition is met. Shown by a flash pattern with equal on and off time.



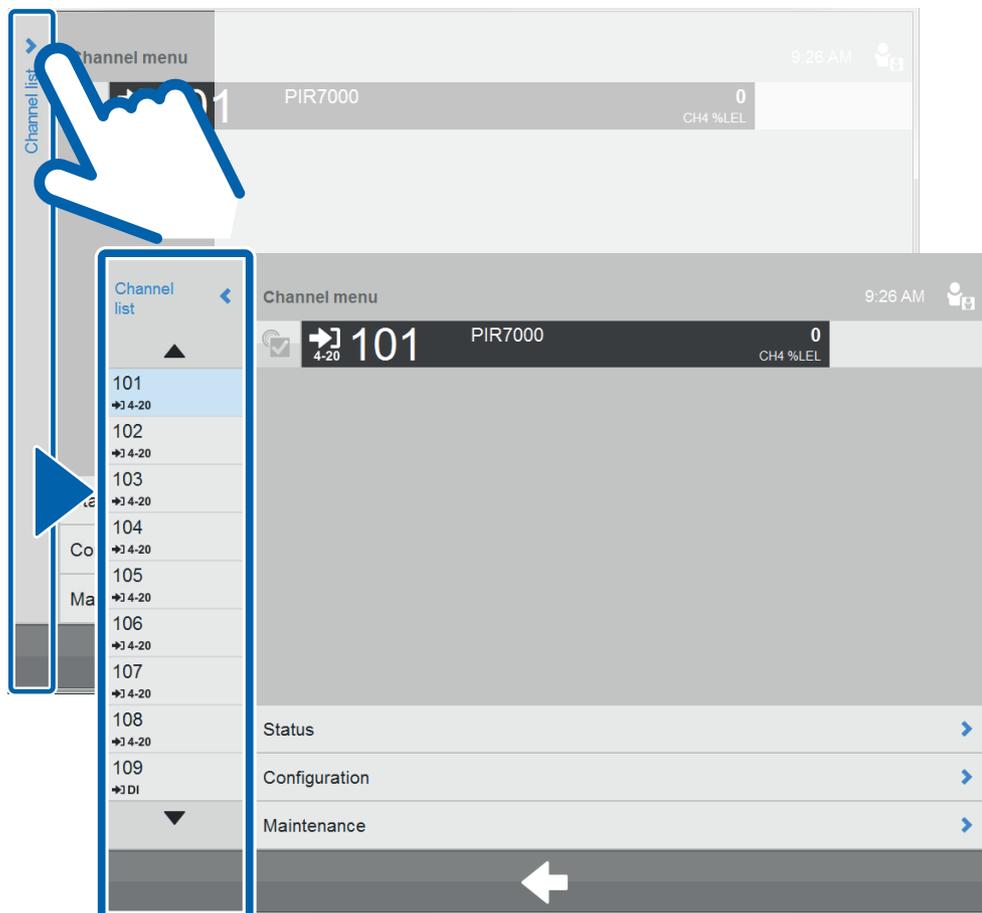
Latching, the condition was met but is currently no longer met. Shown by a flash pattern with 1/8 on and 7/8 time.



Acknowledged, the condition is met and was acknowledged by the user. Shown on a permanent display.

6.19 Side bar

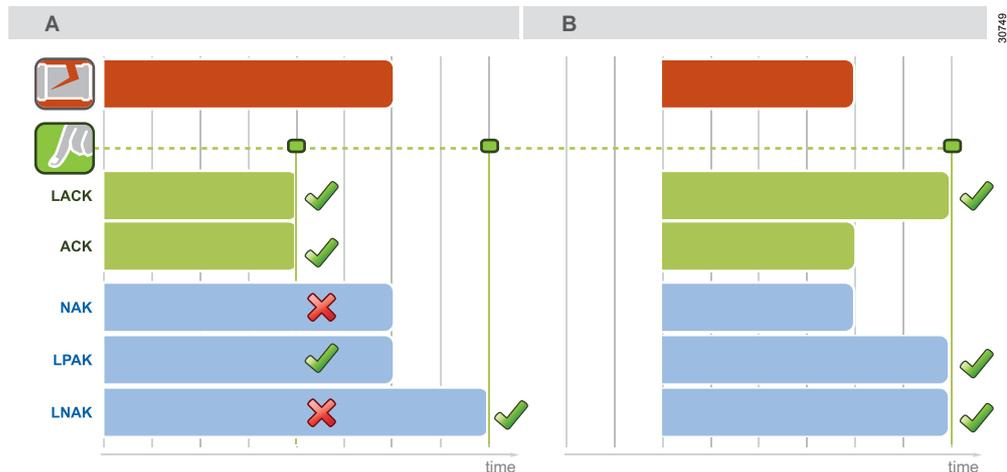
A side bar is displayed in the Port menu and in the Channel menu. This side bar can be used to switch between the Ports and channels.



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6.20 Alarm confirmation modes

The following graphic shows the output behaviour of a relay output depending on the configured alarm confirmation mode, a pending alarm and the acknowledgement signal.



Acknowledgement is accepted.



Acknowledgement not effective.

Case descriptions

LACK (latching and acknowledgeable)

Case A

1. Alarm condition triggered.
2. Relay is activated.
3. Acknowledgement is actuated during the alarm condition.
4. Relay is deactivated.
5. Alarm condition cleared.

Case B

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared, relay remains activated.
4. Acknowledgement is actuated.
5. Relay is deactivated.

ACK (acknowledgeable)

Case A

1. Alarm condition triggered.
2. Relay is activated.
3. Acknowledgement is actuated during the alarm condition.
4. Relay is deactivated.
5. Alarm condition cleared.

Case B

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared.
4. Relay is deactivated.

NAK (non-latching and non-acknowledgeable)

Case A

1. Alarm condition triggered.
2. Relay is activated.
3. Acknowledgement is actuated during the alarm condition, relay remains activated.
4. Alarm condition cleared.
5. Relay is deactivated.

Case B

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared.
4. Relay is deactivated.

LPAK (latching and pre-acknowledgeable)**Case A**

1. Alarm condition triggered.
2. Relay is activated.
3. Pre-acknowledgement is actuated during the alarm condition, relay remains activated.
4. Alarm condition cleared.
5. Relay is deactivated by pending alarm condition.

Case B

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared, relay remains activated.
4. Acknowledgement is actuated.
5. Relay is deactivated.

LNAK (latching and non-acknowledgeable)**Case A**

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared, relay remains activated.
4. Acknowledgement is actuated, relay is deactivated.

Case B

1. Alarm condition triggered.
2. Relay is activated.
3. Alarm condition cleared, relay remains activated.
4. Acknowledgement is actuated.
5. Relay is deactivated.

7 Operation

7.1 Prerequisites for operation

- The REGARD 7000 system is correctly configured.
- Commissioning is correctly completed.
- The user is logged in with the applicable role or the system is configured for automatic login.

7.2 Prerequisites for plants in the area of functional safety and measurement function for flammable gases, oxygen and toxic gases

- After initial commissioning the passwords for the preset users must be changed. For further information, see the following chapter: "Manage users", page 117
- The module 4-20 mA input is suitable for applications conforming to EN 45544-2 with transmitters with output currents at the workplace exposure limit between 5.6 and 12 mA.
- When using the 4-20 mA Input / HART module in accordance with EN 45544-3 (toxic gases) or EN 60079-29-1 (explosive gases and vapours) with the capture range activated, the capture value must be set to zero and the upper and lower limit of the capture range must not exceed 5% of the full scale deflection.
- When using the 4-20 mA Input / HART module conforming to EN 45544-2 (toxic gases), the upper limit of the capture range is not permitted to be set above the measuring range threshold limit (calculated for the combination of REGARD 7000 and connected transmitter). The absolute value of the lower limit of the capture range is not permitted to be more than double the threshold limit.
- When using the 4-20 mA Input / HART module in accordance with EN 50104 (oxygen) with the capture range activated, the capture value must be set to 0 % vol. or 20.9 % vol. and the upper and lower limit of the capture range must not exceed 2% of the full scale deflection.
- When using the 4-20 mA Input / HART module, the transmitter must be approved for HART[®] communication in measuring mode. If this is not the case, a 4-20 mA Input module must be used. The Dräger transmitters currently supported are approved for HART[®] communication in measuring mode.
- With input channels for measuring flammable or toxic gases or oxygen conforming to BVS 16 ATEX G 003 X or PFG 16 G 006 X the parameter **Measurement range minimum** set to 0.
- If a transmitter is used with a catalytic sensor, the **Overrange latching** function on the REGARD 7000 input channel or in the transmitter should be activated. For further information, see the following chapter: "Overrange acknowledge parameter menu", page 93. Dräger recommends using this setting for all applications.
- When configuring REGARD 7000 with the wizard function, the accuracy of the modified configuration parameters must also be checked. This must be confirmed by input of the authorisation code at the end of the configuration process. The operator is responsible for the REGARD 7000 system configuration.

- For the alarm with the highest safety-oriented significance, only acknowledgement types LNAK and LPAK are approved. For further information, see the following chapter: "Alarm confirmation modes", page 66
With multiple outputs for the highest alarm, deviations are permitted (e.g. for acoustic alarm devices).
- Follow the REGARD 7000 Safety Manual (order no. 90 33 497) for a system in the field of functional safety. The REGARD 7000 Safety Manual can be downloaded from Dräger ServiceConnect® (<https://www.serviceconnect.draeger.com>).
- Safety-oriented switch operations are only permitted to be triggered via the REGARD 7000 relay outputs.
- All controls, including digital inputs and Modbus inputs, should be protected against incorrect operation and unauthorised access.

7.3 Prerequisites for plants conforming to NFPA 72

- The installation of plant components and lines must be carried out in accordance with NFPA 72.
- The lines between the relay output and actuator must be monitored for short circuits, line breaks and earth faults (Ground Fault).
- Lines are not permitted to be used for fire and gas warning devices and other plants simultaneously.
- Acknowledgement options are only permitted to be set up in the control room.
- An insulation monitoring relay (Ground Fault Detector) should be installed between the power supply and REGARD 7000.
Dräger recommends using the insulation monitoring relay CM-IWS.1 type P or S from the firm ABB.
For perfect insulation monitoring, all system components being monitored should be operated free of earth potential. For further information, see the instructions for use for the insulation monitoring relay.
- Alarms for fire and carbon monoxide should be identified accordingly.
- For outputs for alarms (Fire / Carbon Monoxide Alarm), errors (Trouble Signal) and warnings (Supervisory Signal), the alarm repetition (Resound) must be activated.
- The power supply for Dashboards should be kept separate from the power supply of the Docking Stations.

The concepts for the status messages below differ on the NFPA 72 and on the REGARD 7000. The table below shows the unique assignment of the terms:

NFPA 72	REGARD 7000
Fire Alarm	Alarm
Trouble Signal	Fault
Supervisory Signal	Warning
Silence	Acknowledge

7.4 Requirements for plants in the maritime sector

- Install the REGARD 7000 in a cabinet separately from other control and regulation systems.
- The REGARD 7000 power supply must be provided via a DNV GL type-tested energy supply unit.
- Before a group acknowledgement on the Dashboard, check all alarms. Attach the supplied sticker to the Dashboard.



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7.5 Special features of operation of the REGARD 7000 in combination with a REGARD

The Bridge module is used to represent the channels of the REGARD in the REGARD 7000 with the following functions:

- Transfer of measured values
- Transfer of alarms; the alarm thresholds are not transferred and must be set manually in the REGARD 7000. For further information, see the following chapter: "Port configuration Bridge Module", page 113
- Transfer of faults
- Transfer of over range
- Transfer of the status Inhibit
- Target gas name and measurement unit

REGARD channels shown in the REGARD 7000 can be acknowledged from the REGARD 7000.

i If alarms in REGARD are acknowledged from REGARD 7000, the response time per channel is 2.5 s, i.e. the reaction time will be approx. 4 minutes for 99 channels.

The following restrictions must be noted:

- If an alarm in REGARD is acknowledged from REGARD 7000, the alarm state of the REGARD master card must be acknowledged separately at the master card.
- The acknowledgement of the over range of a REGARD channel must be implement at REGARD and is not possible from the REGARD 7000.
- If channels shown on REGARD 7000 are to be configured, the relevant REGARD channels must first be set to the Inhibit state.
- After an interruption in the connection between REGARD and REGARD 7000, a pending fault will not be shown again in the REGARD 7000 once the connection has been restored.

-
- When using Dräger Pulsar / Pulsar 2 or Dräger GDxx on a REGARD-Optical-Card, the Beam Block Open Collector output 9 on the Optical-Card must be switched to a REGARD 7000 digital input channel with the aid of an external relay. The digital input channel must be configured as a fault in the REGARD 7000 system.
 - A REGARD 7000 relay shown in a REGARD channel cannot be acknowledged in the REGARD after a fault on the REGARD channel. The relay must be configured for manual acknowledgement to be able to acknowledge the associated REGARD 7000 relay. For further information, see the following chapter: "Parameter menu Acknowledgement mode", page 107
 - In the case of a REGARD system, an over range of a REGARD channel is displayed in the REGARD 7000 with up to 20 s delay depending on the number of channels. The alarm triggering is not affected by this delay.
 - The failure of a REGARD card generates the error message **Fehler Kommunikation** in REGARD 7000. A relay configured to **Comfail** is not switching.
 - When integrating A3 alarms of a bridge module, ensure that the corresponding REGARD channel can also generate an A3 alarm. This is not automatically the case with all REGARD cards.
 - The acknowledgement of a REGARD relay configured to LNAK while an alarm condition is still present means that the acknowledgement should be performed on the REGARD channel card once the alarm condition has been removed. Acknowledgement via REGARD 7000 is no longer possible in this case.
-

⚠ WARNING

Danger of missing alarm issue or false alarms

- ▶ During the configuration of REGARD channels via the REGARD PC interface card and the REGARD configuration software, the corresponding REGARD 7000 channels must be set to the Inhibit status.
-

⚠ WARNING

Danger of non-signalled special state

- ▶ During maintenance of transmitters connected to REGARD, the corresponding REGARD 7000 channels must be set to the Inhibit status. No alarms are issued when the Inhibit status is present.
-

⚠ WARNING

Danger of non-signalled special state

- ▶ Before restarting a REGARD channel card with connected transmitter to a sensor warm-up time of more than 30 s, the corresponding REGARD 7000 channels must be set to the Inhibit status. This status is not permitted to be removed until the warm-up process of the transmitter has been completed.
-

7.6 System behaviour

The table below describes the system behaviour in the different input signal ranges.

	0 mA to 0.1 mA	0.1 mA to 0.1 mA	Underrange minimum to Underrange maximum	Underrange maximum to 4 mA	4 mA to 20 mA	20 mA to Overrange minimum	Overrange minimum to Overrange maximum	Overrange maximum to 38 mA
Measured value display dashboard	Display —	Display —	Current measured value	Current measured value	Current measured value	Current measured value	Display 	Display —
System information dashboard	X 4-20 mA signal fault	Display — X , Δ , i , ▶ ¹⁾	i Readings below the measurement range	none	none	none	i Measurement range exceeded	X Measurement signal fault
Gateway module measured value output	NaN ²⁾	NaN ²⁾	Current measured value	Current measured value	Current measured value	Current measured value	Current measured value	NaN ²⁾
System information gateway module	Fault in the notification and confirmation register	Fault , warning, information, inhibit in the notification and confirmation register ¹⁾	none	none	none	none	Notification of over range in the notification and confirmation register	Fault in the notification and confirmation register
Relay configured to alarms	Last switching state remains ³⁾	Last switching state remains ³⁾	Switching according to configuration	Switching according to configuration	Switching according to configuration	Switching according to configuration	Switching according to configuration	Last switching state remains ³⁾
Relay configured to special signals	Fault activated, other relays keep the last switching state	Dependent on the system configuration	Information relay activated, no input signal dependent switching action with the other relays	No input signal dependent switching action	No input signal dependent switching action	No input signal dependent switching action	Information relay activated, no input signal dependent switching action with the other relays	Fault activated, other relays keep the last switching state

- 1) Depending on the system configuration in terms of the special signals.
- 2) Not a Number, an undefined or non-displayable value.
- 3) For alarm relay configured to **Enhanced voting**, observe the **Degradation scheme**.

For further information, see the following chapter: "Output parameter menu", page 106

The minimum and maximum values for over range and under range are configurable. For further information, see the following chapter: "Range settings parameter menu", page 92

7.7 User role concept

REGARD 7000 has a function and rights management oriented to user roles. Individual users can be created and must be assigned one of 5 roles. Corresponding higher-level functions and rights are available for selecting the role. Multiple users can be assigned to one role. Access to the system is protected by individual passwords for all users.

 All controls that are not available for a specific role are hidden.

After 15 minutes of inactivity the user is logged out or the screen is locked. The user must log in again. If an input from the user is expected during the locked period (e.g. during configuration), the user will be prompted to enter the user password again. If automatic login is configured for the dashboard Dashboard (For further information, see the following chapter: "Set automatic login", page 118), the configured user is automatically logged in.

 Dräger recommends assigning the **Configuration**, **Maintenance** and **Administration** roles to appropriately trained users only.

7.7.1 View only role

The following functions are available:

- Measured value displays
- Status displays
- Change your password

7.7.2 Operation role

The following additional functions are available for the **View only** role:

- View detailed information on individual channels.
- View saved system documents (only if additional functionality is enabled, optionally available).
- Acknowledge of alarms and special signals.

7.7.3 Maintenance role

The following additional functions are available for the **Operation** role:

- Display information on system components.
- Display channel configuration.
- Generate documentation of system configuration as PDF file (only if additional functionality is enabled, optionally available).
- Prepare system for adjustment of the connected transmitters (such as setting channels to the Inhibit state).
- Test REGARD 7000 system components.

7.7.4 Configuration role

The following additional functions are available for the **Maintenance** role:

- Run system configuration.
- Make Dashboard settings.

7.7.5 Administration role

The following additional functions are available for the **Configuration** role:

- Create, change and delete users.
- Perform firmware update for the Dashboards.
- Switch off Dashboard via Dashboard software.
- Administer document library (only if additional functionality is enabled, optionally available).

7.8 View role

After logging into the system the default view will be displayed (configurable). For further information, see the following chapter: "Dashboard settings", page 116.

⚠ CAUTION

Danger of an inconsistent configuration display.

After changing the channel tag or the channel ID of a channel, another dashboard/PC with REGARD 7000 configuration software can be used to display the channel tag and module type for this channel unchanged in the following views:

- Ack. sources
 - Overrange settings
 - Inhibit
 - Output
- After changing the channel tag or the channel ID of a channel on all connected dashboards / PC with REGARD 7000 configuration software, open configuration mode and close again without changing.
-

7.8.1 During operation

To change your own password:

1. Select  > **Edit user**.
 2. Enter the new password into the **Password:** input field.
 3. Repeat the password in the **Verify password:** field and confirm it.
- ✓ The password is changed.

7.9 Operation role

After logging into the system the default view will be displayed (configurable). For further information, see the following chapter: "Dashboard settings", page 116.

⚠ CAUTION

Danger of an inconsistent configuration display.

After changing the channel tag or the channel ID of a channel, another dashboard/PC with REGARD 7000 configuration software can be used to display the channel tag and module type for this channel unchanged in the following views:

- Ack. sources
 - Overrange settings
 - Inhibit
 - Output
 - ▶ After changing the channel tag or the channel ID of a channel on all connected dashboards / PC with REGARD 7000 configuration software, open configuration mode and close again without changing.
-

7.9.1

During operation

In addition to the functions of the **View only** role, alarms and other special signals can be acknowledged.

To acknowledge an alarm or special signal:

1. Select  in the row of the alarm.

To acknowledge all alarms or special signals in the system:

1. Select .

To display detailed information and messages for a channel:

1. Select Channel > **Status**.
 - ⇒ The channel status information is displayed.
2. Select **Channel status**.
3. Select the required messages in the **Reason list** section.
 - ⇒ The cause for the message is displayed.

To display a document from the document library:

- ▶ Observe the information in the following chapter: "Manage system documentation library (optional)", page 120

7.10

Maintenance role

After logging into the system the default view will be displayed (configurable). For further information, see the following chapter: "Dashboard settings", page 116.

⚠ CAUTION**Danger of an inconsistent configuration display.**

After changing the channel tag or the channel ID of a channel, another dashboard/PC with REGARD 7000 configuration software can be used to display the channel tag and module type for this channel unchanged in the following views:

- Ack. sources
- Overrange settings
- Inhibit
- Output
- ▶ After changing the channel tag or the channel ID of a channel on all connected dashboards / PC with REGARD 7000 configuration software, open configuration mode and close again without changing.

7.10.1**Docking Station maintenance**

All Docking Stations in the system are displayed in the system component view.

Proceed as follows to identify the Docking Station that is to be maintained:

1. Select the  button in the channel list view.
2. In the Docking Station row, select the  button.
 - ⇒ The LEDs of all modules installed on this Docking Station flash for approx. 10 s.

 This does not change the state of the input and output channels.

To display information on the Docking Station:

1. Select the  button in the channel list view.
2. In the Docking Station row, select the  button.
 - ⇒ The name and Dräger part number of the Docking Station are displayed.

Docking Station relay test

The **Docking Station relay test** function enables the test of the SSR and SFR on the Docking Station.

The SSR is a positively-driven relay that is not under power when not operating (energized on alarm).

The SFR has a redundant design for safety. Two relays are used as normally closed or normally open relays depending on the application. There is a total of 3 relays on the Docking Station for both operating modes: 1x NO, 1x NC, 1x COMMON (NC/NO).

The corresponding 2 relays must be tested separately depending on the selected operating mode:

- In the Normally Open mode the closing of the contacts must be measured at the applicable contacts of the Docking Station (Observe the information in the following chapter: "Docking Station", page 17) when the applicable NO relay is actuated.
- In the Normally Closed mode the opening of the contacts must be measured at the applicable contacts of the Docking Station (Observe the information in the following chapter: "Docking Station", page 17) when the applicable NC relay is actuated.

Requirements:

- A consumer is connected to the SFR and SSR.
- If no consumer is connected, the relay must be tested for perfect function using a continuity tester.

To perform a relay test of the Docking Station:

1. Select the **T** button in the channel list view.
2. In the Docking Station row, select the ******* button.
3. Select **Docking Station relay test**.
 - ⇒ The relay test menu is displayed.
4. In the Normally Closed operating mode, test the following relays:
 - a. Select the **Test fault relay NC** button.
 - ⇒ The **Test fault relay NC** button displays **ON**.
Check whether the SFR was switched.
 - b. Select the **Test fault relay NC** button.
 - ⇒ The **Test fault relay NC** button displays **OFF**.
 - c. Select the **Test fault relay NO/NC** button.
 - ⇒ The **Test fault relay NO/NC** button displays **ON**.
Check whether the SFR was switched.
 - d. Select the **Test fault relay NO/NC** button.
 - ⇒ The **Test fault relay NO/NC** button displays **OFF**.
5. In the Normally Open operating mode, test the following relays:
 - a. Select the **Test fault relay NO** button.
 - ⇒ The **Test fault relay NO** button displays **ON**.
Check whether the SFR was switched.
 - b. Select the **Test fault relay NO** button.
 - ⇒ The **Test fault relay NO** button displays **OFF**.
 - c. Select the **Test fault relay NO/NC** button.
 - ⇒ The **Test fault relay NO/NC** button displays **ON**.
 - d. Select the **Test fault relay NO/NC** button.
 - ⇒ The **Test fault relay NO/NC** button displays **OFF**.
Check whether the SFR was switched.
6. Select the **Test special state relay** button and check whether the SSR is switched.

i Run the test of the SFR and SSR in SIL systems at regular intervals as directed in the REGARD 7000 Safety Manual and document the test.

7.10.2 Maintenance of modules

Selecting the Docking Station displays the modules in the Docking Station.

Proceed as follows to identify the module that is to be maintained:

1. Select the  button in the channel list view.
2. Select the Docking Station in which the module is installed.
3. In the module row select the  button.
 - ⇒ The module LEDs flash for about 10 s.

 This does not change the state of the input and output channels.

To display information about the module:

1. Select the  button in the channel list view.
2. Select the Docking Station in which the module is installed.
3. In the module row select the  button.
 - ⇒ The name, Dräger part number, serial number, MAC address and firmware version of the module are displayed.

To test the LEDs of a module:

1. Select the  button in the channel list view.
2. Select the Docking Station in which the module is installed.
3. In the module row select the  button.
4. Select **Module maintenance**.
5. Select the **LED test:** button.
 - ⇒ The **LED test:** button displays **ON**. The module LEDs flash.
6. Check that all module LEDs are working.
7. Select the **LED test:** button to stop the LED test.
 - ⇒ The **LED test:** button displays **OFF**. The module LEDs stop flashing.

The **Module maintenance** function enables the restart of a module and is required to clear a latching fault on a module (e.g. if the position of a module in the system is exchanged). A restart briefly shuts down the transmitter powered by the module and thus restarts the transmitter.

 Transmitters with an external power supply must be manually restarted by disconnecting them from their power source. Take the warm-up time of the transmitter into account.

- Alarms are suppressed during restart.
- All relays are briefly disconnected from the power supply if the module is a relay module. All channels configured as normally energized thus switch to active during the restart (approx. 20 s).
- All switching elements connected to a digital input module are disconnected from the power supply during a restart. Potential alarms during the restart (e.g. an input configured for dropping current) are suppressed.

To restart a module:

1. Select the  button in the channel list view.
2. Select the Docking Station in which the module is installed.
3. In the module row select the  button.

4. Select **Module maintenance**.
5. Select **Restart**.
 - ⇒ A wizard is opened.
6. Follow the directions of the wizard.

7.10.3 Maintenance of channels and ports

The various functions for maintenance of a channel and Ports are described below. The functions are identical for channels and Ports.

To display the configuration of a channel or Ports:

- ▶ Channel: Select [channel] > **Configuration** in the channel list view.
 - ▶ Port: In the channel list view, select the button  > [Docking Station] > [Module] > [Port] > **Configuration**.
- ✓ The configuration of the channel or Ports is displayed.

 Observe the information in the following chapter: "Configuration role", page 83

To display the maintenance menu:

- ▶ Channel: Select [channel] > **Maintenance** in the channel list view.
 - ▶ Port: Select the  button in the channel list view. Select [Docking Station] > [Module] > [Port] > **Maintenance**.
- ✓ The maintenance menu for the channel or port is displayed.

7.10.3.1 Maintenance menu *Common*

To restart the channel or Port (not possible with relays):

1. Open Maintenance menu > **Common**.
2. Select **Restart**.
 - ⇒ A wizard is opened.
3. Follow the directions of the wizard.

 When restarting a channel, all states (e.g. alarms, errors, Inhibit) are reset. The associated output should be locked if appropriate, to prevent alarms when restarting the connected transmitter.

The channel is not ready for measurement during the warm-up time of the transmitter (see instructions for use).

Transmitters with an external power supply must be manually restarted by disconnecting them from their power source.

To lock a channel or Port:

1. Open Maintenance menu > **Common**.
2. Select the **Inhibit by Dashboard:** button.
 - ⇒ The **Inhibit by Dashboard:** button displays **ON**.
 - ⇒ The lock is displayed in the **Inhibit reason list**.

To lock one or more channels:

1. Select the  button in the channel list view.
 - ⇒ The function menu is displayed.
2. Select **Select to set inhibit**.

3. Activate the checkbox of the desired channel.
4. Select **Set inhibit**.
- ✓ All selected channels are locked.

7.10.3.2 Maintenance menu **Relay proof test (relays only)**

To carry out a relay test:

1. Open Maintenance menu > **Relay proof test**.
2. Select the **Enable test:** button.
 - ⇒ The **Enable test:** button displays **ON**.
3. Select **Energized** to activate the coil.
 - ⇒ **Result: Coil energized** is displayed.
 - ⇒ The LED on the module lights red.
4. Select the **Not energized** button to prevent activation of the coil.
 - ⇒ **Result: Coil not energized** is displayed.
 - ⇒ The LED on the module does not light.
5. Select the **Enable test:** button to stop the relay test.
 - ⇒ The **Enable test:** button displays **OFF**.
 - ⇒ **Result: Not tested** is displayed.

7.10.4 Dashboard settings

To display device information on the Dashboard used:

1. Select  > **Information** > **Device information**.
 - ⇒ The device information is displayed.
2. As necessary: Select export to save the information as a log file to a USB device connected to the Dashboard.

To configure the screen and the touchscreen:

1. Select  > **Settings** > **Display and touch settings**.

2. **CAUTION**

Restriction of the operability of the system

If the touchscreen is very poorly adjusted, operation of the system will be restricted or impossible!

- ▶ Adjust the touchscreen cautiously and only if necessary

Make the desired settings:

Touchscreen calibration:	Calibrate touchscreen. Touch the red arrow icon with your finger within 15 s and hold it there until OK is displayed.
Touchscreen lock:	The touchscreen will be locked for 60 s to allow the screen to be cleaned without accidentally triggered functions.
Display test:	Testing the basic colours will display a red, green, blue and black screen in succession. Takes approx. 20 s.
Display brightness:	Set screen brightness.

7.11 Configuration role

After logging into the system the default view will be displayed (configurable). For further information, see the following chapter: "Dashboard settings", page 116.

⚠ CAUTION

Danger of an inconsistent configuration display.

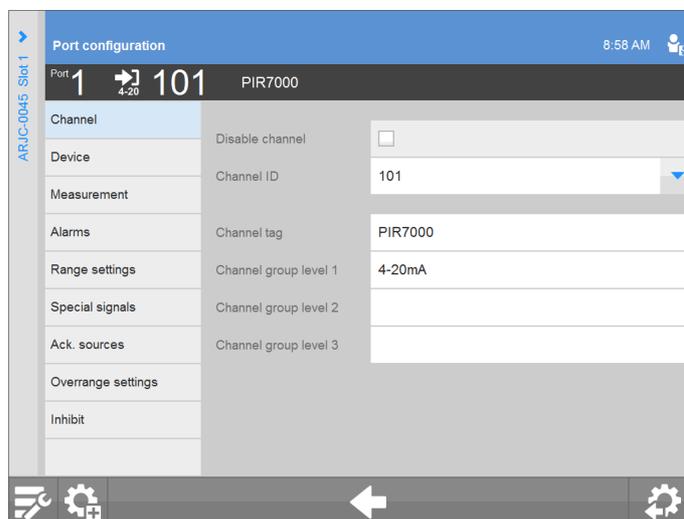
After changing the channel tag or the channel ID of a channel, another dashboard/PC with REGARD 7000 configuration software can be used to display the channel tag and module type for this channel unchanged in the following views:

- Ack. sources
- Overrange settings
- Inhibit
- Output
- ▶ After changing the channel tag or the channel ID of a channel on all connected dashboards / PC with REGARD 7000 configuration software, open configuration mode and close again without changing.

i The user role **Configuration** is optionally available on the Standard Dashboard 3RU via the "System configuration" add-on licence. The Advanced Dashboards always include the "System configuration" function. For further information, see the following chapter: "Display and install add-on licences", page 119

7.11.1 General configuration procedure

The general steps required to configure a Port are given below.



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7.11.1.1 Open configuration mode

CAUTION

Danger of an inconsistent configuration

All settings and system comparisons in configuration mode always relate to the imported system configuration when configuration mode is entered. Subsequent changes to transmitter configurations are not taken into account.

- ▶ Do not make any changes to the connected transmitters during configuration mode.

To open configuration mode:

1. Select .
2. Select .
 - ⇒ The **Enter configuration edit mode** is displayed.
3. Follow the directions on the display.
 - ⇒ The current system configuration is loaded.
 - ⇒ The activated configuration mode is displayed by a dark-blue header and footer.

7.11.1.2 Changing parameters

To change parameters:

1. Open configuration mode.
2. Select [Docking Station] > [Module] > [Port].
3. Changing parameters.

 The parameters of the various modules are explained in the following sections.

⇒ Changes are marked by a colour bar.

 With non-plausible or invalid inputs, the corresponding input field is marked with a  or . Information on the cause and remedy are displayed by selecting this symbol.

4. Select  to confirm the changes.
5. If necessary, configure more Ports.
 - ▶ To cancel all changes and to exit configuration mode: Select and confirm .
 - ▶ To start the transfer wizard: Select  > **Send** and follow the directions of the transfer wizard.

 Before activating the modified system configuration, the system prompts for the input of a control code generated by the system. By entering this code, the user confirms that the system configuration displayed is correct.

All changed channels are locked during transfer of the configuration to prevent unplanned malfunction of the system. The locked channels must be restored to their standard operating mode after configuration.

 Channels that depend on the changed channels are not locked.

7.11.1.3 Changing module names

A unique module name can be assigned to any module.

1. Open configuration mode.
2. In the system component view, select the Docking Station and the module.
3. In the module row select the *** button.
⇒ Information on the module is displayed.
4. Input the desired module name in the **Module tag** input field.
5. Transfer configuration.

7.11.2 Export configuration and reports

This function can be used to export a configuration and optionally a component report¹⁾ and/or system documentation¹⁾ onto a USB stick.

Component report

The component report add-on licence is an additional function of the REGARD 7000 Advanced Dashboard that permits an overview of all components included in the gas warning system to be generated. All item and serial numbers of the REGARD 7000 components are currently exported and displayed in the report. Components that have been included in the configuration during the commissioning process are also listed. The component report is only generated in the Advanced Dashboard used – no additional tool is required. The report is made available as a PDF and can be transferred directly from the dashboard onto a USB stick.

System documentation

The system documentation add-on licence is an additional function of the REGARD 7000 Advanced Dashboard that permits the current configuration of the complete gas warning system to be exported and made available as a PDF file. No additional tools are required to generate the system documentation. It is generated directly on the dashboard and from there can be transferred directly onto a USB stick.

To export a configuration and reports:

1. Plug a USB stick into the USB port on the Dashboards.
2. Select .
- ⇒ The function menu is displayed.
3. Select **Export**.
4. Follow the directions of the wizard.

7.11.3 Save or import configurations

This functions enables configuration changes to be saved to a USB stick and imported and transferred at a later time.

To save a configuration:

1. Plug a USB stick into the USB port of the dashboard.
2. Open configuration mode.
3. Select .
- ⇒ The function menu is displayed.

1) Only if additional functionality is enabled, optionally available via add-on licence.

4. Select **Save**.
5. Follow the directions of the wizard.

To import a configuration:

1. Plug a USB stick into the USB port of the dashboard.
2. Open configuration mode.
3. Select .
 - ⇒ The function menu is displayed.
4. Select **Import**.
5. Follow the directions of the wizard.

If a configuration is imported to a second identical docking station, the wizard asks to which docking station the configuration is to be imported.

7.11.4 Compare system configuration (optional)

This function²⁾ can be used to compare an online or offline³⁾ system configuration with a stored system configuration file

 A system comparison report can be saved as a PDF file at the end of the system comparison. The report contains the differences of all Docking Stations equipped with modules. If there are no differences, only the corresponding Docking Station is shown.

Requirements:

- Component report or system documentation add-on licence installed.
- System configuration file (.sev file) is available for the comparison.
- When using the configuration software: REGARD 7000 is connected to the PC.
- When using the configuration software: Configuration port is configured.

7.11.4.1 Compare online configuration

With the dashboard:

1. Select .
2. Select .
 - ⇒ The function menu is displayed.
3. Select **Compare**.
4. Follow the directions of the wizard.

With the REGARD 7000 configuration software:

1. In the toolbar, select  or in the menu bar, select **Maintenance > Dashboard View...**
 - ⇒ A window is displayed with the dashboard view.
2. In the dashboard view, select the  button.

2) Only if additional functionality is enabled, optionally available via the component report or system documentation add-on licences.

3) Only possible with REGARD 7000 configuration software.

3. Select .
- ⇒ The function menu is displayed.
4. Select **Compare**.
5. Follow the directions of the wizard.

7.11.4.2 Compare offline configuration

For further information, see the following chapter: "Compare offline configuration", page 140

7.11.5 Copying Port configuration

A selected Port configuration can be copied to any number of Ports of the same module type using the Port configuration copy wizard.

Requirements:

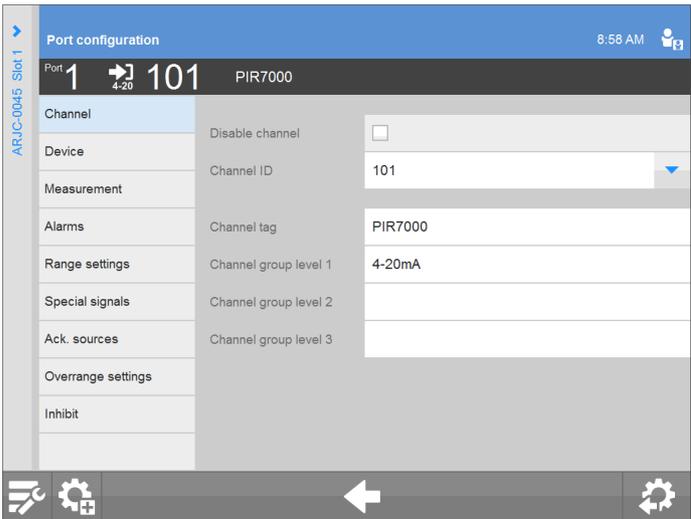
- Configuration mode is opened. For further information, see the following section: "Open configuration mode", page 84.
1. Select [Docking Station] > [Module] and the [Port] to be copied.
 2. Select  > **Copy port configuration assistant**.
 - ⇒ The Port configuration copy wizard is displayed.
 - All Ports of the selected module type are listed.
 - The Port that is to be copied is shown with a grey background.
 3. Select the checkboxes for the Ports to which the Port configuration is to be copied.
 4. Select **Copy descriptions** checkbox if appropriate.
 - This includes copying the parameter values for channel tag, device name, device part number, sensor name and sensor part number.
 5. Select  to copy the Port configuration to all selected Ports.

 The Port configurations for all selected Ports will be overwritten without a confirmation enquiry.

Further steps:

- ▶ To start the transfer wizard: Select  > **Send** and follow the directions of the transfer wizard. For further information, see the following chapter: "General configuration procedure", page 83

7.11.6 Port configuration 4-20 mA Input Module / HART®



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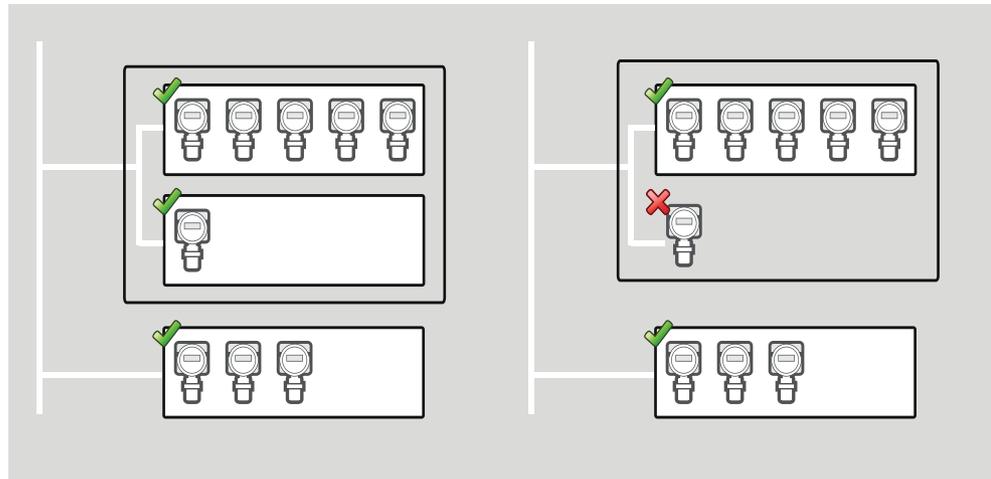
7.11.6.1 Channel parameter menu

Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



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7.11.6.2

Device parameter menu

Information on the transmitter can be recorded in this menu.

Parameter	Description
Device name	Input device name of the transmitter connected to the channel. Selection via dropdown list or text input. Selecting a device name does not result in a change in the REGARD 7000 channel configuration for the corresponding transmitter. The device wizard must be used to do this.
	<p>Device wizard</p> <p>A Dräger transmitter can be selected with the device wizard. The parameters are automatically assigned with the default values of the transmitter depending on the transmitter. The default values can be changed after the device wizard is closed.</p> <p>Even when using the device wizard, the user must check that the configuration and correspondence with the configuration of the connected transmitter are correct.</p>
Device part number	Order number of the transmitter.
Device serial number	Serial number of the transmitter.
Sensor name	Sensor name of the sensor used in the transmitter.
Sensor part number	Order number of the sensor.
Sensor serial number	Serial number of the sensor.
Startup inhibit time	Time for which the channel is locked after switching on the transmitter power supply voltage. This ensures that no alarms are triggered during the warm-up phase of the transmitter.
	Adjustable range: 0 to 600 s

Parameter	Description
Transmitter power supply type	Select whether the transmitter is to be powered from the REGARD 7000 module or an external power source. The External power source type is only required for transmitters that have an intrinsic power supply of more than 500 mA.

7.11.6.3

Parameter menu *Measurement*

Information on the target gas can be recorded in this menu.

Parameter	Description
Gas name	Name of the target gas. Selection via dropdown list or text input.
	Target gas wizard A Dräger transmitter can be selected with the device wizard. The parameters are automatically assigned with the default values of the target gas depending on the target gas. The default values can be changed after the measuring gas wizard is closed.
Short gas name	Short version of the name of the target gas.
Measurement unit	Measurement unit of the target gas. Selection via dropdown list or text input.
Measurement range ([min max] step)	Beginning and ending threshold limits with step width of the display. The step indicates the minimum steps with which the reading changes. Selection via dropdown list.
	Measurement range assistant All parameters for configuration of the measuring range can be set with this wizard.
	Configuration matching assistant (HART module only) This wizard can be used to export and transfer the parameters of the corresponding transmitter. This wizard can only be opened when a supported HART transmitter is connected.

If toxic gases as per EN 45544-2 are being measured, the step must not be set any greater than 5 % of the occupational exposure limit. The beginning threshold limit conforming to EN 45544-2 is then 0.3 % of the measuring range, and corresponding lower at smaller step widths.

7.11.6.4

Alarms parameter menu

Alarms can be configured in this menu.

Parameter	Description
Alarm suppression time	No alarm is triggered for this period after occurrence of an alarm (if signal faults are not to result in an alarm) and not removed when the alarm condition is no longer in place. Adjustable range: 0 to 5 s; default setting 1 s

i Delay times must be taken into account when calculating the system response time. Delay times should always be kept as short as possible during the measurement of:

- Flammable gases and vapours
- Oxygen
- Toxic gases

i Brief signal faults (<1 s) or transitions between special signals (e.g. fault or maintenance signal) and normal measurement operation at a 4 to 20 mA input signal may trigger an unauthorised alarm state if the **Alarm suppression time** is set too low. Remedy: Increase the **Alarm suppression time** depending on the fault potential in the system.

To add an alarm:

1. Select **+**.
⇒ The wizard for the alarm configuration is displayed.
2. Make the desired settings.

Parameter/function	Description
Alarm severity	The alarm severity sets the prioritisation of the alarm. Setting range: A1 (low priority) up to A8 (high priority)
Alarm direction	The alarm direction sets whether the alarm is for a rising or falling gas concentration.
Alarm threshold	The alarm threshold sets when an alarm is triggered. Adjustable range: Equally configured measuring range
Alarm hysteresis	This value set the percentage value for the alarm hysteresis. The percentage value is calculated by the full scale value. Adjustable range: 0 to 5 %; default setting: 1 %
Assign alarm hysteresis to all alarms	It enables the set alarm hysteresis to be used for all alarms for this channel.

3. Select channel and confirm.

i A maximum of 8 alarms per channel can be created.

To change the settings of an alarm:

1. Select an alarm in the list.
⇒ The settings of the alarm are displayed.
2. Make the desired changes and confirm.

To remove an alarm:

1. Enable the checkbox of the alarm.
2. Select  to remove the alarm from the list.

7.11.6.5 **Range settings parameter menu**

Measurement range underrun, measurement range overrun and capture value limits can be set in this menu.

The capture range refers to a range within which minor variations in measured values (such as signal noise, variations in concentration) do not cause variations in the display. Measured values within this range will be displayed with the capture value. Measured values outside the capture range will be displayed with the actual measured value.

Parameter	Description
Overrange maximum Overrange minimum	<p>Range of current values where the Dashboard for the channel displays an under range  and a corresponding status message. Valid measured values are displayed up to the current value set in Overrange minimum.</p> <p>Adjustable range: 20 to 24 mA; Default setting: 20.4 mA (Overrange minimum), 21.0 mA (Overrange maximum)</p>
Underrange maximum Underrange minimum	<p>Range of current values where a corresponding status message is displayed on the Dashboard for a channel.</p> <p>Adjustable range: 3.0 to 4.0 mA; Default setting: 3.7 mA (Underrange minimum), 3.9 mA (Underrange maximum)</p>
Capture enabled	Capture enabled to suppress interference and variations in the display. A capture range set in REGARD 7000 must be identical with the capture range on the connected transmitter (only if present and switched on).
Capture upper limit	Capture upper limit of capture range.
Capture value	Quiescent value of the capture range.
Capture lower limit	Capture lower limit of capture range.

7.11.6.6 **Parameter menu Special signals**

In this menu the user can select how special signals, warnings and faults output by the transmitter are to be displayed by the REGARD 7000. Detection of dynamic transmitter warning signals can also be activated.

To activate detection of dynamic transmitter warning signals:

1. Select the desired warning in the **Dynamic warning signal reason** dropdown list.

To add a **Constant signal**:

1. Select .
2. Select **Constant signal reason** from the dropdown list.
3. Input **Constant signal minimum** into the input field.
Adjustable range: 0.0 to 4.0 mA

4. Input **Constant signal maximum** into the input field.
Adjustable range: 0.0 to 4.0 mA
5. Confirm inputs.

i The properties and settings of the connected transmitter must be taken into account in the configuration of the **Special signals**. If currents outside the defined range are applied at the input, a signal fault is output.

i With 2-wire transmitters, the intrinsic power consumption should be taken into account when setting the special signals. Do not set any special signals lower than typically 2.5 mA. The precise value depends on the transmitter type, length and cross-section of the connection line (see the instructions for use for the transmitter).

i A sufficient distance between **Constant signal minimum** and **Constant signal maximum** must be set (Dräger recommends: $\geq 0.2\text{mA}$).

To remove a **Constant signal**:

1. Enable the checkbox of the **Constant signal**.
2. Select  to remove the **Constant signal** from the list.

i REGARD 7000 does not support any dynamic transmitter maintenance signals (e.g. 3 mA - 5 mA - 3 mA at a frequency of 1 Hz) but detects them and issues an error for the corresponding input channel. In this case, the connected transmitter must be configured for static maintenance signal output.

7.11.6.7

Acknowledgement parameter menu

In this menu channels can be selected via which the current channel can be acknowledged or reset.

i An acknowledgement and a reset of the channels is always possible from the Dashboard.

To add a channel:

1. Select .
⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select  to remove all selected channels from the list.

7.11.6.8

Overrange acknowledge parameter menu

In this menu the **Overrange latching** can be activated or deactivated and channels for acknowledgement of a **Overrange latching** can be added or removed.

To activate **Overrange latching**:

1. Enable **Overrange latching** checkbox.

i Channels can only be added if **Overrange latching** is activated. If **Overrange latching** is deactivated, all added channels are automatically removed from the list.

To add a channel:

1. Select **+**.
 ⇒ A list of the channels is displayed according to the channel filter setting. Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
 2. Select **—** to remove all selected channels from the list.
-

i An input channel must only be used for acknowledgement of the over range of a single measuring channel.

7.11.6.9

Inhibit parameter menu

In this menu various channels can be selected via which the current channel can be inhibited.

i A channel can be inhibited at any time via the Dashboard.

To add a channel:

1. Select **+**.
 ⇒ A list of the channels is displayed according to the channel filter setting. Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select **—** to remove all selected channels from the list.

7.11.6.10

Parameter menu *Transmitter diagnostic* (HART module only)

With the transmitter diagnostics activated, the correspondence of transmitter parameters (configurable) with the parameter values set in the 4-20 mA Input / HART module are checked. A warning is displayed in the event of deviations.

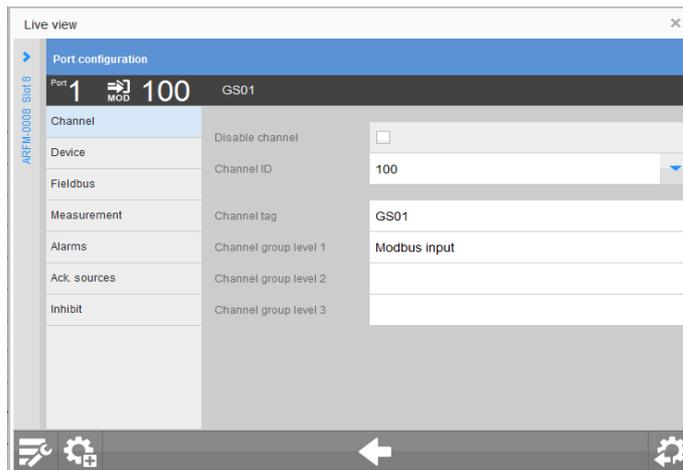
To suppress diagnostic warnings:

1. Enable **Suppress diagnostic warnings** checkbox.

To select the transmitter parameters where correspondence is to be checked:

1. Activate the checkbox of the desired transmitter parameters.

7.11.7 Module and port configuration Modbus RTU Master Module



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7.11.7.1 Module configuration

Open module configuration:

1. Open configuration mode.
2. In the system components view, select the Docking Station and the module.
3. In the module row, press the **...** button.
⇒ Information on the module is displayed.
4. Select **Bus settings [Baudrate Parity Stopbits]**: and make the settings.
5. Transfer configuration.

The fieldbus connection settings can be made in this menu.

To set the transmission speed:

1. In the dropdown list **ModbusMaster baud rate**, select the relevant transfer rate.
Adjustable range: 1.200, 2.400, 4.800, 9.600, 19.200, 38.400, 57.600, 115.200, 230.400, 625.000 bit/s
Default setting: 9.600 bit/s

To set the stop bits:

1. In the dropdown list **ModbusMaster stop bits**, select the stop bits.
Adjustable range: 1, 1,5, 2; default setting: 1

To set the parity value:

1. Select the parity value in the **ModbusMaster parity value** dropdown list.
Adjustable range: **None, Odd, Even**; default setting: **Even**

7.11.7.2 Channel parameter menu

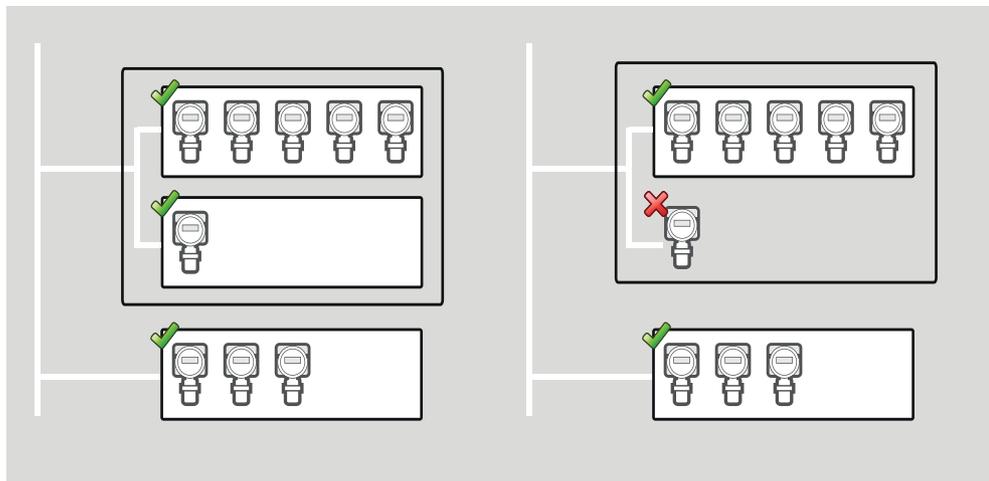
Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.

Parameter	Description
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



7.11.7.3

Parameter menu *Device*

Information on the transmitter can be recorded in this menu.

Parameter	Description
Device name	Input device name of the transmitter connected to the channel. Selection via dropdown list or text input. The selection of a device name does not result in the REGARD 7000 channel configuration being changed for the corresponding transmitter. The device wizard must be used to do this.
Device part number	Order number of the transmitter.

Parameter	Description
Device serial number	Serial number of the transmitter.
Sensor name	Sensor name of the sensor used in the transmitter.
Sensor part number	Order number of the sensor.
Sensor serial number	Serial number of the sensor.
Startup inhibit time	Time for which the channel is locked after switching on the transmitter power supply voltage. This ensures that no alarms are triggered during the warm-up phase of the transmitter. Adjustable range: 0 to 600 s

7.11.7.4

Parameter menu *Fieldbus*

This menu can be used to configure the fieldbus settings.

Parameter	Description
Fieldbus slave ID	Modbus address of the slave Adjustable range: 1 to 247
Slave Type	Pre-configured slave type Selection: None, Polytron 8100, Polytron 8200 LC, Polytron 8200 DD, Polytron 8310, Polytron 8700, Polytron 8720, GS01 and ISA100 UAPMO)
Device Index	Applies when multiple devices have the same Slave-ID (e.g. via a gateway) Note for ISA100 Gateway: the device index is used to determine the register address for DIAG_STATUS, PV_STATUS and PV_VALUE. The registers must be assigned in this sequence. For device index 1, the register address starts from 100. The register addresses for the following device indexes are expected every 20 registers (120, 140, 160, ...)

7.11.7.5

Parameter menu *Measurement*

Information on the target gas can be recorded in this menu.

Parameter	Description
Gas name	Name of the target gas. Selection via dropdown list or text input.
	Target gas wizard A Dräger transmitter can be selected with the device wizard. The parameters are automatically assigned with the default values of the target gas depending on the target gas. The default values can be changed after closing the measured gas wizard.
Short gas name	Short version of the name of the target gas.
Measurement unit	Measurement unit of the target gas. Selection via dropdown list or text input.

Parameter	Description
Measurement range ([min max] step)	Threshold limit and full scale value with display step. The step indicates the minimum steps with which the reading changes. Selection via dropdown list.
	Measurement range assistant This wizard can be used to set all parameters for configuration of the measuring range.

7.11.7.6

Parameter menu Alarms

Alarms can be configured in this menu.

Parameter	Description
Alarm suppression time	No alarm is triggered for this time after an alarm has occurred (if signal faults are not to result in an alarm) and the alarm is not cleared after the alarm condition ceases. Adjustable range: 0 to 5 s; default setting: 1 s

 Delay times must be taken into account when calculating the system response time. Delay times should always be kept as short as possible when measuring:

- Flammable gases and vapours
- Oxygen
- Toxic gases

 Input signals can trigger an unauthorised alarm condition if **Alarm suppression time** is set too low. Remedy: Increase **Alarm suppression time** depending on the fault potential in the plant.

To add an alarm:

1. Select .
⇒ The wizard for the alarm configuration is displayed.
2. Make the desired settings.

Parameter/function	Description
Alarm severity	The alarm severity sets the prioritisation of the alarm. Setting range: A1 (low priority) to A8 (high priority)
Alarm direction	The alarm direction sets whether the alarm is for a rising or falling gas concentration.
Alarm threshold	The alarm threshold sets when an alarm is triggered. Adjustable range: Measuring range configured the same

Parameter/function	Description
Alarm hysteresis	This value set the percentage value for the alarm hysteresis. The percentage value is calculated by the full scale value. Adjustable range: 0 to 5 %; default setting: 1 %
Assign alarm hysteresis to all alarms	It enables the set alarm hysteresis to be used for all alarms for this channel.

3. Select channel and confirm.

 A maximum of 8 alarms per channel can be created.

To change the settings of an alarm:

1. Select an alarm in the list.
⇒ The settings of the alarm are displayed.
2. Make the desired changes and confirm.

To remove an alarm:

1. Enable the checkbox of the alarm.
2. Select  to remove the alarm from the list.

7.11.7.7

Acknowledgement parameter menu

In this menu channels can be selected via which the current channel can be acknowledged or reset.

 An acknowledgement and a reset of the channels is always possible from the Dashboard.

To add a channel:

1. Select .
⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select  to remove all selected channels from the list.

7.11.7.8

Inhibit parameter menu

In this menu various channels can be selected via which the current channel can be inhibited.

 A channel can be be inhibited at any time via the Dashboard.

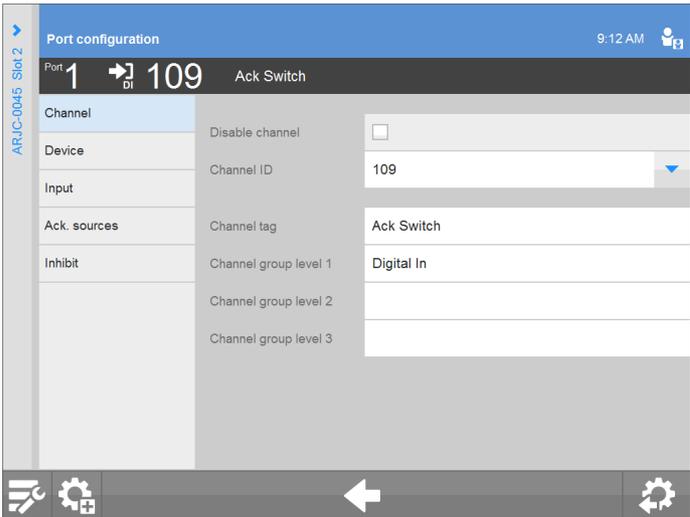
To add a channel:

1. Select **+**.
 ⇒ A list of the channels is displayed according to the channel filter setting.
 Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select **—** to remove all selected channels from the list.

7.11.8 Port configuration Digital Input Module



32390

7.11.8.1 Channel parameter menu

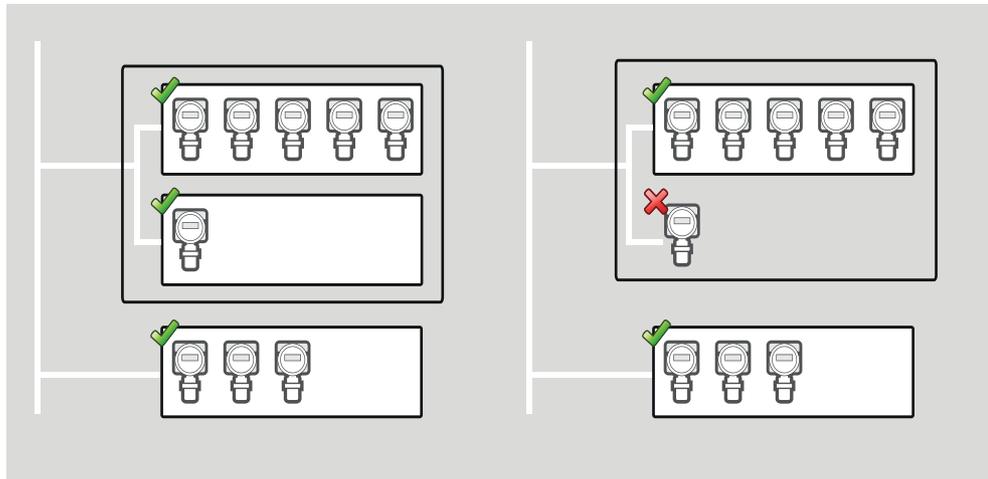
Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).

Parameter	Description
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



7.11.8.2

Device parameter menu

Information on the transmitter can be recorded in this menu.

Parameter	Description
Device name	Input device name of the input element connected to the channel.
Device part number	Order number of the input element.
Device serial number	Serial number of the input element.
Startup inhibit time	Time for which the channel is inhibited after switching on the input element power supply voltage. Ensures that no alarms are triggered during the warm-up phase. Adjustable range: 0 to 600 s
Detector latching mode	Behaviour of the digital input on a connected manual or automatic fire alarm. Latching: A latching fire alarm is acknowledged by briefly switching the operational voltage off and on at the relevant channel. Non-latching: The state of the connected input element is processed in accordance with the system configuration. The supply voltage of the digital input is not shut down.

7.11.8.3

Input parameter menu

The behaviour of the output signal can be configured in this menu. The output signal influences the system behaviour.

 In the "falling switch behaviour" configuration wire break detection must be enabled and a corresponding EOL resistor must be connected.

⚠ WARNING**Faulty device behaviour!**

If the total of the currents through the button or switch resistors is greater than the current through the End-of-Line resistor (EOL) in the "falling switch behaviour" configuration, wire break detection may be faulty.

- ▶ In the "falling switch behaviour" configuration select the total of the currents through the button or switch resistors so they are less than the current through the EOL resistor.

Parameter	Description
Operation mode	Operation mode of the digital input. The digital input only delivers an output signal. A digital input can trigger the following system states depending on the operation mode. Alarms A1 to A8, Fault , Warning , Information or assigned channels in the Inhibit , Acknowledgement , Overrange latch ack. state. Example: Fault selection; the input element (e.g. a button) generates a fault when actuated. Example 2: Inhibit selection; a key switch on actuation generates the Inhibit status on all assigned channels (e.g. range deactivation). For further information, see the following chapter: "Glossary", page 147.
Detector activation direction	Indicates whether the channel is activated on a rising or falling signal. A positive current threshold value must be input for a rising detector activation direction and a negative current threshold value for a falling detector activation direction.
Current threshold	Current value for the current threshold. The total of current threshold and static current is the current value that must be exceeded (for rising detector activation direction) or fall below the threshold (for falling detector activation direction) to activate the input. Adjustable range: -400 to -3 mA or 3 to 400 mA Default setting: 15 mA
Wire break detection enabled	Activate to enable wire break detection at the input.

Parameter	Description
Static current	<p>Current value for the static current. A static current of min. 5 mA must be set for wire break detection enabled. The current value is derived from the End-of-line resistance (EOL) and the supply voltage of 24 V. An EOL of 24 V/15 mA = 1.6 kOhm is required to set a static current of 15 mA, for example.</p> <p>Adjustable range: 0 mA or 5 to 400 mA Default setting: 0 mA with deactivated wire break detection; 15 mA with activated wire break detection</p>

 Wire break detection must be enabled for use in plants with functional safety or with measuring function for flammable gases, oxygen and toxic gases.

7.11.8.4

Acknowledgement parameter menu

In this menu channels can be selected via which the current channel can be acknowledged or reset.

 An acknowledgement and a reset of the channels is always possible from the Dashboard.

To add a channel:

1. Select **+**.

⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**

2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.

2. Select **—** to remove all selected channels from the list.

7.11.8.5

Inhibit parameter menu

In this menu various channels can be selected via which the current channel can be inhibited.

 A channel can be be inhibited at any time via the Dashboard.

To add a channel:

1. Select **+**.

⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**

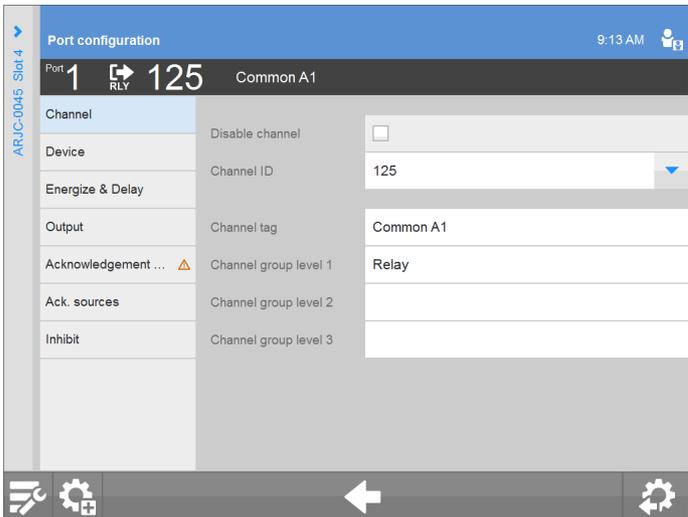
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.

2. Select  to remove all selected channels from the list.

7.11.9 Relay module port configuration



32392

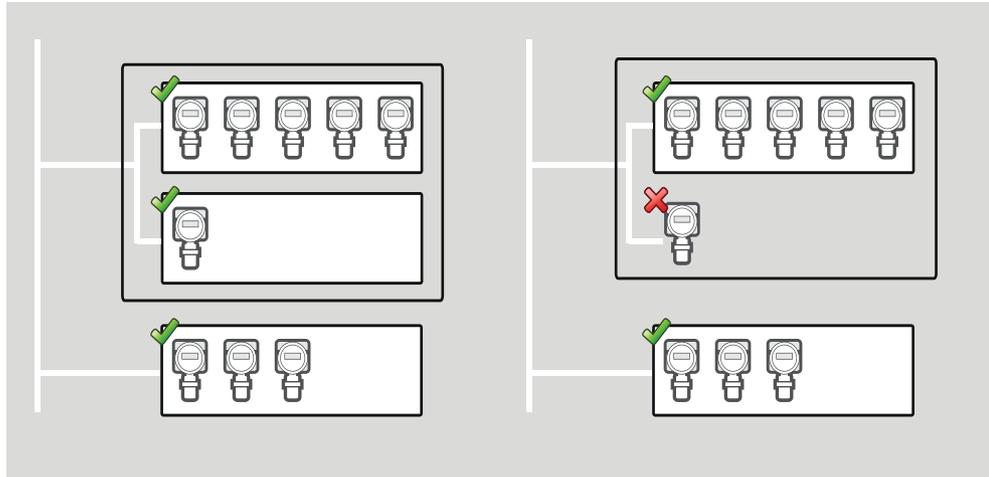
7.11.9.1 Channel parameter menu

Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



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7.11.9.2

Device parameter menu

In this menu information on the device that is switched by the relay can be recorded.

Parameter	Description
Device name	Device name of the device connected to the relay.
Device part number	Order number of the device.
Device serial number	Serial number of the device.

7.11.9.3

Energize & Delay parameter menu

The behaviour of the relay can be set in this menu.

i The max. possible rise rate of the gas concentration must be taken into account when setting the delay time. Delay times must be taken into account when calculating the system response time and should always be kept as short as possible. This applies to the measurement of:

- Flammable gases and vapours
- Oxygen
- Toxic gases

This notice does not apply to the **Deactivation delay time**.

Parameter	Description
Energize mode	Set behaviour of the relay. For further information, see the following chapter: "Glossary", page 147.

Parameter	Description
Activation delay time	<p>Set delay time for activation of the relay. Example: The Activation delay time offers the option of setting commonly controlled actuators (e.g. fan and duct) to a defined time sequence. The fan can be controlled so it only switches on if the duct has opened.</p> <p>The delay time makes an output respond with a delay (configured delay time) to a pending alarm condition. If the alarm condition is no longer applicable during this period, there is no alarm at the output. This does not apply to relays configured as latching relays.</p> <p>Dräger recommends leaving the parameter value at 0 (zero) for safety-related applications.</p> <p>Adjustable range: 0 to 6000 s; default setting 0 s</p>
Deactivation delay time	<p>Set the deactivation delay time of the relay (e.g. for run-down control of a connected fan).</p> <p>Adjustable range: 0 to 6000 s; default setting 0 s</p>

7.11.9.4

Output parameter menu

In this menu the input sources that switch the relay can be set. Setting options for **Source state** are: Alarms A1 to A8, Error, Warning, Information, Inhibit, Comfail.

To configure an input source:

1. Select **Output**.
2. Select **Logic type**.

► **Single**

A channel is defined as an input source for a special state.

- a. Select **Source state**. This sets the state of the input channel as condition for switching the relay.
- b. Select **Source channel**. This sets a channel as input source.
⇒ A list of the available channels is displayed.
- c. Select channel and confirm.

► **Common**

All channels are defined as input source. The relay is switched if one of the channels meets the condition.

- a. Select **Source state**. This sets the state of the input channel as condition for switching the relay.
⇒ All channels with the selected state are selected as input source.

 Dräger recommends when selecting **Common Inhibit** or **Common Fault** setting an **Activation delay time** of 0.5 s.

► **Voting**

The Voting defines the number of channels on which at least one of the defined state conditions must be met to switch the relay.

- a. Input the number of channels in which the condition must be met to switch the relay in the **Voting count** input field.
- b. Select **Source state**. This sets the condition of the input channel.

- c. Select **+** to add a channel as input source.
⇒ A list of the available channels is displayed.
- d. Select all required channels and confirm.

i With a 2 of 2, 3 of 3, ... Voting, make sure that the switching condition can never be met on one of the selected channels if a fault occurs.

Dräger recommends Voting n of m; $m > n$. Example: 2 of 3, 3 of 4.

The maximum number of usable sources m for the voting is derived from the number of channels configured on the system. A maximum of 250 source channels is permitted.

Setting range for voting count n: 1 to m

► **Enhanced voting** (only for the modules Relay 24 V DC/240 V AC complex)

The Voting defines how many of the defined state conditions must be met to switch the relay.

- a. Input the number of fulfilled conditions from which the relay will be switched in the **Voting count** input field.

- b. Select **Degradation scheme**. This defines whether a fault is counted or not with the **Enhanced voting**.

When failure alarm condition: A fault is counted like an alarm during Voting.

When failure no alarm condition: A fault is not counted during Voting.

- c. Select **+** to add a channel as input source.
⇒ A list of the available channels is displayed.
- d. Select all required channels and confirm.
⇒ The **Source state** list is displayed.
- e. Enable checkboxes of all desired states and confirm.
Adjustable range:

To remove a channel with **Voting** or **Enhanced voting**:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select **−** to remove all selected channels from the list.

7.11.9.5

Parameter menu **Acknowledgement mode**

In this menu the acknowledgement modes and the switching behaviour for the current channel can be configured.

To configure an acknowledgement mode for the current channel:

1. Select **Output reset mode** from the dropdown list.

Manual reset

The output channel can be manually acknowledged (e.g. via the Dashboard or an assigned digital input), even if the configured input condition is still present and has not yet been acknowledged on the input side. The relay is reset depending on the set **Acknowledgement mode**.
Example: The relay is configured to a Common A1 alarm and the **Acknowledgement mode ACK** and activates an alarm horn. In this operation mode the horn can be manually acknowledged, even though the alarm condition is still pending.

**Reset by input
ack.**

The output channel is not acknowledged until the configured input condition is no longer pending with reference to the **Acknowledgement mode**.

Example: The relay is configured on a Common A1 alarm and switches a warning light. In this operation mode the warning light is not switched off until the last pending alarm has been cancelled with reference to the **Acknowledgement mode**.

2. Select **Acknowledgement mode** from the dropdown list or select  with the aid of the acknowledgement wizard:

NAK Non-latching and non-acknowledgeable
Non-latching and non-acknowledgeable relay.

ACK Non-latching and acknowledgeable
Non-latching and acknowledgeable relay.

LACK Latching and acknowledgeable
Latching and acknowledgeable relay.

LPAK Latching and non-acknowledgeable but pre-acknowledgeable
Latching and non-acknowledgeable but pending relay.

LNAK Latching, non-acknowledgeable and not pre-acknowledgeable
Latching, non-acknowledgeable and not pending relay.

 Only the LNAK and LPAK acknowledgement types are permitted for use in plants with functional safety or with measuring function for flammable gases, oxygen and toxic gases are permitted for the alarm with the highest safety-oriented importance.

With multiple outputs for the highest alarm, deviations are permitted (e.g. for acoustic alarm devices).

3. Select **Resound time**.

⇒ The **Resound time** menu is displayed.

Enable resound time Enable to repeatedly activate an alarm horn after acknowledgement of the alarm if the alarm condition remains pending. The renewed activation also results with repeated acknowledgement after the set period so long as the switching conditions is pending.

With acknowledgement types NAK and LNAK, the alarm tone repetition has no effect.

With acknowledgement type LPAK, a pending is reset after the time interval for the alarm repetition elapses.

Resound time Time interval for **Resound time**.

Adjustable range: 0 to 24 h.

 For applications as per NFPA 72 the **Resound time** must be enabled.

7.11.9.6**Acknowledgement parameter menu**

In this menu channels can be selected via which the current channel can be acknowledged or reset.

 An acknowledgement and a reset of the channels is always possible from the Dashboard.

To add a channel:

1. Select .

⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**

2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.

2. Select  to remove all selected channels from the list.

7.11.9.7

Inhibit parameter menu

In this menu various channels can be selected via which the current channel can be inhibited.

 A channel can be be inhibited at any time via the Dashboard.

To add a channel:

1. Select .

⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**

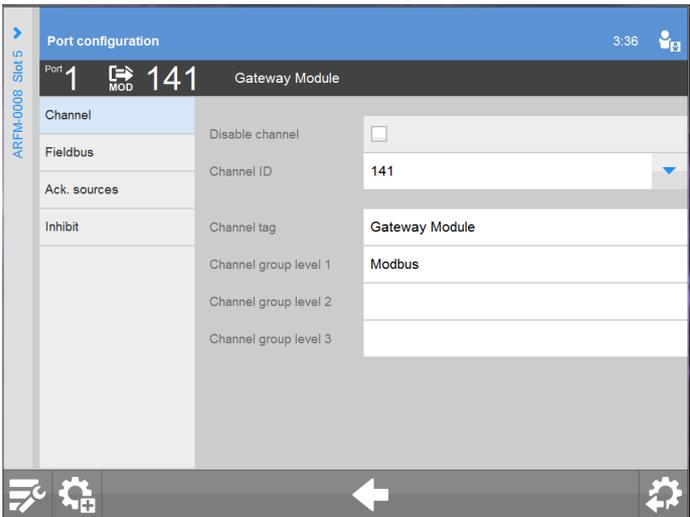
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.

2. Select  to remove all selected channels from the list.

7.11.10 Port configuration Gateway Module



322393

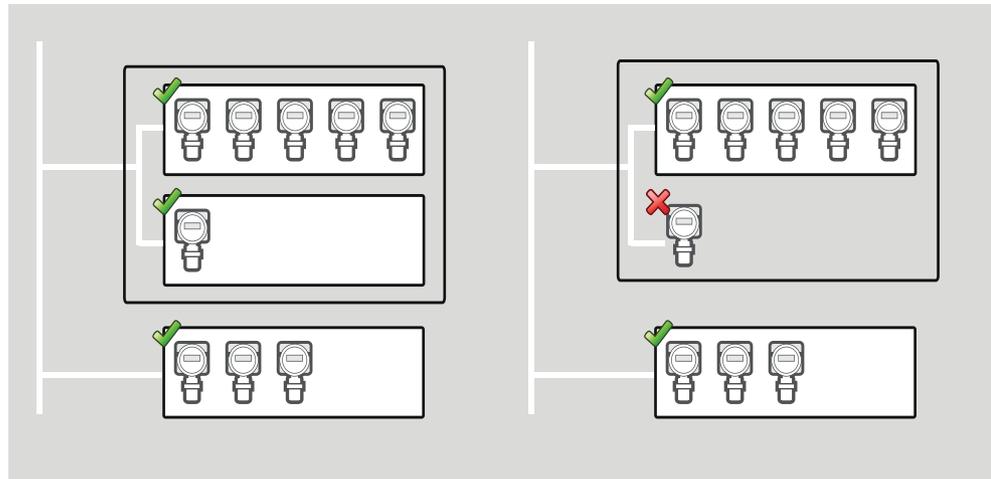
7.11.10.1 Channel parameter menu

Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



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7.11.10.2 Parameter menu *Fieldbus (Modbus)*

The fieldbus connection settings can be displayed in this menu.

To set the transmission speed:

1. Select the applicable bit rate in the **Fieldbus baud rate** dropdown list.
Adjustable range: 9.600, 19.200, 57.600, 115.200, 230.400, 921.600 bit/s
Default setting: 115.200 bit/s

To set the stop bits:

1. Select the stop bits in the **Fieldbus stop bits** dropdown list.
Adjustable range: 1, 1.5, 2; default setting: 1

To set the parity value:

1. Select the parity value in the **Fieldbus parity value** dropdown list.
Adjustable range: **None**, **Odd**, **Even**; default setting: **Even**

To set the **Fieldbus slave ID**:

1. Input the ID that was set in the DCS or SCADA system in the **Fieldbus slave ID** input field.
Adjustable range: 1 to 247 (ID 247 is reserved for internal Dräger use).
For further information, see the following chapter: "Modbus command structure", page 150

To set negative measured values to zero:

1. Enable **Set negative to zero** checkbox.

To ignore invalid requests from the DCS or SCADA system:

1. Enable **Suppress function exceptions** checkbox.

 If the function is disabled, an invalid request will be answered with a corresponding Modbus error code.

7.11.10.3 Parameter menu *Fieldbus (PROFIBUS DP)*

The fieldbus connection settings can be displayed in this menu.

To set the **Fieldbus slave ID**:

1. Input the ID that was set in the DCS or SCADA system in the **Fieldbus slave ID** input field.
2. Adjustable range: 1 to 125.
For further information, see the following chapter: "PROFIBUS DP and PROFINET command setup", page 159

To set negative measured values to zero:

1. Enable **Set negative to zero** checkbox.

7.11.10.4 **Parameter menu *Fieldbus* (PROFINET)**

The fieldbus connection settings can be displayed in this menu.

To set negative measured values to zero:

1. Enable **Set negative to zero** checkbox.

7.11.10.5 **Acknowledgement parameter menu**

In this menu channels can be selected via which the current channel can be acknowledged or reset.

 An acknowledgement and a reset of the channels is always possible from the Dashboard.

To add a channel:

1. Select **+**.
⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select **—** to remove all selected channels from the list.

7.11.10.6 **Inhibit parameter menu**

In this menu various channels can be selected via which the current channel can be inhibited.

 A channel can be inhibited at any time via the Dashboard.

To add a channel:

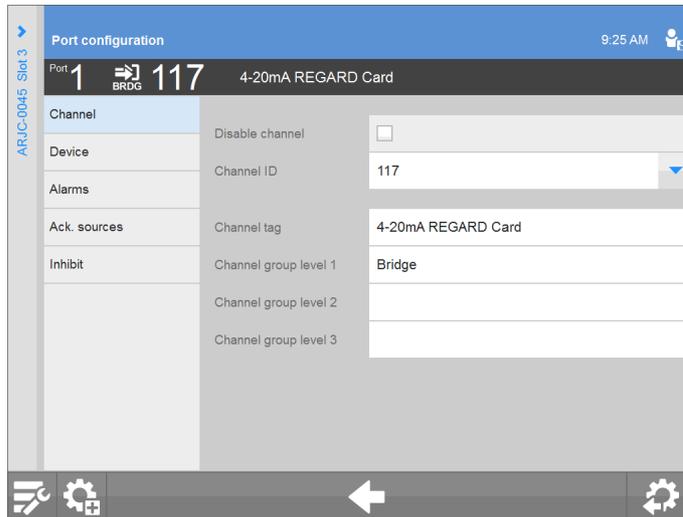
1. Select **+**.
⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels, Available channels, All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.

2. Select  to remove all selected channels from the list.

7.11.11 Port configuration Bridge Module



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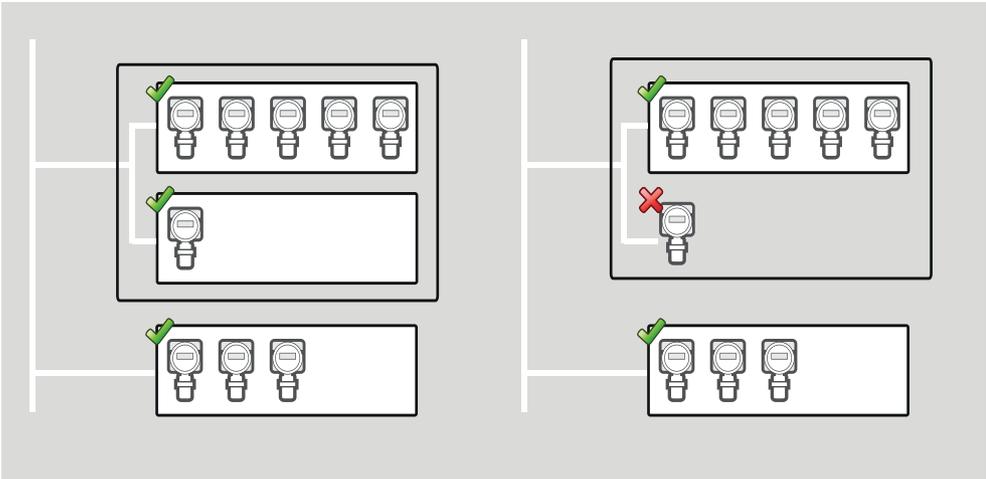
7.11.11.1 Channel parameter menu

Information on the channel can be recorded in this menu.

Parameter	Description
Disable channel	Activate to disable a channel for current operation (e.g. if a channel is not completely configured but channel settings should be made). The state is retained after restarting the system.
Channel ID	Specify channel number. The channel number is displayed in the list and column view. Select NOP so that one channel remains inactive and is not displayed. Adjustable range: 1 to 1536, NOP
Channel tag	Descriptive text for this channel. The Channel tag is displayed in the list view.
Channel group level 1	Allocate channel to a logical group stage 1 (e.g. production building 1). All channels of a group can be displayed together in the list and channel view.
Channel group level 2	Allocate channel to a logical group stage 2 (e.g. level 1).
Channel group level 3	Allocate channel to a logical group stage 3 (e.g. room 1).

Channel groups

Channel groups can be used for the logical grouping of functionally and/or geographically linked plant sections, e.g. all transmitters and output elements of a production hall. Up to 3 hierarchically classified channel group levels can be formed. Note in this process that defined channel groups are not permitted to contain sub-groups and channels simultaneously.



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7.11.11.2 **Device parameter menu**

Information on the transmitter can be recorded in this menu.

Parameter	Description
Device name	Input device name of the transmitter connected to the channel. Selection via dropdown list or text input.
Device part number	Order number of the transmitter.
Device serial number	Serial number of the transmitter.
REGARD card number	Card number (channel number) of the corresponding REGARD channel. Adjustable range: 1 to 99; default setting: 1

7.11.11.3 **Alarms parameter menu**

In this menu the alarm thresholds set in the REGARD can be manually set in the REGARD 7000. The alarm thresholds are solely for consistent display of the REGARD alarm thresholds in the REGARD 7000. The alarm threshold values do not influence the alarm behaviour of the REGARD 7000. For further information, see the following chapter: "Special features of operation of the REGARD 7000 in combination with a REGARD", page 71

To add an alarm:

1. Select **+**.
⇒ The wizard for the alarm configuration is displayed.
2. Make the desired settings.

Parameter/function	Description
Alarm severity	The alarm severity sets the prioritisation of the alarm. Setting range: A1 (low priority) up to A8 (high priority)

Parameter/function	Description
Alarm direction	The alarm direction sets whether the alarm is for a rising or falling gas concentration.
Alarm threshold	The alarm threshold sets when an alarm is triggered. Adjustable range: Equally configured measuring range

3. Select channel and confirm.

To change the settings of an alarm:

1. Select an alarm in the list.
⇒ The settings of the alarm are displayed.
2. Make the desired changes and confirm.

To remove an alarm:

1. Enable the checkbox of the alarm.
2. Select  to remove the alarm from the list.

7.11.11.4 **Parameter menu *Acknowledgement***

In this menu channels can be selected via which the current channel can be acknowledged or reset.

 An acknowledgement and a reset of the channels is always possible from the dashboard.

To add a channel:

1. Select .
⇒ A list of the channels is displayed according to the channel filter setting.
Possible channel filter settings: **Fitting channels**, **Available channels**, **All channels**
2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select  to remove all selected channels from the list.

7.11.11.5 **Inhibit parameter menu**

In this menu various channels can be selected via which the current channel can be inhibited.

 A channel can be be inhibited at any time via the Dashboard.

To add a channel:

1. Select .
⇒ A list of the channels is displayed according to the channel filter setting.
Possible preventive channel filter settings: **Fitting channels**, **Available channels**, **All channels**

2. Select the required channels and confirm.

To remove a channel:

1. Enable the checkbox of the channel. If necessary, enable multiple channels for removal.
2. Select  to remove all selected channels from the list.

7.11.12 Allocating card numbers of a REGARD system to the Bridge Module

Using the allocation wizard for the Bridge Module, the card numbers of a REGARD system can be allocated to the channel IDs and Ports of the REGARD 7000 system.

1. Open configuration mode. For further information, see the following section: "Open configuration mode", page 84.
2. Select [Docking Station] > [Bridge Module] > [Port].
3. Select  > **Bridge Module assignment assistant**.
⇒ The allocation wizard for the Bridge Module is displayed.
4. Determine the card number range of the REGARD system:
 - a. Select the start of the card number range in the **From card number** dropdown list.
 - b. Select the end of the card number range in the **To card number** dropdown list.
5. Select the start of the allocation for the channel IDs of the REGARD 7000 system in the **From channel ID** dropdown list.
6. Select the start of the allocation for the Ports of the REGARD 7000 system in the **From port** dropdown list.
7. Select  to confirm the settings.
8. Carry out further configurations as needed.
9. To start the transfer wizard: Select  > **Send** and follow the directions of the transfer wizard. For further information, see the following chapter: "General configuration procedure", page 83

7.11.13 Dashboard settings

To set the Dashboard name and channel display restrictions of channels:

1. Select  > **Settings** > **Basic settings**.
2. In the **Dashboard tag**: input field, enter a name for the Dashboard.
3. Input individual channels (e.g. 1, 2) or channel ranges (e.g. 5-10) into the **Channel restrictions**: input field that this Dashboard is to display.

 The **Channel restrictions**: setting is only valid for the **View only** user roles and operation and is saved locally on the Dashboard. This gives the option of having several connected Dashboards display different channel ranges.

To set the Dashboard language:

1. Select  > **Settings** > **Language settings**.
2. Select language from the dropdown list and confirm.
⇒ The language is changed.

To set the date and time of the dashboard:

1. Select  > **Settings** > **Date and time settings**.
2. Set the current date in the **Date** section with  and .
3. Select the dropdown list in the **Time zone:** section and select the time zone.
4. Set the current time in the **Time (h, min, s):** section with  and . The corresponding time format is displayed depending on the Dashboard language set.

To set the default view that is displayed after user login:

1. Select  > **Settings** > **View settings**.
2. Select the dropdown list in the **Default view:** section and select the preferred view.
3. Select the dropdown list in the **Auto scroll speed:** section and select the preferred setting.
Setting options: **Off, Fast, Normal, Slow**
Default setting: **Off**

7.12 Administration role

After logging into the system the default view will be displayed (configurable). For further information, see the following chapter: "Dashboard settings", page 116.

CAUTION

Danger of an inconsistent configuration display.

After changing the channel tag or the channel ID of a channel, another dashboard/PC with REGARD 7000 configuration software can be used to display the channel tag and module type for this channel unchanged in the following views:

- Ack. sources
 - Overrange settings
 - Inhibit
 - Output
- After changing the channel tag or the channel ID of a channel on all connected dashboards / PC with REGARD 7000 configuration software, open configuration mode and close again without changing.

7.12.1 Manage users

Personalised users can be created locally on the Dashboard with the user administration. A role must be assigned to every user.

To create a new user:

1. Select  > **User management**.
⇒ A list of all current users is displayed.
2. Select .
⇒ The **New user** input form is displayed. (The fields marked with * are mandatory fields.)
3. Input the desired user ID (max. 15 characters, lower-case letters and digits) in the **User ID/Login:** input field.

4. Input the name of the new user (max. 15 characters, lower-case letters and digits) in the **Name:** input field.
5. Input the password for the new user (min. 4 digits, max. 8 digits) in the **Password:** input field.
6. Confirm the password in the **Verify password:** input field.
7. Select the desired role in the **Role** dropdown list.
8. Select ✓ to confirm all inputs.
⇒ The new user is displayed in the user list.

To delete a user:

1. Select ☰ > **User management**.
2. Select the user that is to be deleted.
3. Select and confirm —.

To edit a user:

1. Select ☰ > **User management**.
2. Select the user that is to be edited.
3. Select ✎.
4. Make the desired changes and confirm.

 The **User ID** cannot be changed for an existing user.

7.12.2

Set automatic login

If automatic login is enabled, the user is automatically (without input of a password) logged in with the specified role after 30 s. Automatic login is also run after automatic logoff from another role. Automatic login is only available for the **View only** and **Operation** roles.

To set up automatic login:

1. Select ☰ > **User management**.
2. Select the desired users in the **Auto Login:** dropdown list (only users with the View and Operation roles are displayed) or select **OFF** to disable automatic login.

7.12.3

Update dashboard firmware

The dashboard firmware can be updated with this function. During the update the dashboard does not show a channel display, but the REGARD 7000 system remains operations. Every connected dashboard must be updated separately.

CAUTION

Damage to the dashboard

An unexpected interruption during the update (e.g. due to a power cut) may result in the dashboard ceasing to function.

- ▶ Follow the directions of the update wizard.
-

Prerequisite:

- A USB stick with the new firmware is available.

 Contact Dräger Service for the current firmware.

1. Select  > **Dashboard update**.
⇒ The update wizard is started.
2. Plug a USB stick with the new firmware into the USB port of the dashboard.
3. Follow the directions of the wizard.

7.12.4 Display and install add-on licences

This function can be used to install a new add-on on the Dashboard.

Available add-on licences for the Advanced Dashboard 6RU/PM:

Add-on licence	Order no.
REGARD 7000 Add-On Library For further information, see the following chapter: "Manage system documentation library (optional)", page 120	83 24 023
REGARD 7000 Add-On Component Report For further information, see the following chapter: "Export configuration and reports", page 85	83 24 024
REGARD 7000 Add-On System Documentation For further information, see the following chapter: "Export configuration and reports", page 85	83 24 025

Available add-on licences for the Standard Dashboard 3RU:

Add-on licence	Order no.
REGARD 7000 Add-On System Configuration For further information, see the following chapter: "Configuration role", page 83	83 27 841

7.12.4.1 Display installed add-on licences

1. Select  > **License management**.
- ✓ All installed add-on licences are displayed.

7.12.4.2 Installing a new add-on

Prerequisite:

- User is logged on with the Administration user role.
 - The add-on has been ordered and the licence code is present.
 - The part and serial numbers of the dashboard is required to order an add-on. To do this, select  > **Information** > **Device information** and make a note of the part and serial numbers.
1. Copy the supplied licence code file to a USB stick.
 2. Plug the USB stick with licence code into the USB port on the Dashboards (with the part and serial numbers specified during the order).
 3. Select  > **License management**.
⇒ All installed add-on licences are displayed.
 4. Select .

5. Select the add-on licence on the USB stick. All add-on licences have the file extension: **.WibuCmRaU**
6. Select  to install the add-on licence.

7.12.5 Manage system documentation library (optional)

The Advanced Dashboard 6RU / PM has an internal library memory of 50 MB. PDF documents can be filed and displayed in this memory.

To save a document in the system documentation library:

1. Select  > **System documents library**.
⇒ The internal system documentation library is displayed.
2. Plug a USB stick with the document into the USB port on the Dashboards.
3. Select .

To delete a document in the system documentation library:

1. Select  > **System documents library**.
⇒ The internal system documentation library is displayed.
2. Select the document that is to be deleted.
3. Select  and confirm the resulting dialogue.

To display a document from the system documentation library:

1. Select  > **System documents library**.
⇒ The internal system documentation library is displayed.
2. Select document.
3. Select .
⇒ The document is displayed and can be viewed with the following functions:

Icon	Function
	Magnify view.
	Reduce view.
	Rotate document 90° clockwise.
	Full screen view.
	Enlarge to document width.

7.12.6 Switching off the dashboard

1. Select  >.
2. Select **Shutdown** and then confirm the dialogue.

Observe the information in the following chapter: "Dashboard", page 45

8 Fault elimination and messages

8.1 General

Faults and messages	Fault LED ⁽¹⁾			Cause	Remedy
	Fault LED ⁽¹⁾	SFR ⁽²⁾	SSR ⁽²⁾		
Module fault 1	x	x	-	Module fault, duplicate MAC address	Replace module.
Docking Station fault 1	x	x	-	Docking Station Fault, serial number or slot incorrect	Replace affected Docking Station.
Docking Station fault 2	x	x	-	Docking Station Fault, special state relay not switching	Replace affected Docking Station.
N/A	x	x	-	Module communication fault	Check that the system is complete in the topology view and if necessary replace the module that is not shown (communication LED off).
Configuration warning	-	-	-	At least two identical channel addresses available in the system	Check and correct configuration.
Reduced data rate	-	-	-	Data rate in the REGARD 7000 network is too low	Check and correct the REGARD 7000 network installation (at modules and Ethernet ports, see Ethernet port LED table)
Comfail 1	x	x	-	Assignment to external switching element (button or rotary switch) is missing or incorrect.	Check and correct assignment to the external switching element (button or rotary switch).
Comfail 2	x	x	-	Assignment to external switching element (button or rotary switch) is missing or incorrect.	Check and correct assignment to the external switching element (button or rotary switch).
Comfail 3	x	x	-	Assignment to external switching element (button or rotary switch) is missing or incorrect.	Check and correct assignment to the external switching element (button or rotary switch).

Faults and messages	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾	Cause	Remedy
Power supply fault 1	x	x	-	The supply voltage of the Docking Station is outside the permitted range.	Check and correct supply voltage.
Power supply fault 2	x	x	-	Module output current too high.	The module output current must not exceed max. 2 A. Check transmitter current, if necessary change transmitter module assignment.
Module fault 2	x	x	-	Faulty module or faulty transmitter connection	Replace the module or check the transmitter connection wiring.
24V supply fault	x	x	-	Transmitter power supply (24 V) missing or too high	Check the transmitter connection wiring.
4-20 mA signal fault	x	x	-	Transmitter signal current (SIGNAL) missing or too high	Check the transmitter connection wiring.
Measurement signal fault	x	x	-	Transmitter output signal sends an undefined value.	Check and correct the transmitter configuration and the associated input channel.
Maintenance signal fault	x	x	-	Not supported dynamic transmitter maintenance signal detected.	If possible, configure the transmitter for static maintenance signals or set the REGARD channel to the Inhibit status before maintenance.
Transmitter fault 1	x	x	-	Transmitter not ready to measure, it sends fault 1 according to the system configuration.	Check transmitter via remote access (HART®) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 2	x	x	-	Transmitter not ready to measure, it sends fault 2 according to the system configuration.	Check transmitter via remote access (HART®) or locally. For fault details see the instructions for use for the transmitter.

Faults and messages	Fault LED ¹⁾			Cause	Remedy
		SFR ²⁾	SSR ²⁾		
Transmitter fault 3	x	x	-	Transmitter not ready to measure, it sends fault 3 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 4	x	x	-	Transmitter not ready to measure, it sends fault 4 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 5	x	x	-	Transmitter not ready to measure, it sends fault 5 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 6	x	x	-	Transmitter not ready to measure, it sends fault 6 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 7	x	x	-	Transmitter not ready to measure, it sends fault 7 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Transmitter fault 8	x	x	-	Transmitter not ready to measure, it sends fault 8 according to the system configuration.	Check transmitter via remote access (HART [®]) or locally. For fault details see the instructions for use for the transmitter.
Warning Beam block	-	-	-	The beam path of the transmitter is restricted but the transmitter is still ready to measure	Check and if necessary clean the transmitter beam path as directed in the instructions for use of the transmitter.

Faults and messages	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾	Cause	Remedy
Warning 1 Transmitter	-	-	-	Transmitter emits the Warning 1 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 2 Transmitter	-	-	-	Transmitter emits the Warning 2 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 3 Transmitter	-	-	-	Transmitter emits the Warning 3 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 4 Transmitter	-	-	-	Transmitter emits the Warning 4 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 5 Transmitter	-	-	-	Transmitter emits the Warning 5 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 6 Transmitter	-	-	-	Transmitter emits the Warning 6 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Warning 7 Transmitter	-	-	-	Transmitter emits the Warning 7 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.

Faults and messages	Fault LED ¹⁾			Cause	Remedy
	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾		
Warning 8 Transmitter	-	-	-	Transmitter emits the Warning 8 message according to the system configuration, but is still ready to measure	Evaluate warning according to the directions in the instructions for use of the transmitter and implement remedy.
Wrong REGARD 7000 configuration	-	-	-	Transmitter transmits an unexpected warning signal	Reconfigure REGARD 7000 to detect dynamic warning signals.
Measurement range exceeded	-	-	-	Measurement range exceeded	n/a
Measurement range underrun	-	-	-	Readings below the measurement range	n/a
Warmup Transmitter	-	-	x	Transmitter in boot phase and not ready to measure.	n/a
Transmitter maintenance	-	-	x	Transmitter in maintenance mode or in boot phase and not ready to measure.	n/a
Special state 1 Transmitter	-	-	x	Transmitter emits the Special State Signal 1 according to the system configuration and is not ready to measure.	n/a
Special state 2 Transmitter	-	-	x	Transmitter emits the Special State Signal 2 according to the system configuration and is not ready to measure.	n/a
Special state 3 Transmitter	-	-	x	Transmitter emits the Special State Signal 3 according to the system configuration and is not ready to measure.	n/a
Special state 4 Transmitter	-	-	x	Transmitter emits the Special State Signal 4 according to the system configuration and is not ready to measure.	n/a
Special state 5 Transmitter	-	-	x	Transmitter emits the Special State Signal 5 according to the system configuration and is not ready to measure.	n/a

Faults and messages	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾	Cause	Remedy
Special state 6 Transmitter	-	-	x	Transmitter emits the Special State Signal 6 according to the system configuration and is not ready to measure.	n/a
Special state 7 Transmitter	-	-	x	Transmitter emits the Special State Signal 7 according to the system configuration and is not ready to measure.	n/a
Special state 8 Transmitter	-	-	x	Transmitter emits the Special State Signal 8 according to the system configuration and is not ready to measure.	n/a
Comfail 4	x	x	-	Assignment to external switching element (button) is missing or incorrect.	Check and correct assignment to external switching element.
Comfail 5	x	x	-	Assignment to external switching element (button) is missing or incorrect.	Check and correct assignment to external switching element.
Comfail 6	x	x	-	Assignment to external switching element (button) is missing or incorrect.	Check and correct assignment to external switching element.
Power supply fault 3	x	x	-	Supply voltage of the Docking Station outside the permissible range	Check and correct supply voltage.
Power supply fault 4	x	x	-	The total current of the transmitter and switching elements connected to the module is too high.	The module output current must not exceed max. 2 A. Check current, if necessary change the module assignment of the transmitter or switching elements.
Module fault 3	x	x	-	Faulty module	Replace module.
Module fault 4	x	x	-	Module defective or connection lines to the connected input elements faulty.	Replace the affected module or check the connection lines on the connected input elements.

Faults and messages	Fault LED ¹⁾			Cause	Remedy
		SFR ²⁾	SSR ²⁾		
Signal circuit fault	x	x	-	Signal current missing or too high	Check connection wiring of connected detectors and switching elements.
Digital input Fault	x	x	-	The channel was set to fault state by user input.	n/a
Digital input Warning	-	-	-	The channel was set to warning state by user input.	n/a
Digital input Information	-	-	-	The channel was set to information state by user input.	n/a
Warmup Device	-	-	x	Device in boot phase and not ready to measure.	n/a
Module fault 5 Configuration warning	x	x	-	Faulty relay	Replace module.
	-	-	-	At least one channel is missing in the configuration for a group message (fault, alarm, warning, maintenance, information).	Correct configuration of the group message.
Comfail 7	x	x	-	At least one input signal is missing for a configured switching function.	Check configuration of switching function and correct if necessary. Check network communications.
Comfail 8	x	x	-	The type of at least one input channel does not match the configured switching function.	Check and correct configuration of switching function.
COM fault	x	x	-	Expected channel card address not received from REGARD	Check corresponding REGARD channel card. Check connection between bridge module and the REGARD equipment rack.
Measurement channel fault	x	x	-	Transmitter not ready for measuring, channel in fault state	Check channel or transmitter.
Measurement channel critical fault	x	x	-	Transmitter not ready for measuring, channel in fault state	Check REGARD channel card.

Faults and messages	Fault LED ¹⁾			Cause	Remedy
	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾		
<i>Inhibit through REGARD card</i>	-	-	x	Transmitter in maintenance mode or in boot phase and not ready to measure	n/a
<i>Inhibit through REGARD HCAL</i>	-	-	x	REGARD channel receives maintenance signal from the transmitter	n/a
<i>HART® not working</i>	-	-	-	HART® communication is not functioning.	Check transmitter installation.
<i>Transmitter is not supported</i>	-	-	-	The connected HART® transmitter is not supported	Select a supported Dräger-HART® transmitter or disable the transmitter diagnostics.
<i>Transmitter configuration mismatch</i>	-	-	-	The transmitter configuration does not match the channel configuration of REGARD 7000	Use the same configuration for the REGARD 7000 channel and the transmitter.
<i>HART® tunnel open</i>	-	-	-	The HART® tunnel on this module port is currently open. The HART® module functions are not available.	n/a
<i>HART® tunnel open on other port</i>	-	-	-	Currently the HART® tunnel is open on another port of this module. The HART® module functions are not available.	n/a
<i>Gas name mismatch</i>	-	-	-	The gas name configured on the channel does not match the gas name received by the transmitter.	Use the same configuration for the channel and the transmitter.
<i>Measurement range maximum mismatch</i>	-	-	-	The maximum value configured on the channel does not match the maximum value received by the transmitter.	Use the same configuration for the channel and the transmitter.

Faults and messages	Fault LED ¹⁾			Cause	Remedy
	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾		
Measurement range minimum mismatch	-	-	-	The minimum value configured on the channel does not match the minimum value received by the transmitter.	Use the same configuration for the channel and the transmitter.
Measurement range step mismatch	-	-	-	The measuring range step configured on the channel does not match the measuring range step received by the transmitter.	Use the same configuration for the channel and the transmitter.
Measurement unit mismatch	-	-	-	The measurement unit configured on the channel does not match the measurement unit received by the transmitter.	Use the same configuration for the channel and the transmitter.
Device assets available	-	-	-	More device assets available	Check channel assets for further information.
Main fault device				Device not ready for measurement; it sends the main fault according to the system configuration	Check device using its diagnostics tool or locally.
Device not connected to infrastructure				Device is not connected to its field infrastructure	Check the configuration of the field infrastructure and that the device is present and enabled.
Infrastructure gateway error				Unexpected operation of the access point of the field infrastructure, no device data can be called.	Check the gateway of the field infrastructure.
No data from device to infrastructure				Device is connected to its field infrastructure, but the data has not been sent.	Check the configuration of the field infrastructure and that the device is present and enabled.
No update from device to infrastructure				Device is connected to its field infrastructure, but the data cannot be updated.	Check the configuration of the field infrastructure and that the device is present and enabled.
Slave not responding				Configured slave register cannot be read.	Check the bus connection or the bus settings of the slave.

Faults and messages	Fault LED ¹⁾	SFR ²⁾	SSR ²⁾	Cause	Remedy
User-specific fault device				Device not ready for measurement; it sends the user-defined fault according to the system configuration.	Check device using its diagnostics tool or locally.
Main info device				Device sends the main info according to the system configuration.	Check device using its diagnostics tool or locally.
User-specific info device				Device sends the user-defined info according to the system configuration.	Check device using its diagnostics tool or locally.
User-specific Special state device				Device sends the special state according to the system configuration and is not ready to measure.	-
Start-up infrastructure				Infrastructure in warm-up phase and not ready to measure.	-
Start-up device				Device in boot phase and not ready to measure.	-
Main Special state device				Device sends the main special state according to the system configuration and is not ready to measure.	-
Main warning device				The device sends the main warning according to the system configuration, but is still ready to measure.	Check device using its diagnostics tool or locally.
Measurement value out of range				Device sends a measured value outside the set measuring range.	Check the set measuring range and check that the capture range around the zero point is activated on the transmitter.
Modbus bandwidth saturated				Not all configured slave registers can be read promptly.	Either increase the baud rate of the bus or reduce the number of slaves.

Faults and messages	Cause		Remedy
	Fault LED ¹⁾	SFR ²⁾ SSR ²⁾	
User-specific warning device			The device sends the user-defined warning according to the system configuration, but is still ready to measure. Check device using its diagnostics tool or locally.

- 1) Fault LED of the module.
2) SFR and SSR of the Docking Station.

8.2

HART[®]

The following errors and messages are only displayed when there are HART[®]-compatible components on the REGARD 7000 system.

Errors and messages	Cause	Remedy
Accessories: flow failure	Pump gas flow too low, measurement is no longer reliable	Check the hoses for blockages and adjust the pump flow if necessary.
Accessories: flow warning	Pump gas flow too low, measurement is less reliable	Check the hoses for blockages and adjust the pump flow if necessary.
Device: temperature warning	Sensor or device not working in the specified temperature range	Operate sensor or device in the specified temperature range.
Maintenance: calibration incomplete	Calibration not executed correctly	Repeat calibration.
Maintenance: calibration interval exceeded	Calibration interval expired	Calibrate transmitter.
Optics: beam block fault	The light transmission is so weak that the gas concentration cannot be calculated with sufficient accuracy	Clean accessible optical elements.
Optics: beam block warning	The instrument detects low light transmission most probably due to dirty optics	Clean accessible optical elements.
Optics: misalignment	Optical transmitter and receiver misaligned	Realign optical transmitter and transmitter.
Power Supply: battery warning critical	Empty battery	Replace battery immediately or recharge where applicable.
Power Supply: battery warning low	Low battery	Battery must soon be replaced or recharged where applicable.
Power Supply: voltage out of range	The power supply is outside the specified range	Check and correct supply voltage.

Errors and messages	Cause	Remedy
Sensor: failure	Contacting or conductance of the sensor too weak for reliable measurement	Replace sensor or refill where applicable.
Sensor: vitality fair	Approx. half of the sensor's life time has been reached	n/a
Sensor: vitality poor	Life span of sensor expired or sensor has been stressed	Sensor should be calibrated. If vitality remains poor, replace the sensor.
Sensor: warm-up	Sensor is not yet fully warmed up, a higher measuring tolerance must be expected	Wait until the sensor is fully warmed up.
Sensor: warning	Contacting or conductance of the sensor close to fault condition	The sensor should be changed soon or refilled where applicable.
Unknown asset	Connected HART [®] device not fully supported	Update software.

9 Maintenance

REGARD 7000 is maintenance-free.

A test of the alarm functions and the function of the SSR and SFR should be performed during commissioning and subsequently every 12 months.

A test of the display function (screen test) should be performed during commissioning and subsequently every 12 months. For further information, see the following chapter: "Dashboard settings", page 82

For further information, see the following chapter: "Docking Station maintenance", page 78

For further information, see the following chapter: "Maintenance of channels and ports", page 81

The test should be performed by specialist personnel. In addition, the maintenance intervals of the connected input and output elements should be observed.

9.1 Replacing module (same slot and same configuration)

For example, replace a faulty module with a new module of the same type in the same slot.

A module can be replaced during operation.

1. Set all input and output channels to the inhibit state.
2. Disable the alarm device connected to the SFR of the docking station.
3. Open configuration mode.
4. Save configuration.
5. Exit configuration mode.
6. Release the two lock buttons of the module with a quarter turn.
7. Remove module.
8. Insert new module of the same type and wait until the module starts (communication LED flashes).
9. Open configuration mode.
10. Import backup configuration.
11. Upload imported configuration.
12. If necessary, manually acknowledge latching system states.
13. Remove the inhibit state from all channels.

9.2 Add module

Add a new module to the system.

1. Set all input and output channels to the inhibit state.
2. Disable the alarm device connected to the SFR of the docking station.
3. Remove slot cover of the selected slot.
4. Insert new terminal block in slot and wire.
5. Insert the code plate supplied with the module into the terminal block (exception: Relay Module 240 V AC).

6. Insert and lock new module.
7. Open configuration mode.
8. Configure system for the desired new functions.
9. Upload new configuration.
10. If necessary, manually acknowledge latching system states.
11. Remove the inhibit state from all channels.

9.3 Replace module (new slot)

Insert an operating module into another slot.

A module can be replaced during operation.

1. Set all input and output channels to the inhibit state.
2. Disable the alarm device connected to the SFR of the docking station.
3. Release the two lock buttons of the module with a quarter turn.
4. Remove module.
5. Remove slot cover of the new slot.
6. Release terminal block at the old slot and insert it into the new slot with its wiring (if necessary, modify wiring accordingly).
7. Insert slot cover in old slot and lock.
8. Insert the module in the new slot and lock.
⇒ The system detects the module and displays it as free.
9. Open configuration mode.
10. Upload available configuration or modify and upload available configuration.
11. If necessary, manually acknowledge latching system states.
12. Remove the inhibit state from all channels.

9.4 Replace transmitter

For example, replace a faulty transmitter with a new transmitter of the same type.

A transmitter can be replaced during operation.

1. Set the channel of the faulty transmitter to the inhibit state.
2. Disable the alarm device connected to the SFR of the docking station.
3. Replace faulty transmitter with new transmitter with the same configuration.
4. Wait for the warm-up phase.
5. Remove the inhibit state from the channel of the new transmitter.

9.5 Additional system changes

The REGARD 7000 system can be extended and modified within the system limits (e.g. add a docking station or a satellite system, connect two existing REGARD 7000 systems, replace a faulty module with a new module in a different slot). The REGARD 7000 system must be restarted after such changes.

10 REGARD 7000 configuration software

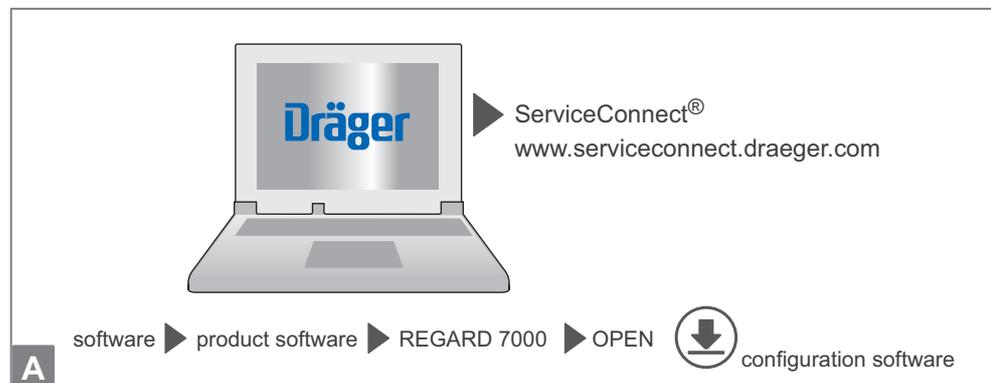
10.1 Introduction

10.1.1 Contents of these help pages

These help pages describe the use of the REGARD 7000 configuration software. The information is intended for persons responsible for operating the REGARD 7000 control unit.

10.1.2 Setting up an account

The REGARD 7000 configuration software can be downloaded free of charge via the ServiceConnect® web portal (www.serviceconnect.draeger.com). The configuration software can be installed on any number of PCs. The REGARD 7000 PC software key (order no. 83 27 253) is required to use the configuration software.



To set up a personal account, please send an email with the following details:
REGARD7000.admin@draeger.com

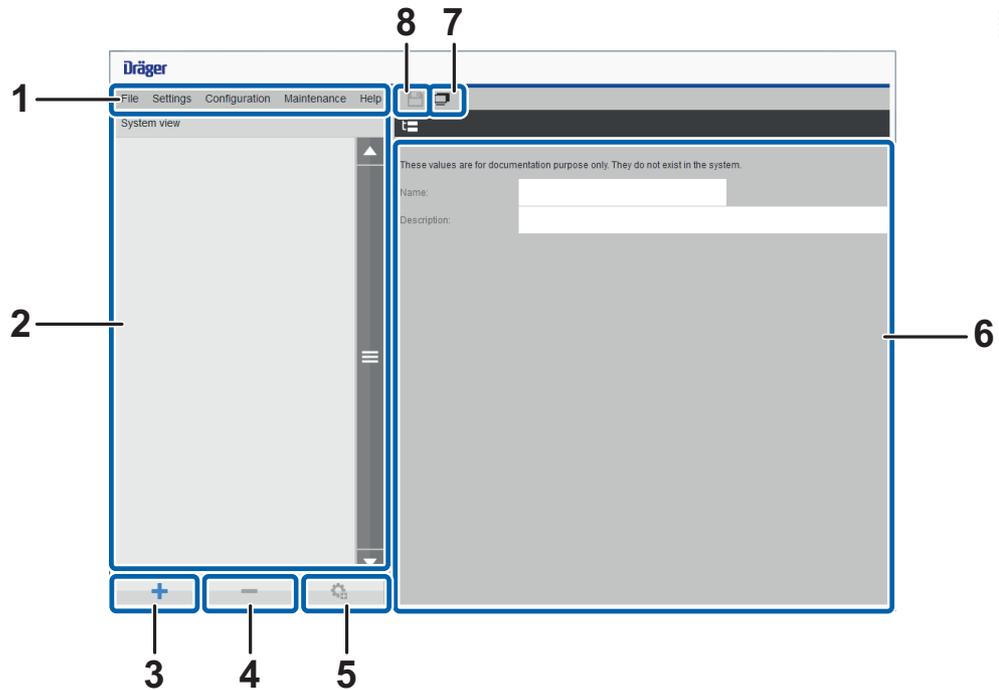
- Last name and first name
- Requested username
(Criteria for the username: 6 - 18 characters, no special characters)

Dräger will send you your personal access data straight away.

10.2 Operating concept for the software

10.2.1 Program interface

The program interface for the configuration software comprises various areas.



- | | |
|---|-------------------------|
| 1 | Menu bar |
| 2 | System overview |
| 3 | Add system component |
| 4 | Remove system component |
| 5 | Wizard menu |
| 6 | Information area |
| 7 | Dashboard view |
| 8 | Save |

The system layout is shown in a tree structure in the system overview. Selecting a system component displays the corresponding data in the information area and this data can also be changed here as necessary. Clicking > or double-clicking a system component displays the lower level structure.

10.2.2 Editing configuration settings

To edit the configuration settings, the data must be transferred to the configuration software using a REGARD 7000 system configuration interface. With an existing connection, modified configuration data can be sent back directly to the REGARD 7000 system. Otherwise it is possible to save the settings on the PC as a file and send them to the system at a later time, or to copy them to the REGARD 7000 system using a USB stick.

i When exporting and saving the configuration settings from a system with HART® channels, the available transmitter configurations are also exported and saved at the same time as necessary. This means it is also possible to generate a warning in the event of deviations between the system and transmitter configurations following an offline change in the configuration.

10.3 Software operating modes

The configuration software can be used with an Ethernet connection to the REGARD 7000 during ongoing operation (online) or without a connection to the REGARD 7000 (offline).

10.3.1 Offline configuration mode

The following applications can be processed in this mode:

- Create new system configurations
- Edit/change system configurations
- Open and save system configuration files
- Create a report on an offline configuration

10.3.2 Online configuration mode

The following applications can be processed in this mode:

- Edit/change system configurations
- Open and save system configuration files
- Download the system configuration

10.4 Creating a new system configuration

10.4.1 Usable key combinations

Key	Action
PLUS or INSERT	Add module or Docking Station to the selected element.
MINUS or DELETE	Remove selected module or Docking Station.
CTRL + PAGE UP	Move selected Docking Station up.
CTRL + PAGE DOWN	Move selected Docking Station down.
PAGE UP	Move up in the structure tree.
PAGE DOWN	Move down in the structure tree.
HOME	Close the structure tree.
END	Open structure tree.
ENTER KEY	Confirm current dialog.
ESC	Close current dialog.

10.4.2 Create new system

1. Select **File > New System**.
- ✓ A new empty system is created in the system view. If a system has been created but not yet saved, the **Discard Changes?** dialog is displayed.

10.4.3 Add or remove Docking Station

10.4.3.1 Add Docking Station

1. In the area **System view**  should be selected.

2. Where necessary, specify in information area **Name:** and **Description:**.
 3. Select **+**.
⇒ A dialog window is displayed.
 4. In the dialog window **Add Docking Station** select the Docking Station and confirm with **✓**.
- ✓ The Docking Station is displayed in the system overview.

10.4.3.2 Remove Docking Station

1. In the area **System view**, select the Docking Station.
 2. Select **-**.
⇒ A dialog window is displayed.
 3. Confirm the removal with **✓**.
- ✓ The Docking Station is removed from the system overview.

10.4.3.3 Move Docking Station

1. In the area **System view**, select the Docking Station.
2. The Docking Station can be moved accordingly using CTRL + arrow keys ↑ or ↓.

10.4.4 Add or remove module

10.4.4.1 Add module

1. In the area **System view**, select the corresponding Docking Station with a double-click.
⇒ The module slots are displayed.
 2. Select the slot to which you want to add a module.
 3. Select **+**.
⇒ A dialog window is displayed.
 4. In the dialog window **Add Module**, select the module type, firmware version and assign a module tag if necessary.
 5. Confirm the details with **✓**.
- ✓ The module is displayed in the system overview.

10.4.4.2 Remove module

1. In the area **System view**, select the corresponding Docking Station with a double-click.
⇒ The module slots are displayed.
 2. Select the slot to be removed.
 3. Select **-**.
⇒ A dialog window is displayed.
 4. Confirm the dialog with **✓**.
- ✓ The module is removed from the system overview.

10.5 Receive and send configuration data

10.5.1 Receive configuration data

Requirements:

- REGARD 7000 is connected to the PC.
- Configuration port is configured.
- 1. In the menu bar, select **Configuration > Receive Configuration....**
- 2. Follow the directions on the display.
- ✓ The current system configuration is loaded.

Observe the information in the following chapter: "Configuration role", page 83

10.5.2 Send configuration data

Requirements:

- REGARD 7000 is connected to the PC.
- Configuration port is configured.
- 1. In the menu bar, select **Configuration > Send Configuration....**
- 2. Follow the directions on the display.
- ✓ The current system configuration is sent.

Observe the information in the following chapter: "Configuration role", page 83

10.6 Compare system configuration (optional)

This function⁴⁾ can be used to compare an online or offline⁵⁾ system configuration with a stored system configuration file

 A system comparison report can be saved as a PDF file at the end of the system comparison. The report contains the differences of all Docking Stations equipped with modules. If there are no differences, only the corresponding Docking Station is shown.

Requirements:

- Component report or system documentation add-on licence installed.
- System configuration file (.sev file) is available for the comparison.
- When using the configuration software: REGARD 7000 is connected to the PC.
- When using the configuration software: Configuration port is configured.

10.6.1 Compare online configuration

With the dashboard:

1. Select .
 2. Select .
- ⇒ The function menu is displayed.

4) Only if additional functionality is enabled, optionally available via the component report or system documentation add-on licences.

5) Only possible with REGARD 7000 configuration software.

3. Select **Compare**.
4. Follow the directions of the wizard.

With the REGARD 7000 configuration software:

1. In the toolbar, select  or in the menu bar, select **Maintenance > Dashboard View....**
 - ⇒ A window is displayed with the dashboard view.
2. In the dashboard view, select the  button.
3. Select .
 - ⇒ The function menu is displayed.
4. Select **Compare**.
5. Follow the directions of the wizard.

10.6.2 Compare offline configuration

Requirements:

- The current configuration data has been received.
1. In the menu bar, select **Configuration > Compare Configuration....**
 2. Follow the directions of the wizard.

10.7 Save and open configuration files

10.7.1 Save configuration files

- In the menu bar, select **File > Save**.
When the file is saved for the first time and a dialog window is displayed:
 - In the dialog window, select a save location and name the file. Then select .

10.7.2 Save a copy of a configuration file

1. In the menu bar, select **File > Save As....**
 - ⇒ A dialog window is displayed.
2. In the dialog window, select a save location and name the file. Then select .

10.7.3 Open configuration files

1. In the menu bar, select **File > Open....**
 - ⇒ A dialog window is displayed.
2. Select the required file and select .

10.8 Set and change configurations

10.8.1 Set parameters

1. In the area, select **System view** [Docking Station > [Module] > [Port]].
2. In the information area, set the required parameters. For further information, see the following chapter: "Configuration role", page 83

10.8.2 Copying Port configuration

A selected Port configuration can be copied to any number of Ports of the same module type using the Port configuration copy wizard.

1. Select [Docking Station] > [Module] and the [Port] to be copied.
2. Select  > **Copy port configuration assistant**.
 - ⇒ The Port configuration copy wizard is displayed.
 - All Ports of the selected module type are listed.
 - The Port that is to be copied is shown with a grey background.
3. Select the checkboxes for the Ports to which the Port configuration is to be copied.
4. Select **Copy descriptions** checkbox if appropriate.
This includes copying the parameter values for channel tag, device name, device part number, sensor name and sensor part number.
5. Select  to copy the Port configuration to all selected Ports.

 The Port configurations for all selected Ports will be overwritten without a confirmation enquiry.

10.8.3 Select transmitter

A Dräger transmitter can be selected with the device wizard. The parameters are automatically assigned with the default values of the transmitter depending on the transmitter. The default values can be changed after the device wizard is closed.

Even when using the device wizard, the user must check that the configuration and correspondence with the configuration of the connected transmitter are correct.

1. Select [Docking Station] > [Module] > [Port].
2. Select  > **Device assistant**.
 - ⇒ The wizard for selecting the gas transmitter is displayed.
3. Select the transmitter in the **Select device** dropdown list.
 - ⇒ The preset parameters are displayed.
4. Confirm the selection with .

10.8.4 Select measured gas

A Dräger transmitter can be selected with the device wizard. Depending on the target gas, the parameters are automatically assigned the default values for the target gas. The default values can be changed after the target gas wizard is closed.

1. Select [Docking Station] > [Module] > [Port].
2. Select  > **Gas assistant**.
 - ⇒ The wizard for selecting the target gas is displayed.
3. Select the target gas in the **Select measured gas** dropdown list.
 - ⇒ The preset parameters are displayed.
4. Confirm the selection with .

10.8.5 Set measuring range

All parameters for configuration of the measuring range can be set with the measurement range wizard.

1. Select [Docking Station] > [Module] > [Port].
2. Select  > **Measurement range assistant**.
⇒ The wizard for setting the target gas is displayed.
3. Enter the parameters.
4. Confirm the selection with .

10.9 Create component and parameter reports

10.9.1 Create and save component report

1. In the menu bar, select **Reports > Component Report...**
⇒ A dialog window is displayed.
2. In the dialog window, select a save location and name the file. Then select .
- ✓ The report is saved as a PDF file.

10.9.2 Create and save parameter report

1. In the menu bar, select **Reports > Parameter Report...**
⇒ A dialog window is displayed.
2. In the dialog window, select a save location and name the file. Then select .
- ✓ The report is saved as a PDF file.

10.10 Display Dashboard view

The Dashboard view represents the Dashboard screen of the REGARD 7000 system and therefore provides the complete range of functions for operating the system. The function is closed following 15 minutes of inactivity.

Requirements:

- REGARD 7000 is connected to the PC.
 - Configuration port is configured.
1. In the toolbar, select  or in the menu bar, select **Maintenance > Dashboard View...**
 2. A window is displayed with the dashboard view.

10.11 Select the PC interface

1. In the menu bar, select **Settings > Network Adapter...**
⇒ A dialog window is displayed.
2. In the dialog window **Select Network Adapter** select the required PC interface and confirm with .

 Dräger recommends deactivating all network services and TCP/IP stacks for the Ethernet connection to the REGARD 7000 system. To retain this setting, a dedicated Ethernet connection with a USB Ethernet adapter should be used.

10.12 Change language of the configuration software

1. In the menu bar, select **Settings** > **Language**.
2. Select the required language.

11**Disposal**

This product must not be disposed of as household waste. This is indicated by the adjacent symbol.



You can return this product to Dräger free of charge. For information please contact the national marketing organizations or Dräger.

12 Technical data

Ambient conditions for REGARD 7000 (except for Dashboard)

Temperature (during operation)	0 ... 55 °C
Temperature (in storage)	−40 ... +65 °C
Humidity	5 ... 95 % r.h., non-condensing
Pressure	700 ... 1300 hPa
Altitude (Relay Module 240 VAC only)	max. 2000 m above mean sea level

Ambient conditions for Dashboard

Temperature (during operation)	0 ... 50 °C
Temperature (in storage)	−20 ... +60 °C
Humidity (in operation)	20 ... 90 % r.h., non-condensing
Humidity (in storage)	5 ... 90 % r.h., non-condensing
Pressure	700 ... 1300 hPa
Altitude	max. 3000 m above mean sea level

Size and weight	[H x W x D] [mm]	[g]
REGARD 7000 4-20 mA Input Module	110 x 46 x 130	265
REGARD 7000 4-20 mA Input / HART Module	110 x 46 x 130	265
REGARD 7000 Modbus RTU Master Module	110 x 46 x 130	265
REGARD 7000 Digital Input Module	110 x 46 x 130	265
REGARD 7000 Gateway Module	110 x 46 x 130	265
REGARD 7000 Modbus RTU Gateway	116 x 23 x 115	130
REGARD 7000 Bridge Module	110 x 46 x 130	265
REGARD 7000 Relais Module (all variants)	110 x 46 x 130	340
REGARD 7000 Slotcover	110 x 46 x 85	115
REGARD 7000 Terminal Block	69 x 44 x 44	53
REGARD 7000 Long Distance Gateway	110 x 46 x 85	115
REGARD 7000 Ethernet zu DSL Converter	99 x 35 x 115	185
REGARD 7000 Docking Station 8-Slot	183.5 x 400 x 78	1690
REGARD 7000 Docking Station 4-Slot	183.5 x 213 x 78	895
REGARD 7000 Advanced Dashboard 6RU	266 x 483 x 68	3800
REGARD 7000 Advanced Dashboard PM	286 x 347 x 68	3700
REGARD 7000 Standard Dashboard 3RU	132.5 x 483 x 155.5	2490

System response times

Transmission of measured values and state information to REGARD 7000	typical 1 s max. 3.3 s
--	---------------------------

Transmission of state information from REGARD (99 channels) to REGARD 7000	typical 2.5 s max. 9 s
--	---------------------------

Transmission of measured values from REGARD (99 channels) to REGARD 7000	typical 10 s max. 20 s
--	---------------------------

A special state is signalled if the maximum transmission time for state information is exceeded.

Measured value update time on the input: 4-20 mA Input / HART Module, Digital Input Module	50 ms
---	-------

Measured value update time on the input: Modbus RTU Master Module	max. 6 s
--	----------

Setting times

t20	< 3 s
t50	< 3 s
t90	< 3 s

The setting times are independent of the target gas.

Time until ready for measurement

After switching on the REGARD 7000	< 60 s
------------------------------------	--------

13

Glossary

Term	Description
Alarm hysteresis	Alarm hysteresis is the zone between the lower value and the upper value of the alarm target value and the normal operation range. The zone is calculated by adding the hysteresis value to the target value of the alarm indicating values below the alarm limit or subtraction from the target value of the alarm indicating values above the alarm limit.
Alarm direction	In a rising alarm direction an alarm is triggered if the gas concentration rises and exceeds the alarm threshold. In a falling alarm direction an alarm is triggered if the gas concentration falls and falls below the alarm threshold.
Docking Station	Base station for installation of input, output and other modules types for formation of a REGARD 7000 control unit. The docking station supplies power to all installed modules and enables communication among the modules.
Input element	Switches, buttons, fire alarms etc.
Energize Mode	Mode of operation of a relay. There is a distinction between normally energized and energized on alarm.
Energized on Alarm	Mode of operation of a relay in which the coil is energized in the activation state.
Gas detection instrument	Instrument that is designed for measurement of a gas concentration alone or in combination with other devices. It may also have a warning function.
Gateway module	Module for transfer of REGARD 7000 data to a higher-level DCS or SCADA system
Ground Fault Detector	Insulation monitoring relay Monitors all signal lines for short circuits and leak currents to the ground potential.
Inhibit	Locked A channel in the inhibit state is locked. The associated relay switching function is suppressed.
Channel	A channel is a configured port and forms either an input or output channel.
Module	Unit for connecting input and output signals. The connected transmitter is also supplied with power via the module (exception: 3-wire transmitter with a power consumption greater than 500mA)
Threshold limit	The smallest measured value of the gas concentration for which the accuracy is within the specified limits.
Normally Energized	Mode of operation of a relay in which the coil is energized in the normal state. Used in safety-critical applications, because if there is a power failure in the control system the relay will fail and the alarm state will be received.

Term	Description
Port	Physical output or input of a module. A configured port forms a channel input channel or output channel). The number of ports in a module shows how many of the total number of channels possible in the system are configured through that module.
REGARD	Dräger control unit for gas alarm systems based on 19-inch plug-in cards, predecessor to the REGARD 7000. Can be connected to a larger REGARD 7000 system via a bridge module in the REGARD 7000.
REGARD 7000	Module control unit for gas and fire alarm systems, successor to the REGARD system.
Slotcover	Cover for a slot
Terminal Block	Designation for a terminal block Connecting element for electrical connection of input and output signals to a module
Transmitter	Fixed gas detector, which supplies a conditioned electrical signal or a measured value output in accordance with a generally accepted industry standard (4 to 20 mA). It is designed for operation with separate control units, systems for data recording and signal processing, central monitoring systems or similar systems. They typically process information from various locations and sources with gas detectors but also from other sources.
Mode of operation for "Alarms A1 to A8" digital input	The activation of the digital input (e.g. by a button or fire alarm) triggers the correspondingly configured alarm A1 to A8.
Information signal digital input Information	Information is available on the channel of the digital input.
Fault signal digital input Fault	A fault is pending on the channel of the digital input.
Warning signal digital input Warning	A warning is pending on the channel of the digital input.
Mode of operation for digital input Acknowledgement	The activation of the digital input (e.g. by a button) triggers an acknowledgement signal, which can be used to perform an acknowledgement on an assigned channel.
Digital input mode of operation Overrange latch ack.	The activation of the digital input (e.g. by a button) triggers a Overrange latch ack. signal, which can be used to perform an Overrange latching on an assigned channel.
Mode of operation for digital input Inhibit	The activation of the digital input (e.g. by a button) triggers an Inhibit signal, which can be used to set the other channels to the Inhibit state.

14 Annex

14.1 Compatible REGARD components

The bridge module supports the following REGARD cards:

Designation	Software version:
Dräger REGARD SE Ex	1.6, 3.0
Dräger REGARD optical card	1.0, 3.0
Dräger REGARD 4-20 mA	1.6, 3.0
Dräger REGARD 8-channel card	1.2, 2.5, 3.0
Dräger REGARD HART®	1.4, 2.0
Dräger REGARD master	1.6, 1.8, 3.0
Dräger REGARD relay display card	1.6, 3.1

14.2 Abbreviations

Abbreviation	Explanation
ACK	Non-latching and acknowledgeable relay Configurable behaviour of a relay output.
ATEX	Atmosphères Explosibles ATEX Directive
DCS	Distributed Control System
EOL	End-of-Line resistor
HART®	Highway Addressable Remote Transducer, standardised communication system for designing industrial fieldbuses. HART® facilitates digital communication between multiple subscribers via a common data bus.
LACK	Latching and acknowledgeable relay Configurable behaviour of a relay output.
LNAK	Latching and non-acknowledgeable relay Configurable behaviour of a relay output.
LPAK	Latching and non-acknowledgeable but pre-acknowledgeable relay Configurable behaviour of a relay output.
MED	Marine Equipment Directive Maritime Equipment Directive
NAK	Non-latching and non-acknowledgeable relay Configurable behaviour of a relay output.
NaN	Not a Number An undefined or undisplayable value.
NC	Normally Closed, closed in normal state Type of usage of a relay contact.
NO	Normally Open, open in normal state Type of usage of a relay contact.

Abbreviation	Explanation
NOP	No Operation A channel with a NOP channel ID is inactive and is not displayed.
PLC	Programmable Logic Controller
SCADA	Supervisory Control and Data Acquisition
SFR	System Fault Relay
SIL	Safety Integrity Level, (safety requirement level according to IEC 61508 and/or EN 50402).
SSR	Special State Relay

14.3 Modbus command structure

14.3.1 Example: Read register

Starting at input register 3701 (decimal) the two measured values of the REGARD 7000 channels 1 and 2 that are contained in four consecutive Modbus registers are read.

Query to the REGARD Modbus RTU Gateway

Slave Addr.	Func. Code	Start Register	Register count	CRC	
01	04	0E 74	00 04	B3	3B

Response from the REGARD Modbus RTU Gateway

Slave Addr.	Func. Code	Byte count	Register 3701 value	Register 3702 value	Register 3703 value	Register 3704 value	CRC	
01	04	08	00 00	7F C0	00 00	7F C0	0F	B3

In the displayed response, both measured values are NaN (Not a Number).

All values hexadecimal.

14.3.2 Example: Write register

Writing the value 0 into the holding register 100 (decimal) acknowledges all acknowledgeable alarm, fault and warning states of a linked REGARD 7000 system.

Query

Slave Addr.	Func. Code	Start Register	Value	CRC	
01	06	00 63	00 00	79	D4

The REGARD Modbus RTU Gateway reflects the query as the answer.

14.3.3 Meaning of fields

Field	Meaning
Slave address	Slave address of the REGARD Modbus RTU Gateway that must be configured.
Function code	Supported Modbus functions: <ul style="list-style-type: none"> – Function 03h - Read Holding Register(s) – Function 04h - Read Input Register(s) – Function 06h - Write Holding Register – Function 10h - Write Holding Register(s)
Start register	U16 address of the first queried Modbus register (input or holding register). The address is the register number minus 1.
Register count	Number of queried Modbus registers (1 to 125d)
Byte count	Number of returned bytes
CRC	Modbus 16-bit checksum

14.3.4 Assignment of the input register

Register (dec.)	U16 address	Type	Number	Contents
300001	0000	U16	1	Byte Order Mark (FFFEh)
300002...300030	0001...001D	U8	58	Device name/manufacturer's information
300033...300048	0020...002F	U8	32	Dräger software part number and software version
300049...300056	0030...0037	U8	16	Device part and serial number
300057...300064	0038...003F	U8	16	CF assembly part and serial number
300065...300072	0040...0047	U8	16	Application assembly part and serial number
300128	007F	U16	1	Header CRC (Modbus 16-bit CRC)
300129...300131	0080...0082	U8	6	MAC address
300132	0083	U16	1	CF assembly hardware version
300133	0084	U16	1	Application assembly hardware version
300134	0085	U16	1	Linked insert (location.slotId)
300135...300136	0086...0087	U32	1	Linked Docking Station (Location.dslId)
300137	0088	U16	1	Configuration state "negative to zero" (1 = active). For further information, see the following chapter: "Parameter menu Fieldbus (Modbus)", page 111
300138	0089	U16	1	Module type of the gateway module (1 = Modbus RTU, 3 = PROFIBUS, 5 = PROFINET)

Register (dec.)	U16 address	Type	Number	Contents
300142	008D	U16	1	REGARD 7000 channel number of the gateway module
300143...300144	008E...008F	U32	1	Fieldbus slave ID of the gateway module
300145...300146	0090...0091	U32	1	RS485 external baud rate (fieldbus)
300147	0092	U16	1	RS485 external, serial options (stop bits, parity)
300148	0093	U16	1	Configuration state "fault suppression" (1 = active). For further information, see the following chapter: "Parameter menu Fieldbus (Modbus)", page 111
300400	018F	U16	1	Number of current REGARD 7000 channels (data packets)
300500	01F3	U16	1	Number of current REGARD 7000 channels with config. info more current than 90 s
300501...302036	01F4...07F3	U16	1536	Channel type information for 1536 REGARD 7000 channels. For further information, see the following chapter: "Channel types", page 153
302101...303636	0834...0E33	U16	1536	State for 1536 REGARD 7000 channels. For further information, see the following chapter: "Structure of the state register of REGARD 7000 channels", page 153
303701...306772	0E74...1A73	F32	1536	Measured values for 1536 REGARD 7000 channels (only for 4-20 mA, bridge and Modbus input channels)
306801...309872	1A90...268F	U32	1536	A1 to A8 alarm states for 1536 REGARD 7000 channels. For further information, see the following chapter: "Structure of alarm state information", page 154
309901...311436	26AC...2CAB	U16	1536	Number in s until the status Inhibit is cancelled
311501...313036	2CEC...32EB	U16	1536	A1 - A8 alarm direction (rising, falling) for 1536 channels. For further information, see the following chapter: "Structure of alarm state information", page 154

Register (dec.)	U16 address	Type	Number	Contents
313101...337676	332C...932B	F32	12288	A1 to A8 alarm thresholds for 1536 REGARD 7000 channels.
337701...340772	9344...9F43	F32	1536	Measurement range underruns for 1536 channels
340801...343872	9F60...AB5F	F32	1536	Measurement range overruns for 1536 channels
343901...348508	AB7C...BD7B	U8	9216	Measurement units for 1536 REGARD 7000 channels
348601...357816	BDD8...E1D7	U8	18432	Gas names for 1536 REGARD 7000 channels.
357817...362424	E1D8...F3D7	U8	9216	Short gas names for 1536 REGARD 7000 channels.
362465...365536	F400...FFFF	U32	1536	Output states for 1536 channels (available depending on type). For further information, see the following chapter: "Structure of output state information", page 154

14.3.5

Channel types

Value	REGARD 7000 channel type
0x0000	Channel not present
0x0101	4-20 mA Input Module / 4-20 mA Input Module HART®
0x0103	Digital Input Module
0x0104	Bridge Input Module
0x0107	Modbus RTU Master Module
0x0141	Relay Output Module
0x01D0	Gateway Output Module
0x01D1	Gateway Output PROFIBUS
0x01D2	Gateway Output PROFINET

14.3.6

Structure of the state register of REGARD 7000 channels

Bit address	Bit value (mask)	Type	Contents
0.0	1	U1	Activation state (1 = active channel, 0 = inactive channel)
0.1	2	U1	Online system test (currently only implemented for the relay module channel)
0.2	4	U1	Inhibit (1 = active)
0.3	8	U1	Channel present (1 = present)
0.4	16	U1	Timeliness of data packet (1 = current, data packet max. 3 s old)
0.5	32	U1	Timeliness of configuration (1 = current, config. info. max. 90 s old)

Bit address	Bit value (mask)	Type	Contents
0.6	192	U2	Measurement range exceeded
1.0	768	U2	General fault state
1.2	3072	U2	Communication error
1.4	12288	U2	Warning
1.6	49152	U2	Information

U2 values have the following meaning:

Value	binary	Meaning
0	00	Inactive
1	01	Active
2	10	Latching (Latching)
3	11	Acknowledged (Acknowledged)

14.3.7

Structure of alarm state information

Starting at register 306801 1536 U32 values are created for the up to 1536 channels, one U32 value in 2 consecutive registers. Every U32 value is divided into 8 bit groups for every 4 bits. They are allocated to alarms A1 to A8 and are interpreted according to the following table. Unused channel positions contain the value 0 (= inactive).

Value	binary	Meaning
0	0000	Inactive
1	0001	Active
2	0010	Latching (Latching)
3	0011	Acknowledged (Acknowledged)
8	1000	Deactivated

The registers from 311501 contain information on the alarm directions of the REGARD 7000 channels. One bit for every single channel defines the alarm direction of the alarm threshold A1 to A8 (starting at the bit with the least value).

- Bit value 0 = alarm with rising measured value.
- Bit value 1 = alarm with falling measured value.

Not configured alarm thresholds contain the default bit value 0.

14.3.8

Structure of output state information

Relay module

For relay module channels the registers from 362465 contain the alarm state, the logical output state and the switching state of the relay.

Bit address	Type	Contents
0.0	U4	Alarm state (relay module)
0.4	U4	Logical output
1.0	U1	Physical switching state (1 = energized)
1.1 ... 3.7	U1	Reserved

Value	binary	Alarm state (relay module)
0	0000	Inactive
1	0001	Active
2	0010	Pre-acknowledged (Pending)
3	0011	Silent (Silent)
4	0100	Latching (Latching)

Value	binary	Logical output
0	0000	Off
1	0001	Activation delay running
2	0010	Deactivation delay running
3	0011	On

Digital Input Module

For digital input modules the U32 values from register 362465 contain the current flow of the corresponding channel in micro-amperes.

Gateway module

For gateway output modules the registers from 362465 contain information on the query status of external systems and the gateway type.

Bit address	Type	Contents
0.0	U1	Connection state (1 = communication within previous second)
0.1 ... 0.7	U1	Reserved
1.0	U8	Gateway type (1 = Modbus RTU, 3 = PROFIBUS, 5 = PROF-INET)
2.0 ... 3.7	U1	Reserved

HART module

For HART modules, the registers after 362465 receive the Expanded HART-Device-Type of the corresponding channel.

14.3.9

Assignment of the holding register

Register (dec.)	U16 address	Type	Number	Contents
400100	0063	U16	1	General notification and confirmation register: Notify, ACK, Inhibit, Uninhibit. For further information, see the following chapter: "Structure of notification and confirmation register (acknowledge/notify register)", page 157

Register (dec.)	U16 address	Type	Number	Contents
400101...401636	0064...0663	U16	1536	Channel-specific notification and confirmation register for 1536 REGARD 7000 channels. For further information, see the following chapter: "Structure of notification and confirmation register (acknowledge/notify register)", page 157
401701...427812	06A4...6CA3	U8	52224	Channel description/channel identification
427901...441724	6CFC...A2FB	U8	27648	Position description (logical group level 3)
441801...455624	A348...D947	U8	27648	Additional device status (e.g. HART® Additional Device Status from command 48, diagnostics information from the Modbus RTU Master)
464001...465536	FA00...FFFF	U16	1536	User-configured channel addressing. Sequence of formation of channel numbers in the Modbus register.address space. Example: Content 1, 10, 15 Read measured values: Register 303701: Info on channel 1 Register 303702: Info on channel 10 Register 303703: Info on channel 15

14.3.10

Diagnostics Information for Modbus RTU Master

First byte:

1: Diagnostics information is up-to-date

0: Diagnostics information is not (no longer) up-to-date

Following bytes

Bit address	Type	Contents
1.0-1.1	U2	Power supply: Voltage outside the permissible range
1.2-1.3	U2	Power supply: Critical low battery warning
1.4-1.5	U2	Power supply: Low battery warning
1.6-1.7	U2	Optical system
2.0-2.1	U2	Optical system: Beam block warning
2.2-2.3	U2	Optical system: Beam block error
2.4-2.5	U2	Sensor: Warm-up, operation with reduced power

Bit address	Type	Contents
2.6-2.7	U2	Sensor: Warning
3.0-3.1	U2	Sensor: Fault
3.2-3.3	U2	Sensor: Vitality adequate
3.4-3.5	U2	Sensor: Vitality poor
3.6-3.7	U2	Maintenance: Calibration incomplete
4.0-4.1	U2	Maintenance: Calibration interval exceeded
4.2-4.3	U2	Accessories: Flow error
4.4-4.5	U2	Accessories: Flow warning
4.6-4.7	U2	Device: Temperature warning

Setup type U2

Value	binary	Meaning
0	00	not supported
1	01	supported invalid
2	10	supported inactive
3	11	supported active

14.3.11 Structure of notification and confirmation register (acknowledge/notify register)

A general acknowledgement of all faults and states of a channel is implemented by writing 0h to the channel-specific notification and confirmation register to acknowledge all REGARD 7000 channels in the general notification and confirmation register.

An over range cannot be acknowledged via Modbus.

The requirement for the maintenance state and cancellation of the maintenance state of a channel is implemented by writing the values 02h (set) and 04h (cancel).

i If all modules of a system have been put into the Inhibit state with "Inhibit all", the Gateway module itself is also in the maintenance state. Before the Gateway module can perform an "Uninhibit all", the maintenance state of the Gateway module must first be exited with an "Uninhibit" request.

Selected state information of the REGARD 7000 channels is displayed as shown in the following table (notify/acknowledge). The information bit is reset by writing the bit value to the register.

Bit address	Bit value	Contents
0.0	1	Notification/acknowledgement ¹⁾ Configuration change ²⁾
0.1	2	Inhibit request
0.2	4	Uninhibit request
0.3	8	Notification/acknowledgement ¹⁾ of new channel
0.4	16	Notification/acknowledgement ¹⁾ of data packet not (any longer) current
0.5	32	Notification/acknowledgement ¹⁾ of configuration not (any longer) current
0.6	64	Notification/acknowledgement ¹⁾ of over range

Bit address	Bit value	Contents
0.7	128	Notification/acknowledgement ¹⁾ of channel error
1.0	256	Notification/acknowledgement ¹⁾ of communication error
1.1	512	Notification/acknowledgement ¹⁾ of warning
1.2	1024	Notification/acknowledgement ¹⁾ of information flag set
1.3	2048	Notification/acknowledgement ¹⁾ of channel deactivated
1.4	4096	Notification/acknowledgement ¹⁾ of maintenance state (Inhibit)
1.5	8192	Notification/acknowledgement ¹⁾ of A1 alarm. ³⁾
1.6	16384	Notification/acknowledgement ¹⁾ A2 alarm ³⁾
1.7	32768	Notification/acknowledgement ¹⁾ A3 or higher alarm ³⁾ (A3 to A8)

- 1) Only the information bit is acknowledged here, not the state itself.
2) Only displays changes to configurations that can be called up via Modbus.
3) Unconfigured alarms are also notified as a change.

14.3.12 Meaning of data types

Data type	Meaning
U8 ¹⁾	Numbers > 1 are an array of ASCII or UTF8 characters that together represent a character chain. Character chains shorter than the maximum usable length are completed with zero. If an array contains multiple character chains, all character chains have the same maximum length. Example: From register 343901 1536 measurement modules of maximum length 6 are saved for 1536 channels (5 characters + termination by zero character). This yields a total length of 9216 U8 values, which are saved in 4608 consecutive Modbus registers. A single U8 value represents a positive number between 0 and 255.
U16 ²⁾	Value assembled from single bits, e.g. contents of a channel state register, or positive number between 0 and 65535.
U32 ²⁾	Value assembled from single bits, e.g. output state information, or positive number between 0 and 4294967295. Divided over two consecutive Modbus registers.
F32 ²⁾	Contains a 32-bit floating decimal number (IEEE-754). Divided over two consecutive Modbus registers.
U4	Bit group of four bits, may be interpreted as value between 0 and 15.
U2	Bit group of two bits, may be interpreted as value between 0 and 3.
U1	One bit, generally 1 = true/active.

- 1) For U8 strings: Byte order little-endian (PC format)
2) For U16/U32/F32: Byte order big-endian

14.4 PROFIBUS DP and PROFINET command setup

A connected PROFIBUS DP or PROFINET Master can be used to query the current status, alarm conditions A1 to A8, as well as the current gas concentration or where applicable the status of the relay, from any REGARD 7000 channel.

In addition, the individual REGARD 7000 channels can be acknowledged or set or reset to Inhibit from a PROFIBUS DP or PROFINET Master.

14.4.1 Downloading the GSD(ML) file

The GSD(ML) file can be downloaded free of charge from the ServiceConnect® web portal (www.serviceconnect.draeger.com).

To set up a personal account, please send an email with the following details to: **REGARD7000.admin@draeger.com**

- Last name and first name
- Desired user name
(Criteria for the user name: 6 - 18 characters, no special characters)

Dräger will send you your personal access data straight away.

14.4.2 Configuration via the GSD(ML) file modules

14.4.2.1 Standard configuration

As the standard configuration, 2 bytes output and 2 bytes input are planned via the "ChI-ID" module. The 2 bytes output allow the PROFIBUS DP or PROFINET Master to query specific REGARD channel IDs. The response data from REGARD 7000 channels then relates to 2 bytes input.

A single REGARD channel is provided by default (configurable). This type of module consists of 1 byte output and 8 bytes input.

Output bytes	Input bytes	Meaning
1		ID of the first queried REGARD 7000 channel
2		
	1	ID of the first supplied REGARD channel
	2	
3		Control of the first queried REGARD 7000 channel ID: 0000 0lma a = 0/1 → acknowledgement m = 0/1 → set Inhibit l = 0/1 → reset Inhibit
	3	Analogue input and REGARD Classic channels: Gas concentration (IEEE 754 float)
	4	Digital input channels: Current in µA
	5	Relay channels: Status of the relay*
	6	
	7	Alarm flags from A1 (LSB) to A8 (MSB), n/a for relay channels

8	Channel status iiww ccff ff → General error condition** cc → Communication error** ww → Warning** ii → Information**
9	Channel status ffxh eioa a = 0/1 → Activation status (1 = active channel, 0 = inactive channel) o = 0/1 → Online system test (not currently supported, value = 0) i = 0/1 → Inhibit (1 = active) e = 0/1 → Channel present (1 = present) h = 0/1 → Timeliness of data packet (1 = current, data packet max. 3 s old) x = 0/1 → Timeliness of configuration (1 = current, config. info max. 90 s old) ff → Range overrun**
10	Channel type: 0x00 Channel not present 0x01 4-20 mA Input Module / 4-20 mA Input Module HART 0x03 Digital Input Module 0x04 Bridge Input Module 0x07 Modbus RTU Master Module 0x41 Relay output module 0xD0 Gateway Modbus RTU Output Module 0xD1 Gateway PROFIBUS DP Output Module 0xD2 Gateway PROFINET Output Module
	Other configurable modules.

* Setup of the status of a relay

Bit address type contents:

0.0 U4 Alarm state (relay module)

0.4 U4 Logical output

1.0 U1 Physical switching state (1 = energised)

1.1 ... 3.7 U1 Reserved

Value of binary alarm state (relay module)

0 0000 Inactive

1 0001 Active

2 0010 Pending (Pending)

3 0011 Silent (Silent)

4 0100 Latching (Latching)

Value of binary logical output
0 0000 Off
1 0001 Activation delay running
2 0010 Deactivation delay running
3 0011 On

**** Setup of a 2-bits State-Machine**

Value of binary meaning:
0 00 Inactive
1 01 Active
2 10 Latching (Latching)
3 11 Acknowledged (Acknowledged)

14.4.2.2 Other configurable modules

The other configurable modules have an identical design to the individual REGARD 7000 channel module (1 byte output, 8 bytes input).

Depending on the number of modules, more REGARD 7000 channels are configurable (upper limit per query cycle: PROFIBUS DP = 30 channels, PROFINET = 62 channels).

Module 3: 2 REGARD 7000 channels (2 bytes output, 16 bytes input)

Module 4: 4 REGARD 7000 channels (4 bytes output, 32 bytes input)

Module 5: 8 REGARD 7000 channels (8 bytes output, 64 bytes input)

Module 6: 16 REGARD 7000 channels (16 bytes output, 128 bytes input)

Module 7⁶⁾: 32 REGARD 7000 channels (32 bytes output, 256 bytes input)

Module 8⁶⁾: 62 REGARD 7000 channels (62 bytes output, 496 bytes input)

The different modules can be combined in the PROFIBUS DP or PROFINET Master as required (size of the plant, PLC power).

6) For PROFINET only.

14.5 Declaration of conformity



EU-Konformitätserklärung
EU-Declaration of Conformity

Dokument Nr. / Document No. SE23816-03

Dräger

Wir / we Dräger Safety AG & Co. KGaA, Revalstraße 1, 23560 Lübeck, Germany

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product

Gaswarnzentrale Typ Regard 7000
Gas Detection Controller Type Regard 7000

mit der EU-Baumusterprüfbescheinigung / Expertise **BVS 16 ATEX G 003 X**
is in conformity with the EU-Type Examination Certificate / **MED B 00002Z6**
Expertise

ausgestellt von der notifizierten Stelle mit der Kenn-Nr. <i>issued by the Notified Body with Identification No.</i>	DEKRA EXAM GmbH Dinnendahlstraße 9 D-44809 Bochum 0158	DNV GL SE Brooktorkai 18 D-20457 Hamburg 0098
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und mit den folgenden Richtlinien unter Anwendung der aufgeführten Normen übereinstimmt
and is in compliance with the following directives by application of the listed standards

Bestimmungen der Richtlinie <i>provisions of directive</i>		Nummer sowie Ausgabedatum der Norm <i>Number and date of issue of standard</i>
2014/34/EU	ATEX-Richtlinie <i>ATEX Directive</i>	EN 60079-29-1:2016, EN 50104:2010, EN 50271:2010
2014/90/EU	Schiffsausrüstungs-Richtlinie <i>Marine Equipment Directive</i>	EN 60079-29-1:2016, EN 50104:2010, IEC 60533:2015, IEC 60945:2002+A1:2008, IEC 60092-504:2016
2014/30/EU	EMV-Richtlinie <i>EMC Directive</i>	EN 50270:2015 (type 2)
2014/35/EU	Niederspannungs-Richtlinie <i>Low Voltage Directive</i>	EN 61010-1:2010
2011/65/EU	RoHS-Richtlinie <i>RoHS Directive</i>	EN 50581:2012

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Zertifikat-Nr.: <i>Certificat No.:</i>	BVS 17 ATEX ZQS/E100	MED D00000TF
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Lübeck, 2018-04-19

Ort und Datum (jjjj-mm-tt)
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