

GD Connect 12

Intelligent interconnected control



Id. Nr. ZS1060097 / 00

Basis: German operating instructions ZS1060096 / 00

Valid for software versions 2.0x

Subject to technical change without notice.

1. Foreword

1.1 Intended use

The control has been designed in accordance with good engineering practice and accepted safety standards. Nevertheless, its use may constitute a risk to the health and safety of users or to third parties or cause damage to the machine or to other items, if

- it is not used for the purpose for which it was intended
- it is operated by untrained personnel
- it is improperly modified or changed
- the safety instructions are not observed.

Therefore, any person entrusted with the operation, maintenance or repair of the machine must read and observe the safety instructions. This must be confirmed by signature if required.

In addition:

- applicable accident prevention regulations,
- generally accepted safety rules and
- national regulations

must be observed.

The control must only be used in full working order and in accordance with its intended use and the instructions set out in the operating manual. All operators must be fully aware of the risks involved in operating the control and must observe all safety instructions. Any functional defects, especially those with safety implications, must be rectified immediately.

The control is designed exclusively for regulating systems which generate compressed air. Using the control for any other purpose is contrary to its intended use. The manufacturer/supplier cannot be held responsible for damage resulting from such use. The risk of such misuse lies solely with the user.

Operation of the control within the limits of its intended use also includes observation of the operating instructions and compliance with the inspection and maintenance instructions.

1.2 Maintenance

Servicing

Please contact your authorized Gardner Denver dealer in the event of a fault or for spare parts. In case of damage, our fully trained personnel will ensure that a quick and proper repair is carried out using original Gardner Denver spare parts. Original Gardner Denver spare parts are manufactured using state-of-the-art technology, thereby guaranteeing the continued reliable operation of the unit.

In case of queries

Please note the data on the typeplate of your control. For queries or spare parts orders, please state the compressor type indicated on the nameplate, the identification no. and the year of construction. This information will ensure that you receive the right information or required spare part.

1.3 Notes

General

These operating instructions are intended to familiarize the user with the control and its intended use. The instructions contain important notes on how to operate the control safely, properly and cost effectively. Observing these instructions helps to avoid risks, to reduce repair costs and downtimes and to increase the reliability and service life of the control.

The operating instructions apply in addition to applicable national rules and regulations regarding the prevention of accidents and environmental protection. They must be kept available at all times at the place of use of the control. The operating instructions must be read and observed by any person carrying out work in connection with the control, e.g. operation, including setting up, fault-finding during operating cycles, disposal of production waste, care, service, and disposal of waste fuels and consumables, upkeep (maintenance, inspection, repair), transport.

In addition to the operating instructions and the binding regulations for the prevention of accidents which apply in the country and place of operation of the control, the generally accepted technical rules for safe and proper working must also be observed.

Guarantee

Operate the control only if you have familiarized yourself with the control and these operating instructions.

Gardner Denver cannot be held responsible for the safe operation of the control if it is used in a manner which does not correspond to the intended use, or for applications other than those mentioned in these instructions.

Warranty claims will not be accepted in the case of:

- Operating errors
Use of spare parts other than Gardner Denver original spare parts
- Modifications and changes to the installation.

The above exclusions do not extend the scope of the warranty and liability conditions of the general terms and conditions of Gardner Denver.

Any unauthorized changes to the control or the installation of components not approved by the manufacturer will result in the withdrawal of the CE mark. As a consequence, any liability and warranty claims will not be accepted by the manufacturer.

Safety instructions

Danger

The safety instructions in chapter 3 of the operating instructions must be strictly observed.

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3. Safety instructions

3.1 Identification of safety instructions

Gardner Denver cannot be held liable for any damage or injury resulting from of the failure to observe these safety instructions or negligence of the usual care and attention required during handling, operation, maintenance or repair, even if this is not explicitly mentioned in these operating instructions.

If any of the regulations contained in these instructions - especially with regard to safety – does not correspond to the local legal provisions, the stricter of the two shall prevail.

These safety instructions are general in nature and apply to various types of machines and equipment. Therefore some references may not apply to the unit(s) described in these instructions.

Danger

Passages marked with this sign indicate a risk of injury to personnel.

Important

Passages marked with this sign indicate a risk of damage to machinery or parts of machinery.

Note

Passages marked with this sign provide technical information on an optimal cost-effective use of the machine.

3.2 General safety instructions

Organizational measures

The operating instructions must be kept available at all times at the place of use of the control (in the tool compartment or box provided for such a purpose). In addition to the operating instructions, other generally applicable legal and other mandatory regulations relating to accident prevention and environmental protection must be observed. Such compulsory regulations may also cover the handling of hazardous materials or the issuing/ wearing of personal protective equipment, or traffic regulations.

Instructions regarding supervisory responsibility and duty of notification in relation to internal factors, for example regarding work organization, sequences of operations, duties and responsibilities, shall be maintained in addition to the operating instructions.

Personnel asked to work on the machine must have read the operating instructions and in particular the chapter on safety instructions before starting work. Reading the instructions after work has begun is too late. This applies in particular to persons working only occasionally on the machine, e.g. for setting up or maintenance.

Regular checks must be made to ensure that personnel are observing the operating instructions and in particular the safety requirements

For safety reasons, long hair must be tied back or otherwise secured, garments must be close-fitting and no jewellery must be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts. As necessary or as required by regulations, personal protective equipment should be used.

Observe all safety and warning notices attached to the control.

Ensure that safety instructions and warnings attached to the control are always complete and perfectly legible.

If changes to the machine/unit or its operating behaviour which could have safety implications are observed, stop the control immediately and report the fault to the appropriate department/person.

Spare parts must comply with the technical requirements specified by the manufacturer. This is ensured by the use of original spare parts.

Follow the prescribed intervals or those specified in the operating instructions for routine checks and inspections. For maintenance work, tools and equipment appropriate to the task must be used. Personnel must be made familiar with the location and operation of fire extinguishers. Observe all fire-warning and fire-fighting procedures. Limit values (pressures, time settings, etc.) must be permanently displayed.

3. Safety instructions

Selection and training of personnel; basic responsibilities

Work on/with the control must be carried out by reliable personnel only. Statutory minimum age limits must be observed.

Employ only trained or instructed personnel and clearly set out individual responsibilities for operation, setup, maintenance and repair.

Ensure that only authorized personnel work on or with the machine.

Define the machine operator's responsibilities, giving the operator the authority to refuse instructions by third persons that are contrary to safety regulations.

Do not allow persons to be trained or instructed or persons taking part in a general training course to work on or with the control without being continuously supervised by an experienced person.

Work on the electrical equipment of the control must be carried out only by a skilled electrician in accordance with electrical engineering rules and regulations.

3.3 Changes and modifications

Do not make any changes, modifications or attachments to the control which could affect safety without the supplier's prior permission.

Unauthorized changes to the unit are not permitted for safety reasons.

Original parts were designed specifically for this unit. We wish to point out that we have not approved and will not approve parts and special accessories which have not been supplied by us. The installation and/or use of such products can therefore affect active and/or passive safety.

The manufacturer cannot be held liable for damage resulting from the use of non-original parts or special accessories.

3.4 Installation and normal operation

Installation

In addition to general operating requirements laid down by local authorities, the following specific instructions must be observed.

For the lifting of a control cabinet, suitable lifting gear must be used which meets local safety regulations. All loose or slewable parts must be safely fixed before the unit can be lifted. It is strictly prohibited for personnel to remain within the danger zone of a lifted load.

The correct method of lifting (according to the operating instructions of the load suspension device) must be ensured.

If a remote control is used, the system must carry a clearly visible notice as follows: Attention: This system is operated by remote control and can start up without prior warning!

As an additional safety measure, persons who start remotely controlled systems must take adequate safety precautions to ensure that nobody is checking or working on the system. A label with a corresponding warning notice must be attached to the remote control equipment.

If a system comprises several compressors, hand-operated isolator valves must be installed in order to be able to shut off each machine individually. When working with pressure systems, do not rely on the effectiveness of check valves alone to isolate these systems.

Safety equipment, protective covers or insulation must not be removed or modified. Any pressure vessel which is located outside the system, the permissible operating pressure of which is higher than atmospheric pressure and which is fitted with two or more pressure supply lines, must be provided with additional safety equipment that will automatically prevent the pressure from exceeding the permissible operating pressure by more than 10%.

Electrical connections must comply with local regulations. Power units must be connected to earth and protected from short-circuits by means of fuses.

Normal operation

Take all necessary precautions to ensure that the system is used only when in a safe and reliable state.

Operate the system only when all protective equipment, emergency shut-off equipment, soundproofing elements and extraction devices are in place and in full working order.

3. Safety instructions

Make regular checks to ensure that:

- all means of protection are correctly fitted and fixed,
- all fittings are firmly tightened,
- all electrical cables are connected correctly and are in good condition,
- the safety mechanisms are in full working order.

Avoid any working practices which may compromise safety. Access panels, etc. must be kept closed during operation. If a fault occurs, stop the machine/unit immediately and lock it. Have any defects rectified immediately.

Observe the start-up and stopping procedures and the control displays according to the operating instructions.

Before starting up or setting the machine in motion, ensure that nobody is at risk.

3.5 Special work/maintenance

Precautions

Observe the adjusting, maintenance and inspection activities and intervals set out in the operating instructions, including information on the replacement of parts and equipment. These activities may be carried out by skilled personnel only.

Brief the operating personnel prior to starting special operations or maintenance work. Appoint a person to supervise the activities.

Maintenance and repair work may only be carried out under the supervision of a person who is qualified for this work.

If the machine/unit is completely shut down for maintenance and repair work, it must be secured to prevent inadvertent restart:

- Lock the main command elements and remove the key and/or
- Attach a warning sign to the main switch.

Always use the correct tools for maintenance and repair work.

Never use inflammable solvents or carbon tetrachloride to clean parts. Take precautions against toxic vapours from cleaning agents.

In any work concerning the operation, conversion or adjustment of the control and its safety devices or any work related to maintenance, inspection and repair, always observe the start-up and shutdown procedures set out in the operating instructions and the information on maintenance work.

Ensure that the maintenance area is adequately secured.

Maintenance/rectification of faults

The employer must inform personnel of the dangers possibly arising during the repair and maintenance of the system and of measures to avoid them; personnel must observe all measures for safety at work. Safety equipment for the prevention or elimination of danger must be maintained regularly and its function checked at least once a year. Faults observed must be rectified immediately and/or reported to the responsible person.

Only use original spare parts.

Only carry out maintenance and repair work when the system is not in operation and the power supply disconnected. Ensure that the power unit cannot be switched on inadvertently.

Before removing or opening pressurized components, positively isolate any source of pressure and depressurize the entire system.

If work which produces heat, flames or sparks has to be carried out on a machine, the adjacent components must be protected by means of non-inflammable material.

Before releasing the system for operation after maintenance or overhaul, check that the operating pressures, temperatures and time settings are correct and that the regulating and shutdown equipment is working properly.

Motor, air filter, electrical components and regulating equipment must be protected from the ingress of humidity, e.g. when cleaning the system by means of a steam jet.

Never use etching solvents which could attack the materials used.

Check the accuracy of the pressure indicator at regular intervals. When the permissible tolerance limits are exceeded, these devices must be replaced.

The fastening of loads and the instructing of crane operators should be entrusted to experienced persons only. The person giving the instructions must be within sight or voice contact with the operator. For carrying out overhead assembly work always use specially designed safety ladders and working platforms. Never use machine parts as a climbing aid. Wear a safety harness when carrying out maintenance work at elevated heights.

Keep all steps, handles, handrails, platforms, landings and ladders free from dirt, snow and ice. Always re-tighten screwed connections which have been loosened for maintenance and repair work. If the setup, maintenance or repair requires the removal of safety equipment, this equipment must be remounted and checked immediately after completion of these activities.

Ensure that consumables and replacement parts are disposed of in a safe and environmentally friendly manner.

3. Safety instructions

3.6 Warning of special risks

Electrical power

Attention: external voltage:

If external electrical circuits which cannot be cut out by the main switch are connected to the control, these external electrical circuits must be identified in accordance with EN 60204. Warning signs must be fixed near the main switch and near these electrical circuits. In addition, these conductors must be laid separately and/or colour-coded.

Use only original fuses with the specified current rating. Switch off the control immediately if a fault occurs in the electrical system.

Work on the electrical system or equipment may only be carried out by a skilled electrician or by specially instructed personnel under the control and supervision of such an electrician and in line with the relevant electrical engineering rules.

If regulations require, the power supply to parts of machines and plants on which inspection, maintenance and repair work is to be carried out must be cut off. Before starting any work, check the de-energized parts for the presence of power and earth or short-circuit them in addition to insulating adjacent live parts and elements.

The electrical equipment of the control must be inspected and checked at regular intervals. Defects such as loose connections or scorched cables must be rectified immediately.

Necessary work on live parts and elements must be carried out in the presence of a second person who can cut off the power supply in case of danger by operating the emergency shutdown or main power switch. Secure the working area with a red-and-white safety chain and a warning sign. Use insulated tools only.

Before starting work on high-voltage assemblies and after having cut off the power supply, the feeder cable must be earthed, and components such as capacitors short-circuited with an earthing rod.

Gas, dust, steam, smoke

Carry out welding, flame-cutting and grinding work on the control only if this has been expressly authorized, as there may be a risk of explosion and fire.

Before carrying out welding, flame-cutting and grinding operations, clean the control and its surroundings to remove dust and inflammable substances and make sure that the premises are adequately ventilated (risk of explosion).

Adhere to the regulations in force for the place of operation.

Observe any existing national regulations if work is to be carried out in confined spaces.

4. Features of the system

4.1 Functions

The GD Connect 12 is an intelligent interconnected control for up to 12 compressors, which is responsible for keeping a pressurized air network within a relatively small pressure band in the interests of energy efficiency.

An optimal use and display of the compressor station and states is provided by the colour graphic display with touch function.

The main functions and features of the GD Connect 12 are as follows:

- **Choice of language settings**
- **Guided commissioning**
The user is guided through the necessary steps for commissioning a station, compressor or extension module.
- **Connection of compressors**
GD compressors are directly connectable via a data line (see chapter 4.2).

For all other compressors, an appropriate compressor module has to be used:

Compressor module (STD)

For connecting a compressor with fixed speed or half/full load control.

Compressor module (VSD)

For connecting a compressor with speed regulation.

- **Control of compressors**
Switching of the compressor based on the calculated air need to maximize the energy-efficient operation of the compressors.
- **User-defined profiles**
A profile is a set of parameters (i.e. pressure band and compressor priorities) corresponding to different operating requirements of the station. Up to 12 profiles are definable and can be activated by the timer control or a programmable digital input.
- **Current station status display**
Touch controls can display further information about the station (i.e. statistics, events, etc.)
- **Current compressor status display**
Touch controls can display further information about each compressor (i.e. operating hours, events, etc.)
- **Programmable inputs and outputs**
Programmable inputs and outputs can be used to control the stations and/or output status messages to the customer.

- **SD card drive**
to log data from the compressed air station.
- **Battery buffered real time clock**
- **Code-protected menus**
to adjust all necessary parameters.
- **RS485 interface**
The customer can use a separate RS485 interface to communicate with the GD Connect 12. The ModBus-RTU protocol is implemented as standard; an optional PROFIBUS module can be installed if required.
- **Extension modules**
Extension modules can increase the number of programmable inputs and outputs. Up to 4 extension modules can be added to the GD Connect 12.
- **Help functions**
to show wiring diagrams and necessary adjustments to the compressor controls for operation via the GD Connect 12.

Abbreviations

In this document and in the display of the GD Connect 12, the following abbreviations are used:

- AI-x = Analog input no. x
- DI-x = Digital input no. x
- DO-x = Digital output no. x

- AC = Alternating current
- DC = Direct current
- UC = Universal current (AC or DC)
- COM = Common connection e.g. at a change-over contact.

- STD = Standard
- VSD = Variable Speed Drive

Overviews

Section 4.2 "Overview" shows all system components with the appropriate order numbers.

Section 4.3 "Example of a compressed air station with GD Connect 12" shows an example of an installation.

4. Features of the system

4.2 Overview

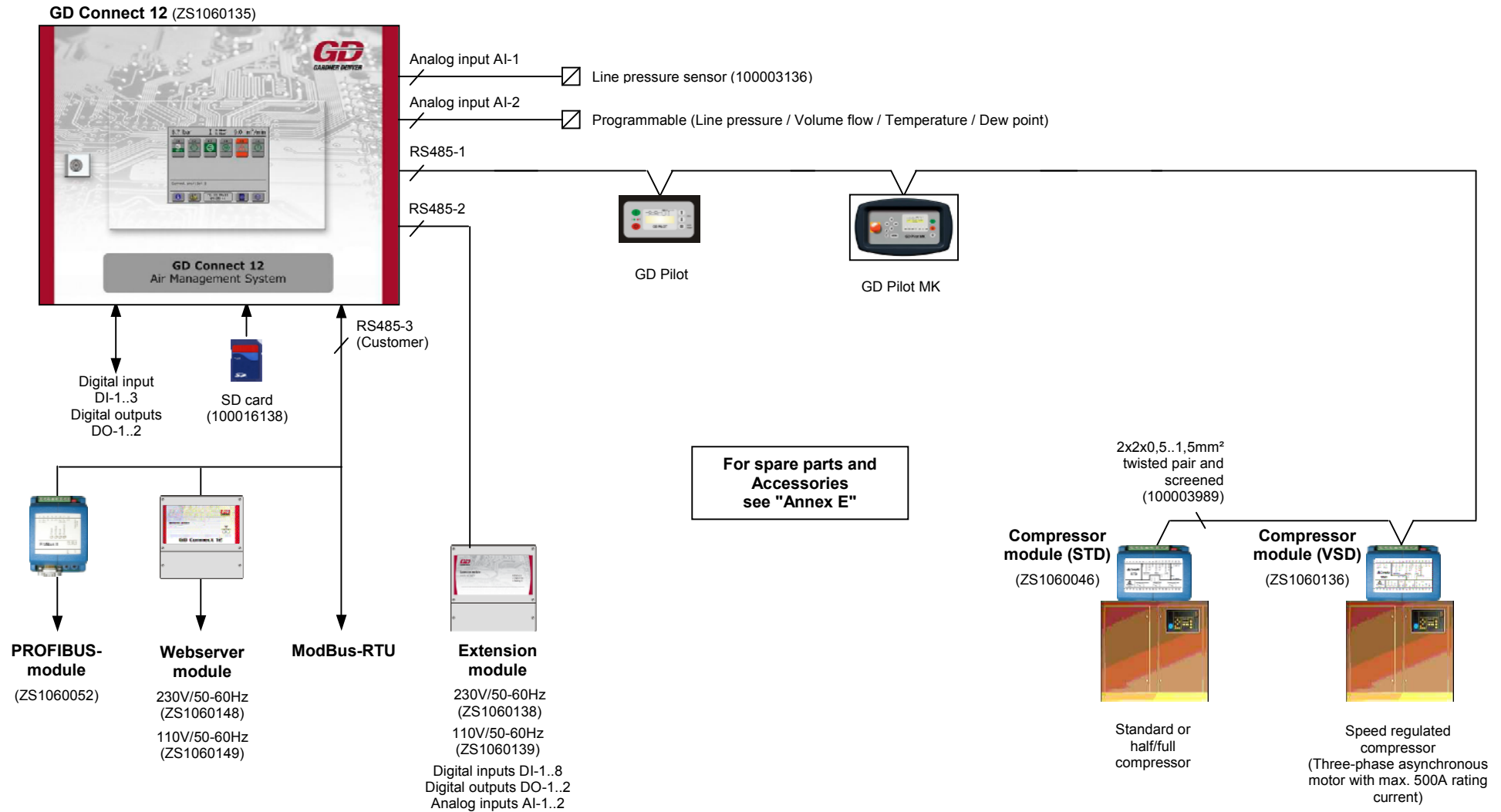


Fig. 1

4. Features of the system

4.3 Example of a compressed air station with GD Connect 12

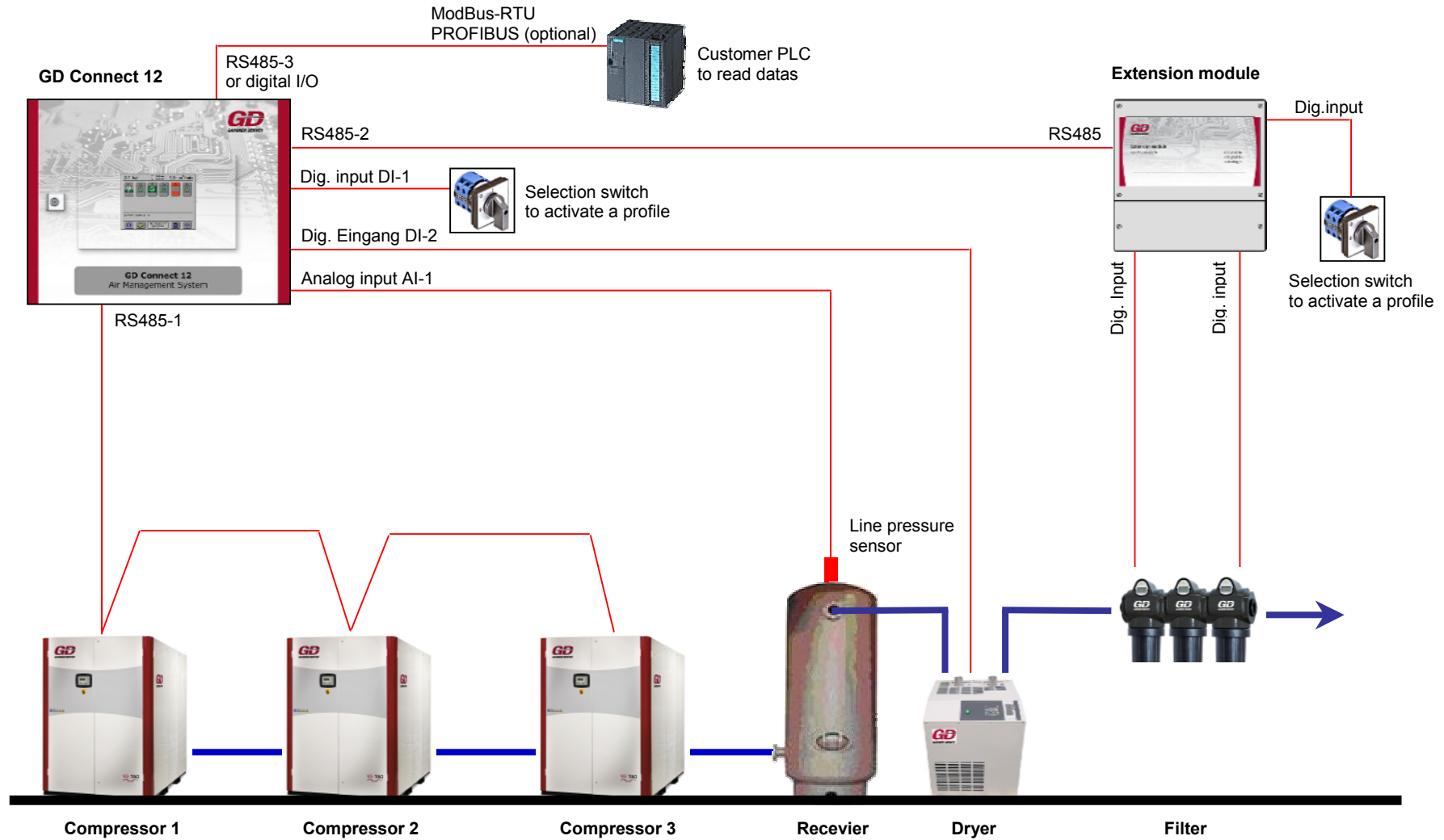


Fig. 2

4. Features of the system

Fig. 2 shows an example of a compressed air station with a GD Connect 12:

- The connection of the compressors with GD Pilot is directly via the RS485 interfaces.
- The size of the compressed air receiver equals the parameter "Receiver volume" that has to be set on the GD Connect 12.
- A programmable digital input at the GD Connect 12 can monitor a warning or error message from a dryer.
- A further programmable digital input at the GD Connect 12 can be used to set a selection switch, for example, for switching to a different profile (e.g. for pressure reduction).
- The RS485-3 interface allows the customer to read data from the GD Connect 12, e.g. the status of the compressors, and to activate a profile or reset a statistics counter, for example. The data is transmitted via the ModBus protocol. An optional PROFIBUS interface can be retrofitted if required.

Communication to the customer is also provided by digital inputs or outputs.

- If the distance to further filters, dryers or selection switches is too great or if the number of inputs and outputs on the GD Connect 12 is too small, an extension module can be added.

4. Features of the system

4.4 Technical data for the GD Connect 12

Electrical connection

System: 1~/N/PE
Voltage: 110/230V +/-10% 50/60Hz
Adjust control transformer accordingly
Power: 16VA
Cable: 1.0 .. 2.5 mm² / AWG 17..13
Fuse: max. 10A

Display

Type: Colour graphical display
Resistive touch panel
above the display
Screen size: 5.7" (diagonal)
Resolution: QVGA (320x240)

Analog inputs AI-1..2

Type: 4..20mA
Input voltage: 24VDC

AI-1: Passive / Active dep. on connection
AI-2: Passive / Active dep. on connection

Wiring length: max. 500m
>500m: use amplifier

Digital inputs DI-1..3

Wiring length: max. 20m
>20m: use coupling relay

Digital outputs DO-1..2

Type: Potential-free relay outputs
(change-over contacts)
Load: max. 240V / 1A

Connection of compressors

Interface: RS485-1
Cable type: 2x2x0.5..1.5mm²
twisted pair and screened
Wiring length: max. 1200m
Devices: max. 12 compressors

Connection of extension modules

Interface: RS485-2
Cable type: 2x2x0.5..1.5mm²
twisted pair and screened
Wiring length: max. 1200m
Devices: max. 4 extension modules

Customer interface

Interface: RS485-3
Cable type: 2x2x5..1.5mm²
twisted pair and screened
Wiring length: max. 1200m
Protocol: ModBus-RTU
PROFIBUS (optional)
Baudrate: 2400..38400 (adjustable)

Memory card

Type: SD card
Class: max. Class 2
Size: max. 2GB

Ambient temperature

Operation: 0..55°C
Storage: -25..75°C

EMC conformity

Immission: DIN EN 61000-6-3
Immunity: DIN EN 61000-6-2

Dimensions (W x H x D)

380 x 300 x 155 mm

Type of construction / Protection

Steel plate housing / IP54

Mounting

Wall mounting
Weight: 11 kg / 24 lbs

4. Features of the system

4.5 Scope of delivery

After receipt, check the scope of delivery:

- GD Connect 12 control cabinet
incl. cable glands
- 2 coded plugs (4-pin)
for the RS485-1 and RS485-3 interfaces
- Line pressure sensor
- Plug kit to connect the compressor controllers
- SD card
- Wiring diagram
- CD-ROM with manuals
- Quick Start Guide incl. drill template for mounting
The drill template can also be found in the annex.

4.6 System components

Analog inputs

There are two analog inputs (4..20mA) on the GD Connect 12:

Analog input AI-1

This is fixed assigned to the "Line pressure 1" function. The scaling is adjustable in the menu "Adjustments GD Connect 12" menu, "Inputs/Outputs" sub-menu. Either a passive or active 4..20mA sensor can be used.

Analog input AI-2

This input can be set to different functions and scalings in the menu "Adjustments GD Connect 12" , "Inputs/Outputs" sub-menu. Either a passive or active 4..20mA sensor can be used.

Information on how to connect the analog inputs can be found in the annex.

General information on connecting compressors

Compressors are connected to the GD Connect 12 via the RS485-1 interface only.

The RS485 interfaces of the GD Connect 12 and the compressor controls should form a bus structure, i.e. all compressors are connected in series, starting from the GD Connect 12.

Fig. 3 shows examples of correct and incorrect wiring of the compressor station.

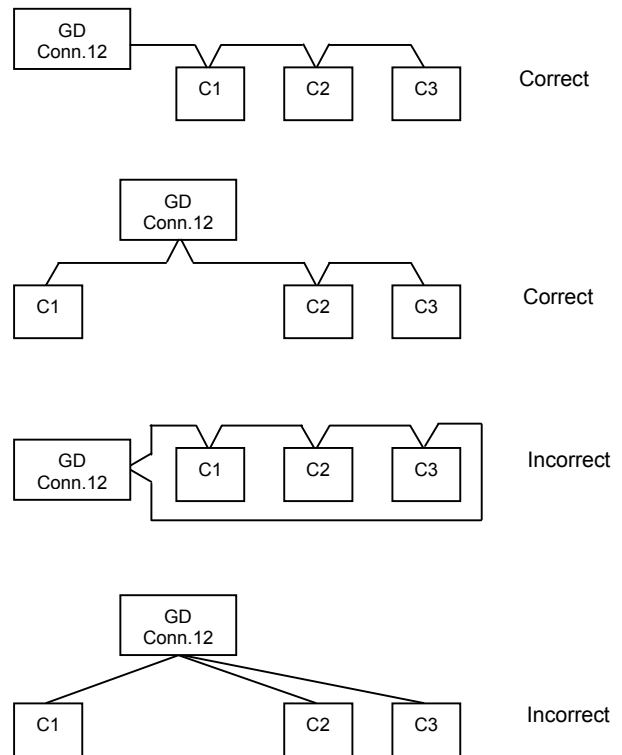


Fig. 3 – Wiring of the compressor station

Connecting Gardner Denver compressors

GD compressors can be connected directly to the GD Connect 12 via their RS485 interfaces.

Note

In order to operate correctly, the appropriate minimum software version must be installed on the controllers. The minimum software versions are listed in the overview in section 4.2.

Note that the RS485 interfaces of the compressor controls have been set to the correct values for

- Protocol
- Baudrate
- Address

Further information on the connections (wiring diagrams and compressor control settings) can be found in the annex.

4. Features of the system

Connecting other compressors

Compressors from other manufacturers can be connected to the GD Connect 12 via compressor modules:

- Compressor module (STD)
Compressors with fixed speed or half/full load control can be connected with this module.
- Compressor module (VSD)
Compressors with speed regulation can be connected with this module.

Further information on the modules can be found in chapter 6 "Compressor module (STD)" and chapter 7 "Compressor module (VSD)" respectively.

Programmable inputs and outputs

The GD Connect 12 has

- 3 digital inputs (DI-1..3)
- 2 digital outputs (DO-1..2)

These are routed to the terminal strip and can be assigned to various functions.

Further information on programming can be found in the description of the "Settings" menu in section 5.7.

ModBus-RTU / PROFIBUS interface

A separate RS485 interface is provided for customer use to read the current operating status of the GD Connect 12 (RS485-3).

The ModBus-RTU protocol is implemented as standard. Details of the protocol and the addresses can be found in a separate document ("GD Connect 12 Programmer guide ModBus-RTU").

To enable the GD Connect 12 to be connected to a PROFIBUS network, an optional PROFIBUS module can be installed in the GD Connect 12 control cabinet.

For the PROFIBUS module too, details of the protocol and the addresses can be found in a separate document ("GD Connect 12 Programmer guide PROFIBUS").

Extension modules

An extension module is used to expand the number of programmable inputs and outputs of the GD Connect 12.

The RS485-2 interface of the GD Connect 12 can connect a maximum of 4 extension modules.

The extension modules are available in two versions which differ only in terms of their power supply:

- Version 1: 230V AC / 50-60Hz
- Version 2: 110V AC / 50-60Hz

An extension module adds

- 8 digital inputs (DI-1..8)
- 2 digital outputs (DO-1..2)
- 2 analog inputs (AI-1..2)

to the GD Connect 12.

Further information can be found in chapter 8 "Extension modules".

5. Operation

5.1 First commissioning

Note

This section describes the behaviour of the control when it is booted up for the first time after delivery.

After the first commissioning, this behaviour can be initialized every time by entering a code (see section 5.9 "Codes").

Note

Do not touch the display when switching on the power supply, otherwise the GD Connect 12 will not start up correctly.

After booting up, the language selection screen appears (see Fig. 4).



Fig. 4 – Language selection

You can select the language by touching the appropriate flag symbol.

After that you can decide whether to use the wizard to help with commissioning. The wizard automatically prompts you to set the necessary parameters.

Before starting this wizard, the GD Connect 12 can show you the list of parameter settings required:

Once commissioning has been completed, the main screen comes up and the GD Connect 12 switches off, i.e. it shows the status of the compressors but does not control them.

This is also indicated by the message "GD CONNECT 12 IS SWITCHED OFF"

To switch on the GD Connect 12, open the menu "Adjustments GD Connect 12" menu. In the "Regulation" sub-menu you can switch on the control. (See also section 5.7 "Settings").

Note

In order to operate correctly, the appropriate minimum software version must be installed on the GD Pilot and GD Pilot MK. The minimum software versions are listed in the overview in section 4.2.

5. Operation

5.2 Main display

The main display contains essential information about the condition of the air station.

The individual elements of the main display are shown in Fig. 5.

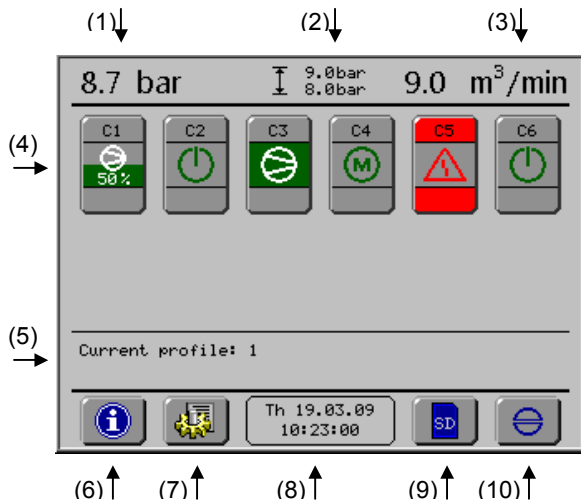


Fig. 5 – Main display

- (1) Current line pressure
- (2) Current pressure band
- (3) Current volume flow
- (4) Compressor switches showing the compressor status (see Fig. 6).
- (5) Status lines showing status, warnings and fault indications.
- (6) "Info" key to show information about the air station.
- (7) "Settings" key to change parameters.
- (8) Current date and time
- (9) "SD card" key
- (10) "Reset" key to reset warnings and fault messages.

The status of a compressor is indicated on the compressor key as shown in the following table:

	On load Indication for compressors with fixed speed.
	On load + delivery rate Indication for compressors with speed regulation or half/full load control.
	Off load The compressor motor is running, but the compressor does not produce compressed air.
	Blow down (Symbol flashing) The value of the final pressure as the value of the start protection.
	Standby The compressor is at standstill, is ready and can be started by the GD Connect 12 when pressure is required.
	Switched off The compressor is at standstill and no fault is signalled, but it cannot be started by the GD Connect 12.
	Fault The compressor is signalling a fault.
	Service The compressor is being serviced and is therefore not available. Warnings and fault messages will be ignored.
	Fault communication Serial communication to the compressor control or to the compressor module has failed.
	Software update necessary The software of the compressor controller needs an update.
	Warning / Service The compressor indicates a warning or requires servicing.

Fig. 6 – Compressor status

5. Operation

5.3 Compressor information

Further information about a compressor can be displayed by touching the appropriate compressor key.

Here the information can be read but cannot be changed.

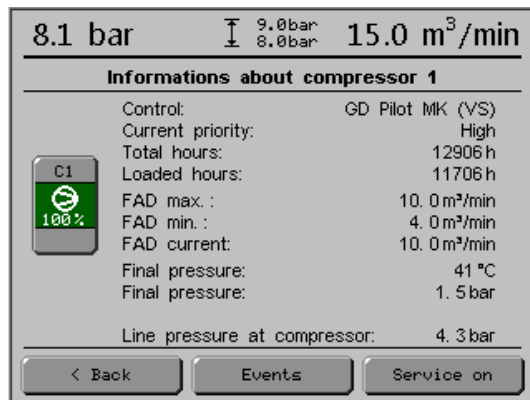


Fig. 7 – Compressor information

The compressor parameter settings and other keys are displayed first.

"Events" key

Pressing this key displays a list of the last 50 events for this compressor.

Events are

- Warnings
- Faults
- Maintenance work

For each compressor the list of events can be deleted in the menu "Adjustments GD Connect 12" after entering the appropriate code (see section 5.9 "Codes").

Touching this key again, which is now labelled "Parameters", returns you to the list of parameters.

"Service on" key

When the compressor is being serviced, the power supply to the compressor has to be switched off.

To suppress the resulting fault signal, the compressor can be set to "Service" status.

If this status is active

- The appropriate symbol is shown on the compressor key (see Fig. 6), the compressor is not loaded and is taken out of the sequence by the GD Connect 12.

- Warnings and fault messages that are received are not displayed and are not listed in the event list for the compressor.
- "Service on" is displayed in the list of events for this compressor.

Once servicing has been completed the compressor can be brought back into the sequence by touching this key again, which is now labelled "Service off", and entering the appropriate code (see section 5.9 "Codes").

5.4 SD card

The following compressor station data can be logged on the SD card during normal operation:

- Line pressure
Unit: 1/10 bar
- Volume flow
Unit: 1/10 m³/min
- Compressor status
1 = On load
2 = Off load
3 = Blow down
4 = Standby
5 = Off
6 = Fault
7 = Service
8 = Fault communication
- Compressor load
Unit: %

The GD Connect 12 writes this data to a CSV file and automatically creates a file for each day with a file name based on the corresponding date.

Example: SM100217.csv
⇒ Log file from 17 Feb. 2010

CSV format separates the data with a comma and is compatible with MS Excel.

5. Operation

5.5 Air station information

Further information about the air station can be displayed by touching the "Info" key (see Fig. 5).

Here the information can be read but cannot be changed.



Fig. 8 – Air station information

Overview timer control

The timer control programming is displayed here.

Each day of the week is represented by a horizontal bar which is the same colour as the current profile displays.

Current profile

All parameters of the current profile can be displayed here.

A profile is a set of parameters (i.e. pressure band and compressor priorities) corresponding to different operating requirements of the station.

Up to 12 profiles are definable and can be activated by the timer control or a programmable digital input.

Events

Pressing this key displays a list of the last 50 events for the air station.

This list includes all compressor events and any relating to the air station, e.g. a fault in the GD Connect 12 line pressure sensor.

The event list can be deleted in the "Adjustments GD Connect 12" menu.

Measured values

The line pressure and volume flow values can be shown here as diagrams.

Operating hours

The distribution of the compressor operating hours is shown here rather than in the compressor information.

There are two types of operating hours:

- **Absolute operating hours**
These are the total and loaded hours as listed in the compressor controls.
- **Relative operating hours**
These are the total and loaded hours since a user-defined time.

This can be the time since the distribution of newly added operating hours to individual compressors the GD Connect 12, for example.

The relative operating hours can be reset in the "Adjustments GD Connect 12" menu.

Statistics

Various statistical values since a user-defined time are displayed here, e.g. the minimum and maximum line pressures ever measured.

The statistical values can be reset in the "Adjustments GD Connect 12" menu.

Software

The GD Connect 12 software versions are displayed here.

Help

This gives the user access to various help topics, such as wiring diagrams for compressor controls or how to operate the GD Connect 12.

5. Operation

5.6 Controlling the air station

The GD Connect 12 offers various options for adapting the air station to different requirements.

Profiles

A profile is a set of parameters corresponding to different operating requirements of the station.

A profile contains the following parameters:

- Max. pressure warning
- Max. pressure
- Min. pressure
- Min. pressure warning
- Receiver volume
- Compressor priorities

Different set points can therefore be defined with different profiles.

Activating a profile

If several profiles have been defined by the customer, they can be activated in various ways:

a) Activation by timer control

The timer control allows profiles to be activated at a predefined time. Fig. 9 shows an example of a weekly program with different conditions of the customer's plant.

Profile 1 = Normal production
Profile 2 = Weekend
Profile 3 = Retrofitting

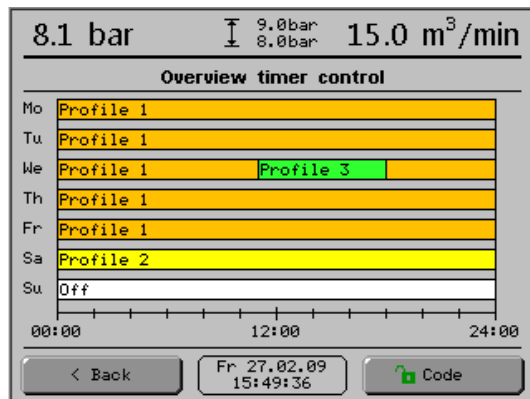


Fig. 9 – Weekly program of the timer control

The timer control is programmed using channels.

For the example in Fig. 9, the programming is as follows:

Channel 1:	Mon-Fri / 0..24h	Profile 1 active
Channel 2:	Wed / 10..14h	Profile 3 active
Channel 3:	Sat / 0..24h	Profile 2 active
	Sun / 0..24h	Station off

If no profile is active for a particular time range (on Sunday in this example), the station stays off, i.e. the compressors remain on standby, but are not loaded.

b) Activation by digital inputs or interface

A profile can also be activated by programmable inputs or the serial customer interface.

The digital inputs can be located on the GD Connect 12 itself or on extension modules.

This allows the customer to either install a selection switch in the plant or to activate a profile using a separate PLC (as also shown in Fig. 2).

If no channel of the timer control is active, the station can only be controlled by the digital input.

The customer can therefore "relocate" the programming of the timer control to a separate PLC.

c) Activation by timer control and digital inputs or interface

The combination of timer control and activation by digital inputs or customer interface allows the customer to activate profiles intermittently and outside the programmed times without having to reprogram the timer (e.g. unscheduled production or at the weekend or for unplanned conversions).

This "overrides" the activation of a profile with the help of a digital input or the serial interface of the currently loaded profile timer.

5. Operation

Line pressure regulation

To regulate the line pressure within the pressure band, the GD Connect 12 loads the compressor with the following criteria:

Criterion 1: Priority

Compressors with the highest priority will be loaded first, followed by compressors with lower priorities.

There are four priorities available:

- High
These compressors will be loaded first.
- Normal
These compressors will be loaded once all high-priority compressors have been loaded.
- Low
These compressors will be loaded once all high-priority and normal-priority compressors have been loaded.
- Off
These compressors will never be loaded.

Criterion 2: Demand

If several compressor with the same priority could be switched, the compressor will be switched which corresponds to the delivery of the identified additional need of compressed air.

Criterion 3: Total hours

If several compressors with the same FAD could be switch, the compressor with the lowest number of total hours will be loaded first.

In addition to the listed criteria, the following parameters are relevant for the switching of compressors:

Switch on and switch off delay

If a compressor is to be loaded or unloaded, a timer is started with the appropriate adjusted time.

If the timer runs out and conditions for switching the compressor are still valid, the compressors are switched.

Pressure above "Max. pressure warning"

If the pressure exceeds the adjusted value of "Warning line pressure max.", all compressors are unloaded at the same time and an appropriate message is displayed.

Pressure below "Min. pressure warning"

If the pressure falls below the adjusted value of "Warning line pressure min.", all available compressors are loaded and an appropriate message is displayed.

Failure of the GD Connect 12

If communication between the GD Connect 12 and the compressors fails due to a broken cable or power loss, the compressors are switched over automatically to their internal pressure regulation after 10s.

5.7 Settings

Touching the "Settings" key opens the main menu. From here the user can access the sub-menus and the language and code input settings.

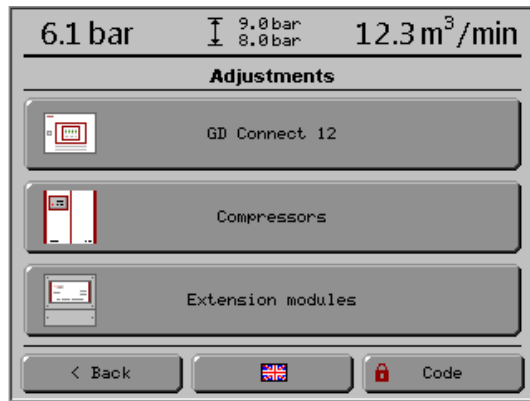


Fig. 10 – Adjustments

Adjustments GD Connect 12

Parameters relating to the GD Connect 12 and to the control of the air station can be set here.

The menu is divided into the following sub-menus:

Regulation

The parameters for controlling the air station can be set here:

- **GD Connect 12**
This menu item switches the GD Connect 12 on and off.

If the GD Connect 12 is switched off, the status of the compressors is shown, but the air station is not controlled, i.e. the compressors run on their internal pressure regulation.
- **Suppress warning Pmin**
After activation of a profile, the low pressure warning is suppressed for this time.
- **Cut-in delay**
Before a compressor is loaded, the GD Connect 12 waits for the time set with this parameter.

If this time elapses and the condition for loading the compressor is still valid, the compressor is loaded.
- **Cut-out delay**
Before a compressor is unloaded, the GD Connect 12 waits for the time set with this parameter.

If this time elapses and the condition for unloading the compressor is still valid, the compressor is unloaded.

- **Compens. total hours**
In this parameter the customer can set how the GD Connect 12 compensates the total hours of the compressors.

"Relative" setting

The operating hours are compensated with the relative operating hours.

"Absolute" setting

The operating hours are compensated with the absolute operating hours.

The meaning of absolute and relative operating hours is explained in section 5.5 "Air station information".

- **Regulate pressure to**
This parameter defines, on which line pressure sensor the GD Connect 12 is regulating.

If both analog inputs are defined as line pressure sensors, the second line pressure value will be also shown in the header. The value, on which the GD Connect 12 regulates, will be displayed in large print, the value on which the GD Connect 12 is not regulating will be shown at the right of it in small print.

"Line pressure 1" setting

The GD Connect 12 regulates the pressure to the line pressure sensor, which is connected to the analog input AI-1.

"Line pressure 2" setting

The GD Connect 12 regulates the pressure to the line pressure sensor, which is connected to the analog input AI-2.

"Highest pressure" setting

The GD Connect 12 regulates the pressure to the highest line pressure of "Line pressure 1" and "Line pressure 2".

"Lowest pressure" setting

The GD Connect 12 regulates the pressure to the lowest line pressure of "Line pressure 1" and "Line pressure 2".

5. Operation

- Determine volume flow
With this parameter the user can set how the volume flow displayed is determined.

"Line pressure" setting

The volume flow will be calculated with the gradient of the line pressure, on which the GD Connect 12 is regulating.

"Volume flow x" setting

The volume flow will be measured with a volume flow meter, which is connected either to the analog input AI-2 of the GD Connect 12 or to an analog input of an extension module.

Timer control

The various timer control channels can be set here. The current date and time can also be set in this menu.

Profiles

The various profile parameter settings can be programmed here

In a profile the following parameters can be set:

- Max./Min. pressure warning
These values are limits which trigger warning signals.
- Max./min. pressure
Pressure range within which the GD Connect 12 regulates the line pressure.
- Receiver volume
Volume of the receiver into which the compressors pump the compressed air. The volume of the pipes is not included.
- Compressor priorities
In a profile each compressor can be set to an individual priority.

Events / Statistics

Here the various statistics counters and event lists can be reset or deleted.

Inputs/Outputs

Here the inputs and outputs can be assigned to various functions.

Programmable functions of digital inputs DI-1..3:

- No use
- Activate profile 1 / 2 / .. / 12
- Warning Dryer 1..4
- Warning Filter 1..4
- Warning Bekomat 1..4
- Warning Dew point
- Warning External

In addition, two further parameters are programmable for the digital inputs to each function:

- A delay, which avoids, that the appropriate message is indicated to early.
- The condition of the digital input, which indicates the programmed message (input open or closed).

Programmable functions of digital outputs DO-1..2:

- No use
- Collective warning
- Collective fault
- Coll. warning/fault
- Warning Line press. max.
- Warning Line press. min.
- Warning Compressor
- Fault Compressor
- Warn/Fault Compr.
- Warning Dryer
- Warning Filter
- Warning Bekomat
- Warning External
- Coll. warn. Temperature
- Warn. Temperature 1..8 max.
- Warn. Temperature 1..8 min.
- Coll. warn. Dew point
- Warning Dew point 1..8
- Compr. on load
- Compr. motor running
- Profile 1 / 2 / .. / 12 active
- Station off

Programmable functions of analog inputs AI-1..2:

Analog input AI-1

- Line pressure 1

Analog input AI-2

- No use
- Line pressure 2
- Volume flow 1..8
- Temperature 1..8
- Dew point 1..8

5. Operation

RS485 interfaces

Communication with the RS485-3 interface reserved for the customer can be configured here.

The "Protocol/Module" menu item defines whether communication is via ModBus-RTU or PROFIBUS module.

If "ModBus-RTU" is set, the baudrate and address settings can be changed.

If "PROFIBUS module" is set, the baudrate and address settings cannot be changed because they are automatically set to the requirements of the PROFIBUS module.

Adjustments Compressors

The various compressor settings can be defined here and new compressors can be added or existing compressors deleted.

Adjustments extension modules

The extension module parameters can be set here.

Language

The flag on the key shows the current language setting. Touching this key opens the language selection screen.

Code

The code for locking and unlocking settings can be entered here (for more information see section 5.9 "Codes").

5. Operation

5.8 Messages

Status messages

GD CONNECT 12 IS SWITCHED OFF

The GD Connect 12 shows the status of the compressors but does not control them.

Air station off

The compressor station has been switched off by the timer control.

Current profile: 1

The current profile is profile 1.

Fault messages

Fault Sensor Line press. 1

Fault Sensor Vol. flow 1

The sensor of the appropriate programmed function has a fault, so that the compressors will not be regulated by the GD Connect 12.

Fault VSD-module

A compressor module (VSD) has a fault. The reasons could be:

- The type of analog input AI-1 of the compressor module (VSD) has not been defined correctly with the jumper at terminals 21 to 24.
- The line pressure sensor of the compressor at analog input AI-1 of the compressor module (VSD) has a fault.

Power loss

The power supply to the GD Connect 12 has failed.

Warning messages

Warning Line press. max.

The line pressure has exceeded the "Max. pressure warning" limit of the current profile.

Warning Line press. min

The line pressure is lower than the "Min. pressure warning" limit of the current profile.

Warning Dryer 1

Dryer 1 is indicating a warning signal.

Warning Filter 1

Filter 1 is indicating a warning signal.

Warning Bekomat 1

Bekomat 1 is indicating a warning signal.

Warning Temperature 1 max

The temperature 1 has exceeded the programmed maximum limit.

Warning Temperature 1 min

The temperature 1 has fall below the programmed minimum limit.

Warning Dew point

A digital input has indicated, that the dew point has been exceeded.

Warning Dew point 1

The measured dew point on an analog input has been exceeded.

Warning External

An external device is indicating a warning signal.

Warning Battery

The internal battery of the GD Connect 12 has run down and needs to be replaced.

Warning C1 Remote load

Compressor 1 was switched to load, but no corresponding feedback signal has been received.

Warning C1 Remote off-load

Compressor 1 was switched to off-load, but no corresponding feedback signal has been received.

Warning Sensor Line press. 1

Warning Sensor Vol. flow 1

Warning Sensor Temperat. 1

Warning Sensor Dew point 1

The sensor of the appropriate programmed function has a fault. The compressors are still regulated by the GD Connect 12.

Signal at DI-1

A signal is being indicated at input 1 of the GD Connect 12, but the input is set to the function "No use".

Signal at DI-1 Ext.mod.1

A signal is being indicated at input 1 of Extension module 1, but the input is set to the function "No use".

5. Operation

5.9 Codes

To prevent unauthorized program changes, the settings are code-protected.

By touching the "Code" key in the main menu, a code can be entered to change the parameter settings.

The symbol on the key indicates whether the access code is locked or unlocked:



Code is locked, parameters cannot be changed.

In the GD Connect 12 there are different codes:

Code "7070"



This code allows

- Settings in the menu to be locked (see section 5.7 "Settings")
- The "Service" status of a compressor to be switched on or off (see section 5.3 "Compressor information")

After the code is unlocked, the code will be locked again

- automatically after 15min
- or by a power loss

Code "7555"



This code allows the "Service" status of a compressor to be switched on or off (see section 5.3 "Compressor information").

After the code is unlocked, the code will be locked again

- automatically after 15min
- or by a power loss

Code "7777"

With this code, the GD Connect 12 can be reset to the factory settings and the commissioning assistant can be started. (see chapter "5.1 First commissioning").

6. Compressor module (STD)

6.1 Functions

The compressor module (STD) is used to connect any compressor with fixed speed or half/full load regulation to the GD Connect 12.

The status of the compressor is detected by the digital inputs of the compressor module and sent to the GD Connect 12 via its RS485 interface.

In addition, the commands to control the compressor are transmitted via the RS485 interface from the GD Connect 12 to the compressor module and are executed by the digital outputs.

6.2 Technical data

Electrical connection

Voltage: 110..230V AC/DC +/-10%
Power: 1VA

Digital inputs

Voltage: 24..230V AC/DC +/-10%
Note which terminals are used

"Operation" Compressor available or collective fault signal
Terminals 6 / 7 / 8

"Motor" Compressor motor is running
Terminals 9 / 10 / 11

"Load" Compressor is on load
Terminals 12 / 13 / 14

Digital outputs

"Remote load enable" Remote load enable
Terminals 21 / 22 / 23

"Remote load" Remote load
Terminals 26 / 27 / 28

"Remote half load" Remote half load
Terminals 31 / 32 / 33

Type: Potential-free relay outputs (change-over contacts)

Load: max. 240VAC / 1A

Connection to the GD Connect 12

Interface: RS485
Cable type: 2x2x0.5..1.5mm² twisted pair and screened
Wiring length: max. 1200m
Address: Adjustable from 1..12 by DIP switches
Bus termination: 120 Ohm (by DIP switches)

Ambient temperatures

Operation: 0 .. 55°C
Storage: -25 .. 75°C

EMC conformity

Immission: DIN EN 61000-6-3
Immunity: DIN EN 61000-6-2

Dimensions (W x H x D)

100 x 110 x 70 mm

Type of construction / Protection

Plastic housing / IP30

Mounting

DIN rail TS35

6.3 Scope of delivery

After receipt, check the scope of delivery:

- Compressor module (STD)

6. Compressor module (STD)

6.4 Connection to the GD Connect 12

The module is connected to the GD Connect 12 via the built-in RS485 interface.

The wiring diagram showing how to connect the RS485 interface to the GD Connect 12 can be found in the annex.

The DIP switch settings for addressing the module and for switching bus termination on and off are also listed there.

6.5 Connection to the compressor

Note

The connection of the compressor module (STD) as shown in this document is intended as a guide for the majority of compressor control systems in use. Some compressors differ in terms of operation and/or function; consult your compressor supplier/specialist for advice.

Wiring diagrams with examples showing how to connect a compressor control to the module can be found in the annex.

Danger

Switch off the power supply to the compressor, before connecting the compressor module (STD) to the compressor control.

Digital inputs

The module detects the compressor status via three digital inputs, which are indicated via three LEDs on the module.

A voltage in the range from 24 to 230V AC or DC can be connected at each input.

Each input is routed to three terminals:

- "24..48VUC" terminal
- "110..230VUC" terminal
- "COM" terminal

Note that the voltage used signal must be routed to the appropriate terminal.

Important

Do not connect voltages of more than 250V to the inputs.

If the voltages used exceed 250V, an auxiliary contact must to be used to switch a suitable voltage to the inputs.

The inputs may only be connected to power circuits with appropriate fuse protection.

6. Compressor module (STD)

"Operation" digital input

A signal must be connected to this input to indicate that the compressor is ready to produce compressed air after sending a remote load signal.

On compressor controls which do not provide such a signal the input can be connected to the collective fault signal of the compressor. This will indicate to the GD Connect 12 that there is no fault at the compressor.

A parameter on the GD Connect 12 can be used to define whether or not a voltage at the input signals availability.

"Motor" digital input

Contacts A1 and A2 of the main contactor coil can be connected directly to this input.

If the compressor control energizes the coil of the main contactor, the compressor module detects the voltage over the coil and indicates to the GD Connect 12 that the motor is running.

On compressor controls without a main contactor, any output can be used which indicates that the motor is running, e.g. a fan contactor or a soft starter signal.

A parameter on the GD Connect 12 can be used to define whether or not a voltage at the input signals that the motor is running.

"Load" digital input

The contact regulation valve coil can be connected directly to this input.

If the compressor control energizes the coil of the regulation valve, the compressor module detects the voltage over the coil and indicates to the GD Connect 12 that the compressor is on load.

On compressors with half/full load regulation, this input should indicate whether the compressor is in half or full load.

Any output which indicates that the compressor is on load could also be used.

A parameter on the GD Connect 12 can be used to define whether or not a voltage at the input signals the compressor load.

Digital outputs

Danger

When a compressor module (STD) is installed, the compressor's pressure switch can no longer provide over-pressure protection.

For compressors that are not equipped with independent over-pressure detection, it is recommended that a pressure switch be incorporated in the compressor fault circuit(s) such that any local over-pressure condition will stop the compressor independently from the GD Connect 12.

The compressor is controlled by two or three digital outputs. The status of these outputs is indicated via three LEDs.

These digital outputs are change-over contacts and can be adapted to the requirements of the compressor control by selecting the appropriate terminals.

Wiring diagrams with examples showing how to connect a compressor control with line pressure sensor or line pressure switch can be found in the annex.

"Remote load enable" digital output

Do not use this input to switch the compressor on and off.

This output should cause a change-over from internal regulation to the control via the digital outputs of the compressor module.

"Remote load" digital output

Do not use this input to switch the compressor on and off.

This output switches the compressor to load.

This remote load signal should then be effective when the "remote load enable" output is sent to the compressor control.

"Remote half load" digital output

Do not use this input to switch the compressor on and off.

On compressors with half/full load control, this output should switch the compressor to half load.

This remote load signal should then be effective when the "remote load enable" output is sent to the compressor control.

6. Compressor module (STD)

6.6 Parameters

To control a compressor with fixed speed using a compressor module (STD), the following parameter settings must be made.

These parameters can be set from the menu on the corresponding compressor.

Address

The address set here must be the same as that set at the compressor module (STD).

Control

This must be set to "Compress. module (STD)".

FAD

Free air delivery of the compressor.

Hours

Since the operating hours can not be read from the compressor control, they must be entered manually (total hours and loaded hours).

Type

This menu item indicates whether the compressor is a standard or a half-/full load compressor.

Connection

Invert signals

This parameter specifies whether voltage at the corresponding inputs indicates a signal or not.

Full load command

This parameter specifies how the compressor module (STD) sends a load command (for standard compressors) or full load command (for half-/full load compressors) to the compressor:

- "Half and full load" setting
To send a full load command, both outputs ("Remote load" output and "Remote half load" output) of the compressor module (STD) are activated.
- "Full load only" setting
To send a full load command, only the "Remote load" output of the compressor module (STD) is activated.

7. Compressor module (VSD)

7.1 Functions

The compressor module (VSD) is used to connect any speed regulated compressor to the GD Connect 12.

The status of the compressor is detected by analog and digital inputs on the compressor module and sent to the GD Connect 12 via its RS485 interface.

Speed regulation is obtained by manipulating the line pressure signal by means of the analog output. This is connected to the analog input of the compressor control which is normally connected to the line pressure sensor.

The appropriate command is transmitted via the RS485 interface to the compressor module and is executed by means of the digital and analog outputs.

7.2 Technical data

Required compressor drive

Motor type: Three-phase asynchronous motor
Rating current: max. 500A

Electrical connection

Voltage: 110..230V AC/DC +/-10%
Power: 1VA

Digital inputs

Voltage: 24..230V AC/DC +/-10%
Note which terminals are used

"Operation" Compressor available or collective fault signal
Terminals 6 / 7 / 8

"Warning" Compressor sends a warning signal
Terminals 9 / 10 / 11

"Load" Compressor is on load
Terminals 12 / 13 / 14

Digital outputs

"DO-1" Optional use
Terminals 1 / 2

"DO-2" Optional use
Terminals 3 / 4

Type: Potential-free relay outputs
(change-over contacts)

Load: max. 240V / 1A

Analog input AI-1

Type: 4..20mA / 0..10V / 0..5V
(depending on jumper)
Function: Detection of line pressure at the compressor

Analog output AO-1

Type: 4..20mA / 0..10V / 0..5V
(depending on jumper)
Burden: Active sensor: 94 Ohm
Passive sensor: 650 Ohm max.
Function: Manipulated line pressure at the compressor

Connection to the GD Connect 12

Interface: RS485
Cable type: 2x2x0.5..1.5mm²
twisted pair and screened
Wiring length: max. 1200m
Address: Adjustable from 1..12 by DIP switches
Bus termination: 120 Ohm
Switchable by DIP switches

Ambient temperatures

Operation: 0°C .. 55°C
Storage: -25 .. 75°C

EMC conformity

Immission: DIN EN 61000-6-3
Immunity: DIN EN 61000-6-2

Dimensions (W x H x D)

100 x 110 x 70 mm

Type of construction / Protection

Plastic housing / IP30

Mounting

DIN rail TS35

7. Compressor module (VSD)

7.3 Scope of delivery

After receipt check the scope of delivery:

- Compressor module (VSD)
- Current transducer LEM HTA500S (Measuring range 500A)
- Cable (1.5m) to connect the current transducer to the compressor module (VSD)

7.4 Connection to the GD Connect 12

The module is connected to the GD Connect 12 via the built-in RS485 interface.

The wiring diagram showing how to connect the RS485 interface to the GD Connect 12 can be found in the annex.

The DIP switch settings for addressing the module and for switching bus termination on and off are also listed there.

7.5 Connection to the compressor

Note

The connection of the compressor module (VSD) as shown in this document is intended as a guide for the majority of compressor control systems in use. Some compressors differ in terms of operation and/or function; consult your compressor supplier/specialist for advice.

Note

The compressor module (VSD) can only be connected to compressors with a three-phase asynchronous motor with a max. rating current of 500A.

Wiring diagrams with examples showing how to connect a compressor control to the module can be found in the annex.

Danger

Switch off the power supply to the compressor before connecting the compressor module (VSD) to the compressor control.

Digital inputs

The module detects the compressor status via three digital inputs, which are indicated via three LEDs on the module.

A voltage in the range from 24 to 230V AC or DC can be connected at each input.

Each input is routed to three terminals:

- "24..48VUC" terminal
- "110..230VUC" terminal
- "COM" terminal

Note that the voltage used signal must be routed to the appropriate terminal.

Important

Do not connect voltages of more than 250V to the inputs.

If the voltages used exceed 250V, an auxiliary contact must be used to switch a suitable voltage to the inputs.

The inputs may only be connected to power circuits with appropriate fuse protection.

7. Compressor module (VSD)

"Operation" digital input

A signal must be connected to this input to indicate that the compressor is ready to produce compressed air after sending a remote load signal.

On compressor controls which do not provide such a signal the input can be connected to the collective fault signal of the compressor. This will indicate to the GD Connect 12 that there is no fault at the compressor.

A parameter on the GD Connect 12 can be used to define whether or not a voltage at the input signals availability.

"Warning" digital input

A warning message can optionally be connected at this input.

If no warning message is required or available, this input can be left open.

A warning message has no influence on the regulation of the compressor. A warning message that is received is simply displayed on screen and is stored in the event list for the compressor.

"Load" digital input

The contact regulation valve coil can be connected directly to this input.

If the compressor control energizes the coil of the regulation valve, the compressor module detects the voltage over the coil and indicates to the GD Connect 12 that the compressor is on load.

Any output which indicates that the compressor is on load could also be used.

A parameter on the GD Connect 12 can be used to define whether or not a voltage at the input signals the compressor load.

Digital outputs

The use of digital outputs is optional.

The status of these outputs is indicated via three LEDs.

These digital outputs are change-over contacts and can be adapted to the requirements of the compressor control by selecting the appropriate terminals.

Wiring diagrams with examples showing how to connect a compressor control with line pressure sensor or line pressure switch can be found in the annex.

Digital output DO-1

Do not use this input to switch the compressor on and off.

This output can be used for a "remote load enable" signal if required.

Digital output DO-2

Do not use this input to switch the compressor on and off.

This output can be used for a "remote load" signal if required.

Analog inputs

Analog input AI-1

This analog input detects the line pressure at the compressor.

This is done by removing the compressor's line pressure sensor from the compressor control and connecting it to analog input AI-1 on the compressor module.

This is necessary for the following reasons:

- The line pressure at the compressor can be monitored and if it is getting too high, the compressor can be set to off-load.
- If the GD Connect 12 or the compressor module fails, an internal relay will short circuit the analog input and the analog output. This will cause an automatic connection of the line pressure sensor to the compressor control to allow the compressor to continue to operate.

The relay short circuits terminals 25 and 28.

7. Compressor module (VSD)

Analog input AI-2

This analog input detects the speed of the compressor.

To measure the speed of the compressor, one phase of the motor leads has to be wired through the current transducer supplied. This must be connected to the compressor module using the cable supplied.

This enables the module to measure the current of the compressor motor and to calculate the speed using the parameter settings in the GD Connect 12.

Analog output AO-1

Danger

For compressors that are **not** equipped with independent over-pressure detection it is recommended that a pressure switch be incorporated in the compressor fault circuit(s) such that any local over-pressure condition will stop the compressor independently from the GD Connect 12.

The analog output is used for regulating the speed of the compressor motor.

This is done by connecting the analog output to the analog input at the compressor control which is normally used to connect the line pressure sensor.

If the compressor module changes the signal of the analog output to reduce the line pressure, the speed of the compressor will be increased and vice versa.

Fig. 11 shows the relation between the analog inputs and outputs on the compressor module and the compressor control.

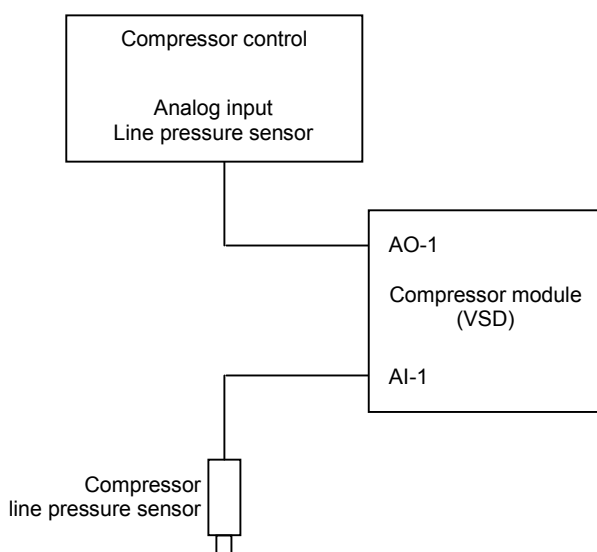


Fig. 11 – Relation between analog inputs and outputs

Note

On connection of analog input AI-1 and analog output AO-1, the line pressure measured at the line pressure

sensor will be displayed correctly at the compressor control even if power is lost at the compressor module (VSD).

Note

An amplifier can be connected between analog output AO-1 and the analog input of the compressor control if necessary.

7. Compressor module (VSD)

7.6 Parameters

To control a speed regulated compressor using a compressor module (VSD), the following parameter settings must be made.

These parameters can be set from the menu on the corresponding compressor.

Address

The address set here must be the same as that set at the compressor module (VSD).

Control

This must be set to "Compress. module (VSD)".

FAD max. and min.

Maximum and minimum free air delivery of the compressor.

Hours

Since the operating hours can not be read from the compressor control, they must be entered manually (total hours and loaded hours).

Connection

Invert signals

This parameter specifies whether voltage at the corresponding inputs indicates a signal or not.

Type line pressure sensor

This shows whether the type of line pressure sensor is 4..20mA or 0..5V or 0..10V.

Feedback control circuit

Danger

Do not set too high a value for the "Safety pressure" parameter. This value must be the maximum pressure of the corresponding compressor.

Safety pressure

If the line pressure that is measured from the line pressure sensor of the compressor exceeds this value, the load of the compressor will be interrupted and it will be switched over to internal regulation of the compressor, so that the speed will be automatically reduced.

Off-load pressure

The line pressure value at which the compressor is switched to off load.

This value is necessary in order to have a defined set point for switching the compressor to off-load.

Target pressure

The line pressure value which is the target pressure of the compressor control.

The GD Connect 12 regulates the compressor speed to the off-load pressure and target pressure.

Load pressure

The line pressure value at which the compressor is switched from standby to load to produce compressed air.

This value is necessary in order to have a defined set point for switching the compressor to load when it is on standby.

Max. and off load speed

Indicates the maximum and minimum speed, i.e. the regulation range of the compressor.

Number of pole pairs

Indicates the number of pole pairs of the compressor motor to detect correctly the speed.

8. Extension module

8.1 Function

An extension module is used to expand the number of programmable inputs and outputs of the GD Connect 12.

The RS485-2 interface of the GD Connect 12 can connect a maximum of 4 extension modules.

The extension modules are available in two versions which differ only in terms of their power supply:

- Version 1: 230V AC / 50-60Hz
- Version 2: 110V AC / 50-60Hz

An extension module adds

- 8 digital inputs (DI-1..8)
- 2 digital outputs (DO-1..2)
- 2 analog inputs (AI-1..2)

to the GD Connect 12.

8.2 Technical data

Electrical connection

Voltage: 230V AC +/-10%
110V AC +/-10%

Internal fuses

F1 (Primary): T0.16A (5x20mm)
F2 (Secondary): T0.5A (5x20mm)

Digital inputs

Number: 8
Input voltage: 24V DC

Digital outputs

Number: 2
Type: Potential-free relay outputs
(change-over contacts)
Load: max. 240V / 1A

Analog inputs

Number: 2
Type: 4..20mA
Input voltage: 18V DC
Type: Passive / Active
(depending on jumper)
Burden: < 100 Ohm
Wiring length: max. 500m
>500m: use amplifier

Connection to the GD Connect 12

Interface: RS485
Cable type: 2x2x0.5..1.5mm²
twisted pair and screened
Wiring length: max. 1200m
Address: Adjustable from 1..4 by DIP switches
Bus termination: 120 Ohm
Switchable by DIP switches

Ambient temperatures

Operation: 0°C .. 55°C
Storage: -20 .. 70°C

EMC conformity

Immission: DIN EN 61000-6-3
Immunity: DIN EN 61000-6-2

Dimensions (W x H x D)

180 x 180 x 74 mm

Type of construction / Protection

Plastic housing / IP64

Mounting

Wall mounting

Weight: 1.5 kg / 3.3 lbs

8.3 Scope of delivery

After receipt check the scope of delivery:

- Module in plastic housing
- Cable (1m) to connect the extension module to the GD Connect 12

8. Extension module

8.4 Connection to the GD Connect 12

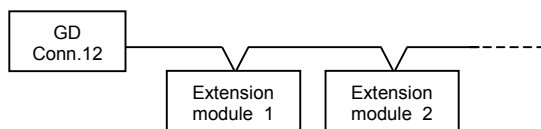
The module is connected to the GD Connect 12 via the built-in RS485 interface.

The extension module will be delivered with a 3 wire connection cable (1m).

This will be connected to the RS485-2 of the GD Connect 12.

For longer distances, the cable should be removed and an appropriate cable is to create.

If several extension modules are used, they are connected in the same way as the compressor controls in a bus structure.



The wiring diagram showing how to connect the RS485 interface to the GD Connect 12 can be found in the annex.

The DIP switch settings for addressing the module and for switching bus termination on and off are also listed there.

8.5 Connection of external signals

The sensors and switches for digital and analog inputs are connected directly to the extension module.

The appropriate terminals can be found in the annex.

After connecting an extension module, the inputs and outputs can be programmed in the "Adjustments Extension module" menu.

Digital inputs

Programmable functions of digital inputs DI-1..8:

- No use
- Activate profile 1 / 2 / .. / 12
- Warning Dryer 1..4
- Warning Filter 1..4
- Warning Bekomat 1..4
- Warning Dew point
- Warning External

In addition, two further parameters are programmable for the digital inputs to each function:

- A delay, which avoids, that the appropriate message is indicated to early.
- The condition of the digital input, which indicates the programmed message (input open or closed).

Digital outputs

Programmable functions of digital outputs DO-1..2:

- No use
- Collective warning
- Collective fault
- Coll. warning/fault
- Warning Line press. max.
- Warning Line press. min.
- Warning Compressor
- Fault Compressor
- Warn/Fault Compr.
- Warning Dryer
- Warning Filter
- Warning Bekomat
- Warning External
- Coll. warn. Temperature
- Warn. Temperature 1..8 max.
- Warn. Temperature 1..8 min.
- Coll. warn. Dew point
- Warning Dew point 1..8
- Compr. on load
- Compr. motor running
- Profile 1 / 2 / .. / 12 active
- Station off

8. Extension module

Analog inputs

Programmable functions of the analog inputs:

- No use
- Line pressure 1..8
- Volume flow 1..8
- Temperature 1..8
- Dew point 1..8

Note that a line pressure sensor that is connected to an extension module cannot be used to regulate the line pressure. Pressure regulation and subsequent switching of the compressors can only be done from sensors which are connected at analog inputs AI-1 or AI-2 of the GD Connect 12.

For the connection of a volume flow meter applies:
Detection of the volume flow and subsequent switching of the compressors can also be done from a sensor which is connected to an analog input of an extension module.

The values measured at the analog inputs of an extension module can therefore only be used for monitoring.

Either active or passive sensors can be connected to the analog inputs. Jumpers J1 and J2 must be set accordingly. An overview of the jumpers can be found in the annex.

9. Webserver module

9.1 Function

The Webserver module provides an interface for the customer, which allows the visualization of the GD Connect 12 via network.

For this visualization, no special software has to be installed, but is done with the help of a webbrowser as e.g. Microsoft Internet Explorer or Mozilla Firefox.

The Webserver module is available in two versions which differs only in terms of their power supply:

- Version 1: 230V AC / 50-60Hz
- Version 2: 110V AC / 50-60Hz

9.2 Technical data

Electrical connection

Voltage: 230V AC +/-10%
110V AC +/-10%

Internal fuses

F1 (Primary): T0.5A (5x20mm)
F2 (Secondary): T0.5A (5x20mm)

Connection to the GD Connect 12

Interface: RS485
Cable type: 2x2x0,5..1,5mm²
twisted pair and screened
Wiring length: max. 1200m
Bus termination: 120 Ohm
Switchable by jumper J1 and J2

Connection to the network

Interface: Ethernet
10Base-TX / 100Base-TX
Connection: RJ45

Ambient temperatures

Operation: 0° .. 55°C
Storage: -40 .. 70°C

EMC conformity

Immission: DIN EN 61000-6-3
Immunity: DIN EN 61000-6-2

Dimensions (W x H x D)

180 x 180 x 74 mm

Type of construction / Protection

Plastic housing / IP64

Mounting

Wall mounting
Weight: 1,5 kg / 3.3 lbs

9.3 Scope of delivery

After receipt, check the scope of delivery:

- Module in plastic housing
- SD card (1GB) within the SD card reader of the Webserver module
- Cable (1m) to connect the Webserver module to the GD Connect 12
- Ethernet cable (3m)
(Cat.5E, Type 100Base-TX)

9. Webserver module

9.4 Connection to the GD Connect 12

The module is connected to the GD Connect 12 via the built-in RS485 interface.

The Webserver module will be delivered with a 3 wire connection cable (1m).

This will be connected to the RS485-3 of the GD Connect 12.

For longer distances, the cable should be removed and an appropriate cable is to create.

The wiring diagram that shows how to connect the RS485 interface to the GD Connect 12 can be found in the annex.

After the connection of the Webserver module, the RS485-3 interface of the GD Connect 12 has to be adjusted to enable the communication to the GD Connect 12.

There, in the menu "Adjustments GD Connect 12" – "RS485 interface" the menu item "Protocol/module" has to be adjust to "Webserver module".

9.5 Connection to the net work

The Webserver module will be delivered with an installed Ethernet connection cable (Cat.5E, Type 100Base-TX, 3m).

When installing this cable, it is necessary to ensure that it is not bent or stretched and the shield and the locking lugs of the plug are not damaged.

For longer distances, the cable should be removed and an appropriate cable is to create.

To ensure the continued water protection, the cable must be leaded through a suitable M20 gland before the assembly.

9.6 Access via browser

Within the Webserver module a HTTP-Server is integrated which can be accessed via web browser.

Suitable are (inter alia) the current versions of

- Microsoft Internet Explorer
- Mozilla Firefox

Also the Adobe Flash Player has to be installed (version 9.0 or higher). It is to find for the appropriate web browser and for the appropriate operating system

- either onto the CD, which will be delivered with the GD Connect 12
- or in the internet.

9.7 Configuration

For the first configuration of the Webserver module a fixed IP address can be forced.

Therefore the DIP switches 1 and 2 must be set to „On“ and then the module must be reboot. After this, the module is accessible at the IP address „192.168.2.1“ and can be reconfigured.

The following parameters can be adjusted:

- Hostname
- Switch on and off the usage of DHCP
- IP address
- Netmask
- Gateway
- DNS server

After the configuration, the DIP switches can be reset and the module must be reboot.

Annex A: Wiring diagrams

GD Connect 12 terminals

Terminal strip X0	Function	
1	Infeed	L
2		N
PE		PE

Terminal strip X5	Function	
1	Control voltage	24V AC
2		24V AC
3		0V AC
4		0V AC
5	Analog input AI-1	(-)
6		(+)
7	Analog input AI-2	(-)
8		(+)
9		GND
10	Digital inputs DI-1..3	+24V DC
11		+24V DC
12		+24V DC
13		DI-1
14		DI-2
15		DI-3
16	Digital output DO-1	COM
17		NO
18		NC
19	Digital output DO-2	COM
20		NO
21		NC

Terminal strip X1	Function	
1	RS485-1 Compressors	GND
2		B(-)
3		A(+)
4		PE

Terminal strip X2	Function	
1	RS485-2 Extension modules	GND
2		B(-)
3		A(+)
4		PE

Terminal strip X3	Function	
1	RS485-3 Customer	GND
2		B(-)
3		A(+)
4		PE

Terminal strip X4	Function	
1	PROFIBUS module	GND
2		B(-)
3		A(+)
4		24V AC
5		0V AC
6		PE
7		PE

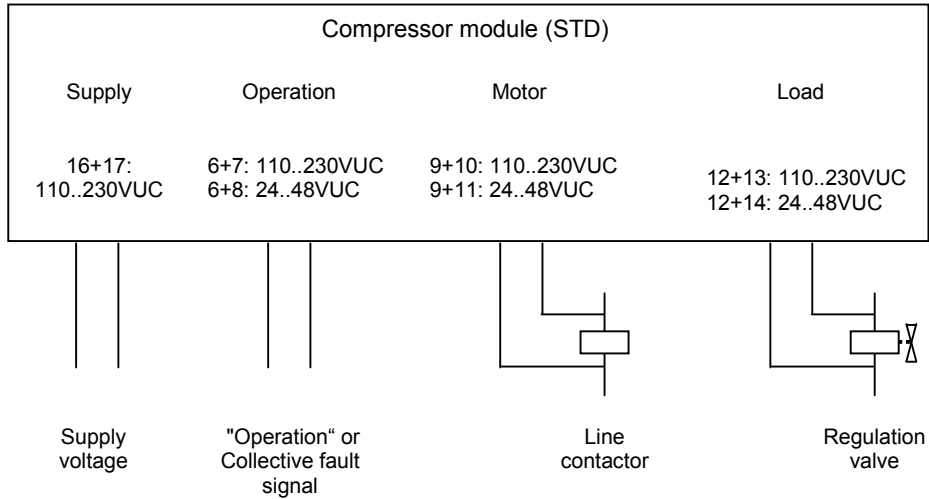
Connections on control transformer	
240V	Terminal 5 + 1
230V	Terminal 5 + 2
220V	Terminal 5 + 3
120V	Terminal 4 + 1
110V	Terminal 4 + 2
100V	Terminal 4 + 3

Compressor module (STD) to a compressor

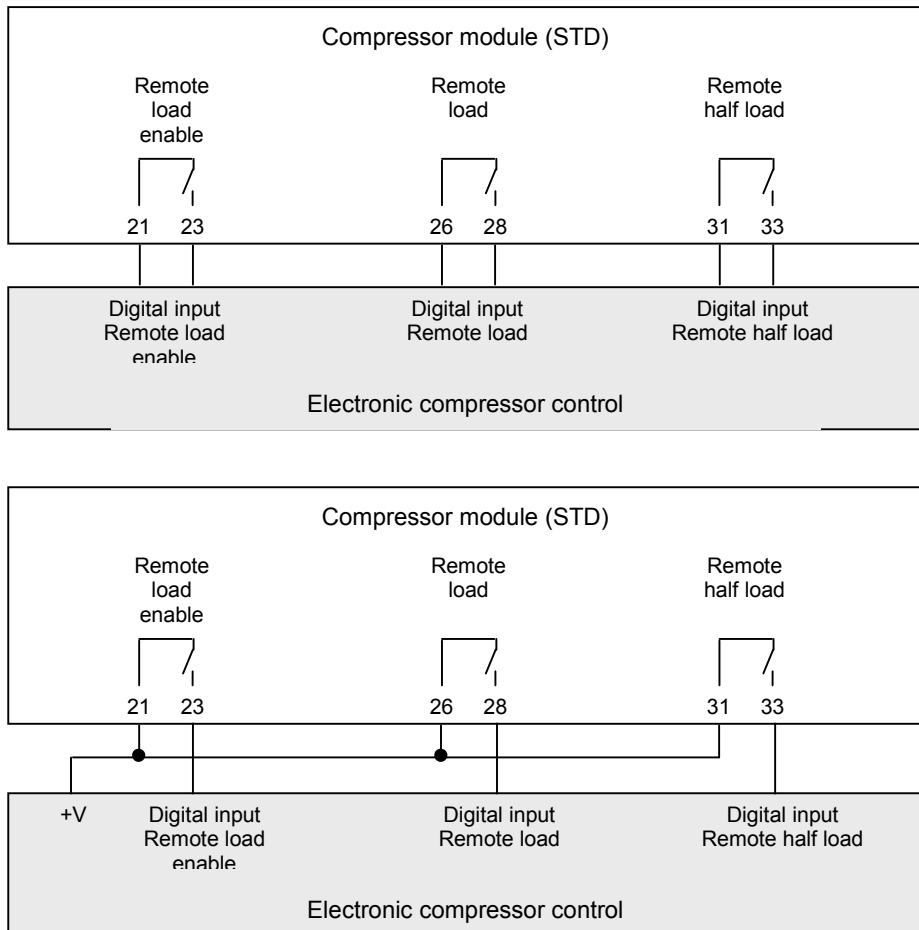
Note

The connection of the compressor module (STD) as shown in this document is intended as a guide for the majority of compressor control systems in use. Some compressors differ in terms of operation and/or function; consult your compressor supplier/specialist for advice.

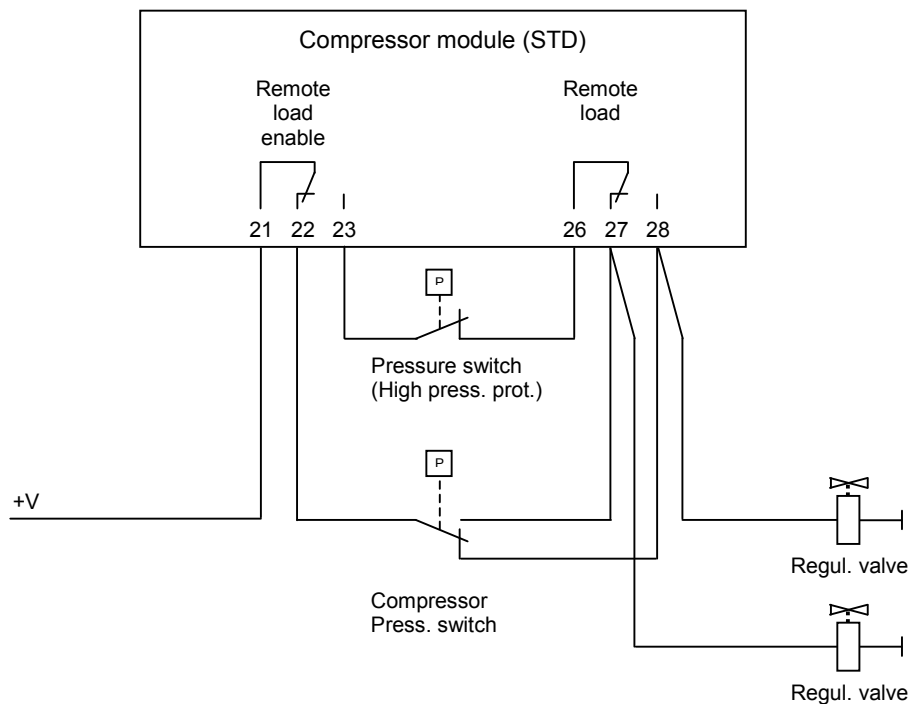
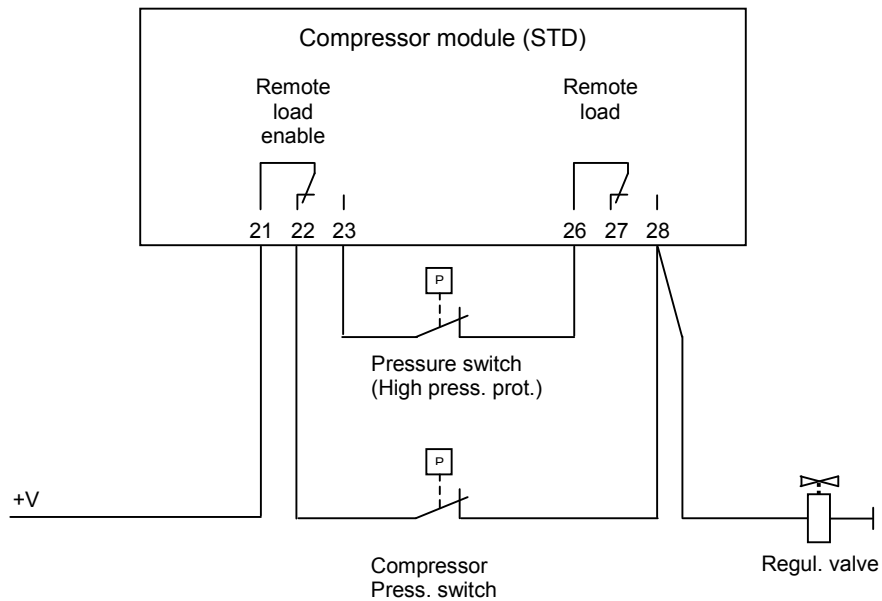
Connection of the compressor status messages



Controlling a compressor with line pressure sensor and electronic compressor control (examples)



Controlling a compressor with line pressure switch (example)



Danger

When a compressor module (STD) is installed, the compressor's pressure switch can no longer provide over-pressure protection.

For compressors that are not equipped with independent over-pressure detection it is recommended that a pressure switch be incorporated in the compressor fault circuit(s) such that any local over-pressure condition will stop the compressor independently from the GD Connect 12.

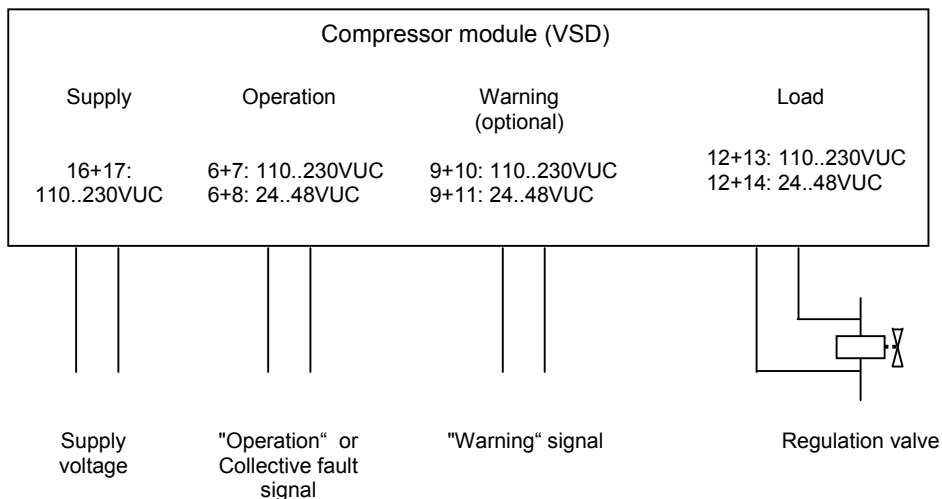
Compressor module (VSD) to a compressor

Note

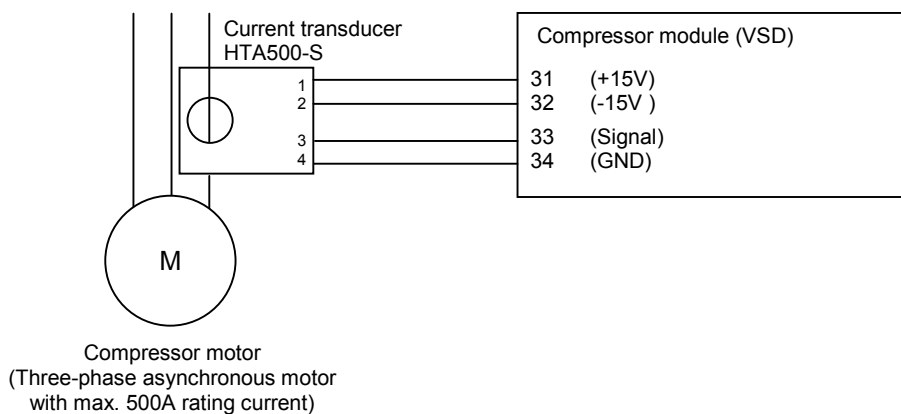
The connection of the compressor module (VSD) as shown in this document is intended as a guide for the majority of compressor control systems in use.

Some compressors differ in terms of operation and/or function; consult your compressor supplier/specialist for advice.

Connection of the compressor status messages



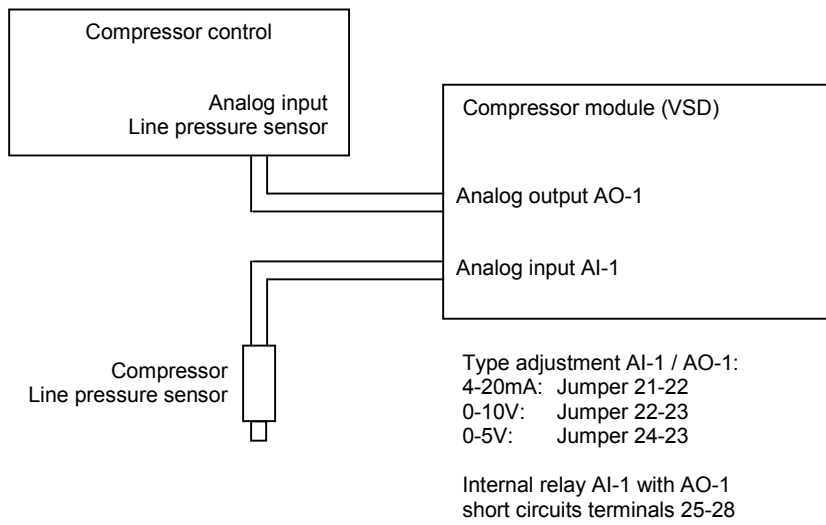
Connection of the current transducer for speed detection



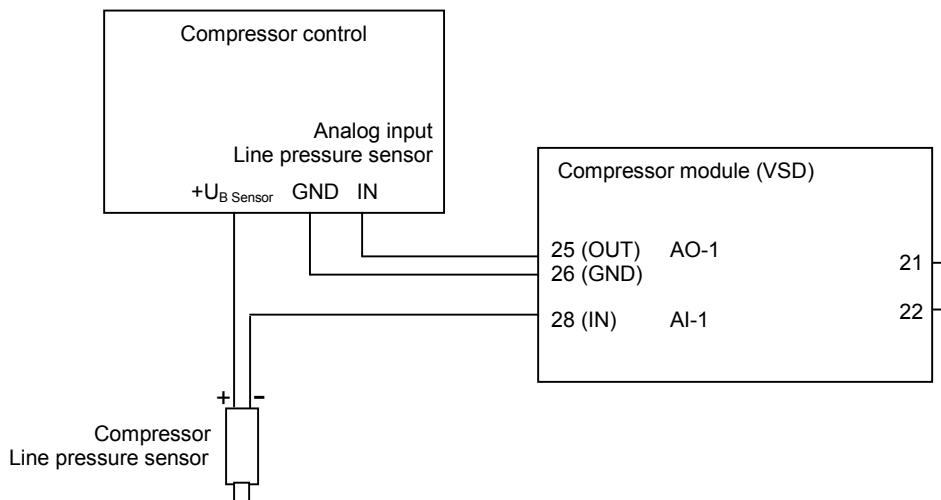
Danger

The current transducer supplied is designed for a maximum current of 500A. Ensure that the current flowing through the current transducer does not exceed 500A.

Connection of the compressor line pressure sensor



Example of a compressor with a passive 4..20mA line pressure sensor



Danger

For compressors that are not equipped with independent over-pressure detection it is recommended that a pressure switch be incorporated in the compressor fault circuit(s) such that any local over-pressure condition will stop the compressor independently from the GD Connect 12.

Annex B: Module settings

Compressor module (STD)

Terminals

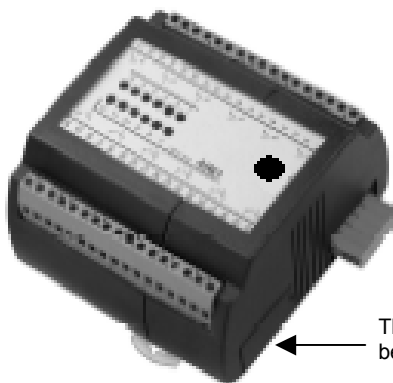
Terminal	Function	
1	Not used	
2		
3		
4		
5		
6	Digital input "Operation"	COM
7		110..230VUC
8		24..48VUC
9	Digital input "Motor"	COM
10		110..230VUC
11		24..48VUC
12	Digital input "Load"	COM
13		110..230VUC
14		24..48VUC
16	Power supply 110..230V AC/DC +/-10%	(~) (+)
17		(~) (-)
21	Digital output "Remote load enable"	COM
22		NC
23		NO
26	Digital output "Remote load"	COM
27		NC
28		NO
29	Digital output "Remote half load"	COM
30		NC
31		NO

Address

The following table shows the necessary DIP switch settings:

Address	DIP switches				
	1	2	3	4	5
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	0	1	0

1 = ON (up)
0 = OFF (down)



The DIP switches are behind this cover.

Baudrate / Protocol

No adjustments necessary.

Bus termination

DIP switches 9 and 10 to "ON" to switch on bus termination.

Compressor module (VSD)**Terminals**

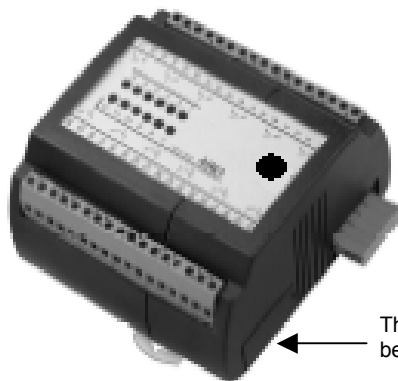
Terminal	Function	
1	Digital output DO-1	COM
2		NO
3	Digital output DO-2	COM
4		NO
6	Digital input "Operation"	COM
7		110..230VUC
8		24..48VUC
9	Digital input "Warning"	COM
10		110..230VUC
11		24..48VUC
12	Digital input "Load"	COM
13		110..230VUC
14		24..48VUC
16	Power supply 110..230V AC/DC +/-10%	(-) (+)
17		(-) (-)
21	Adjustment AI-1 / AO-1 4-20mA: Jumper 21-22 0-10V: Jumper 22-23 0-5V: Jumper 24-23	
22		
23		
24		
25	Analog output AO-1	OUT
26		GND
27	Analog-input AI-1	+15V
28		IN
29		GND
30	Analog-input AI-2	Screen
31		+15V
32		-15V
33		SIGN
34		GND

Address

The following table shows the necessary DIP switch settings:

Address	DIP switches 1 2 3 4 5
1	1 0 0 0 0
2	0 1 0 0 0
3	1 1 0 0 0
4	0 0 1 0 0
5	1 0 1 0 0
6	0 1 1 0 0
7	1 1 1 0 0
8	0 0 0 1 0
9	1 0 0 1 0
10	0 1 0 1 0
11	1 1 0 1 0
12	0 0 0 1 0

1 = ON (up)
0 = OFF (down)



The DIP switches are behind this cover.

Baudrate / Protocol

No adjustments necessary.

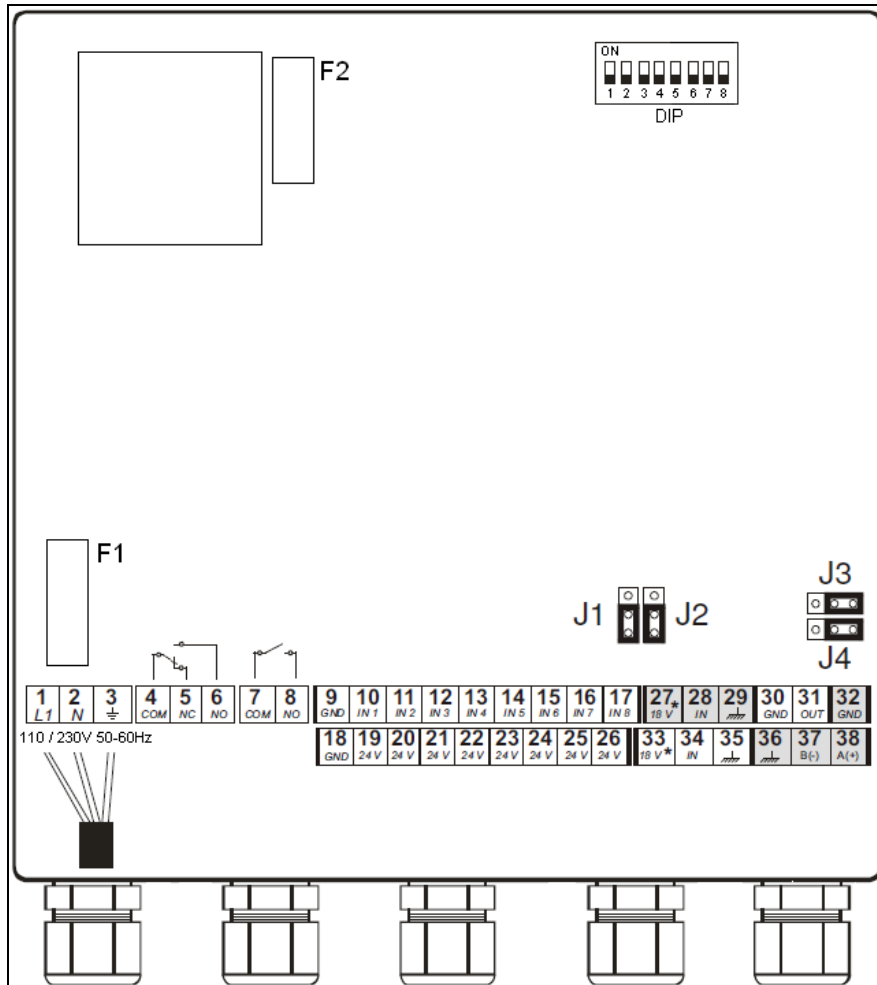
Bus termination

DIP switches 9 and 10 to "ON" to switch on bus termination.

Extension module**Terminals**

Terminal	Function	
1	Power supply 230V AC / 50-60Hz	L1
2		N
3		PE
4	Digital output DO-1	COM
5		NC
6		NO
7	Digital output DO-2	COM
8		NO
9	Digital inputs DI-1..8	GND
10		DI-1
11		DI-2
12		DI-3
13		DI-4
14		DI-5
15		DI-6
16		DI-7
17		DI-8
18		GND
19		24V DC
20		24V DC
21		24V DC
22		24V DC
23		24V DC
24		24V DC
25	24V DC	
26	24V DC	
27	Analog input AI-1	18VDC / GND
28		AI-1
29		Screen
33	Analog input AI-2	18VDC / GND
34		AI-2
35		Screen
32	RS485	GND
36		Screen
37		B(-)
38		A(+)

Drawing



Jumper for analog inputs

Analog-Eingang AI-1 (Terminal 27)

J2		18V DC
J2		GND

Analog-Eingang AI-2 (Terminal 33)

J1		18V DC
J1		GND

Address

The following table shows the necessary DIP switch settings:

Adresse	DIP-Schalter						
	1	2	3	4	5	6	7
1	1	0	0	0	0	0	0
2	0	1	0	0	0	0	0
3	0	0	1	0	0	0	0
4	0	0	0	1	0	0	0

1 = ON (oben)
0 = OFF (unten)

Baudrate



DIP switch 8 to OFF (bottom).

Protocol

No adjustments necessary.

Bus termination

Set jumpers J3 and J4 accordingly.

<p>J3</p>  <p>J4</p>	Bus termination on
<p>J3</p>  <p>J4</p>	Bus termination off

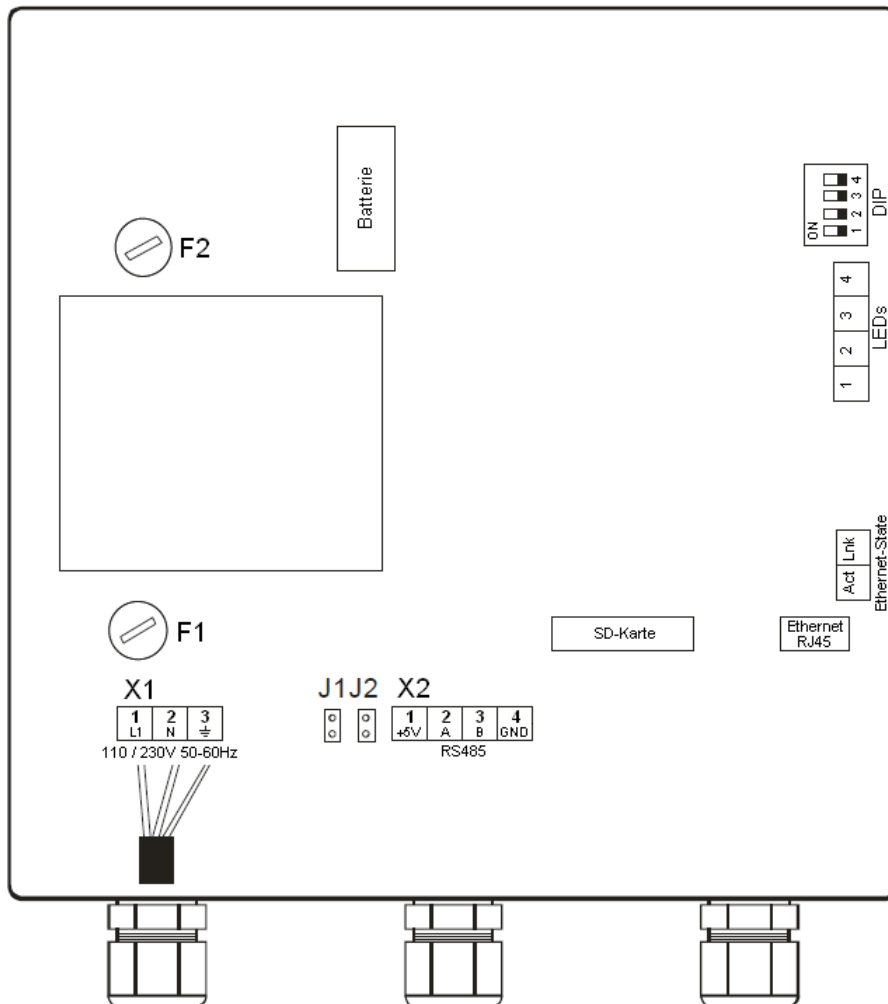
Webserver module

Terminals

Terminal X1	Function	
1	Power supply 230V AC / 50-60Hz	L1
2		N
3		PE

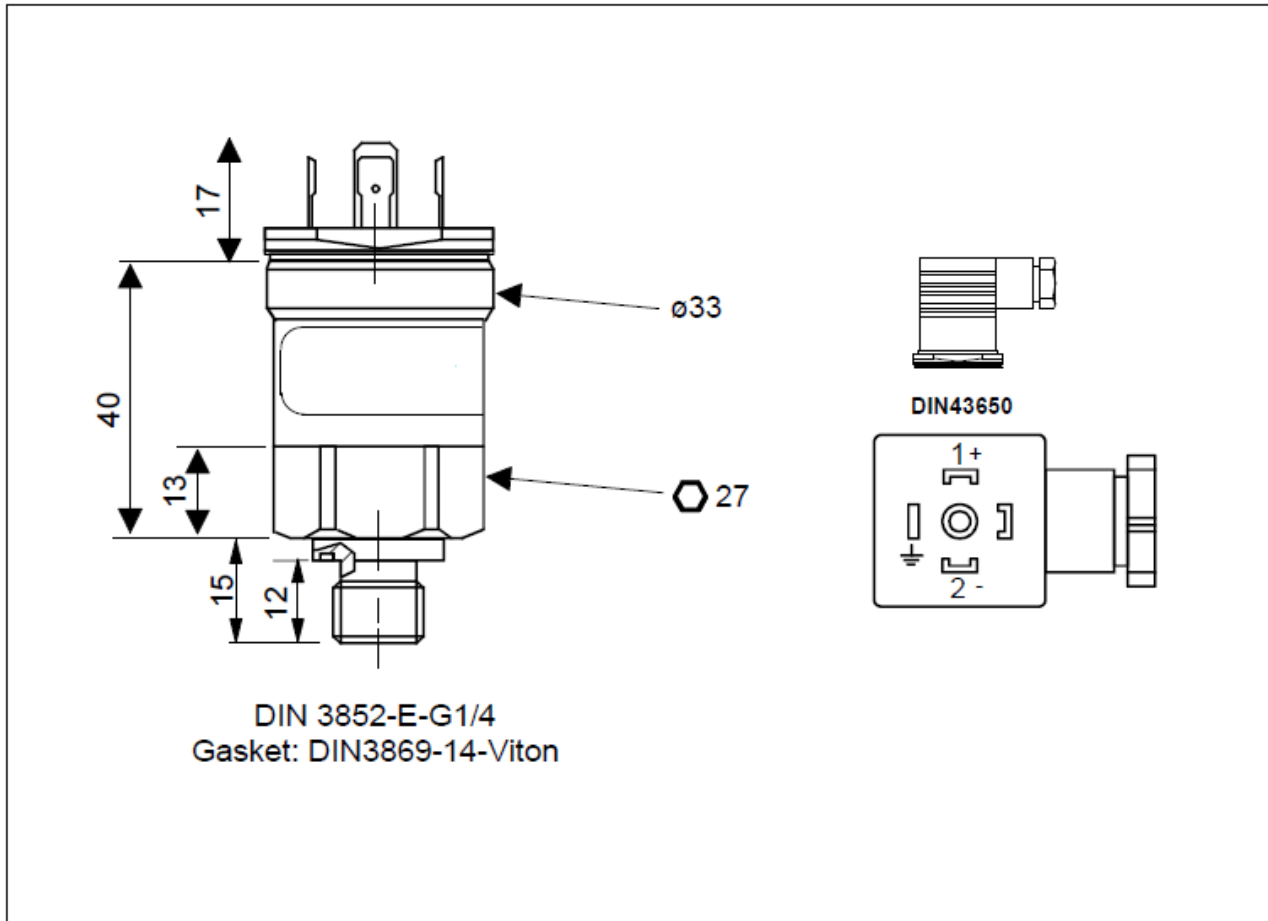
Terminal X2	Function	
1	RS485	+5V
2		A(+)
3		B(-)
4		GND

Drawing



Annex C: Technical data of the line pressure sensor

Within the scope of delivery of the GD Connect 12.
Gardner Denver ID no. 100003136

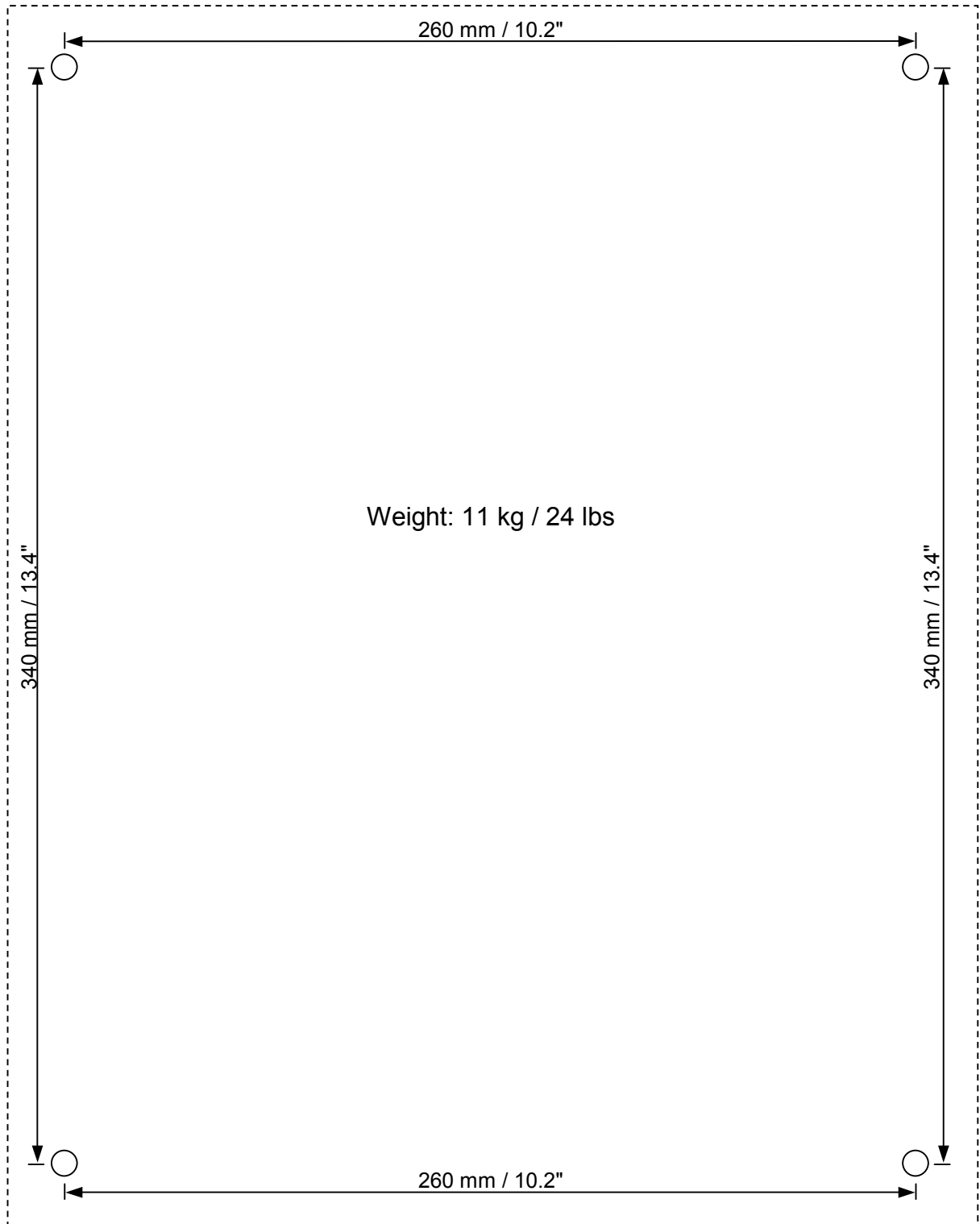


Technical data

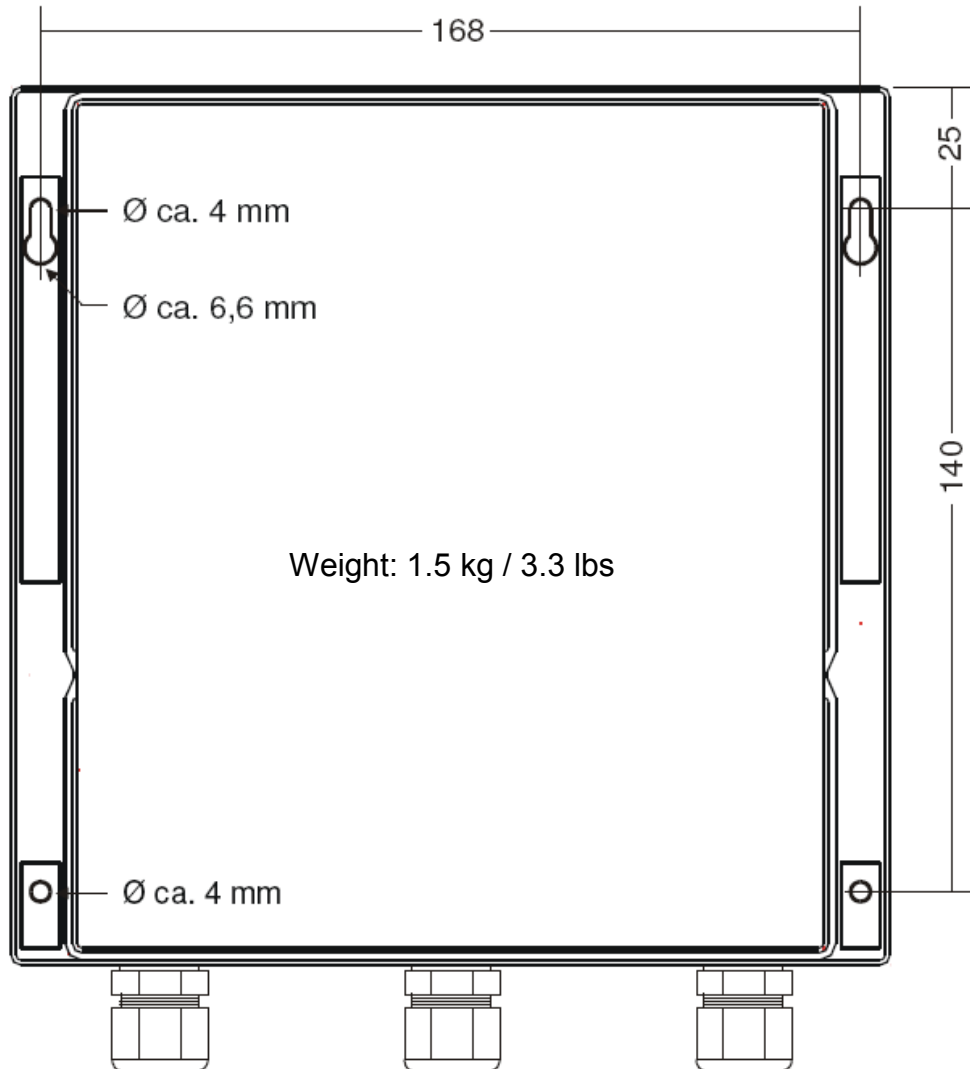
Measuring range:	-1 .. 15bar
Output signal:	4 .. 20mA
Supply voltage:	10 .. 30V DC
Current limitation:	28 mA
Polarity protected	
Media temperature:	0 .. 85 °C
Ambient temperature:	0 .. 85 °C
Operating pressure:	max. 16 bar
Testing pressure:	24 bar

Annex D: Drill templates for mounting

GD Connect 12 drill template / Webserver module



Extension module drill template



Annex E: Spare parts and accessories

GD Connect 12 **ZS1060135**

Spare parts

Line pressure sensor	10000 3136
Control unit	ZS1060035
Battery 3.6V 1.20Ah	10001 6235
Automatic circuit breaker 1A	A10235174
Control transformer	10001 6063
Plugs for RS485 interfaces	10001 6066
Plug kit for compressor controls	10001 6137
SD card 1GB	10001 6138
CD-ROM with manuals	ZS1060041

Compressor module (STD) **ZS1060046**

Spare parts

Fuse T1A 250V 5x20mm	10000 4436
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Compressor module (VSD) **ZS1060136**

Spare parts

Fuse T1A 250V 5x20mm	10000 4436
Current transducer	10001 6223
Cable to connect current transducer to the compressor module	10001 6224

Extension module 230V / 50-60Hz **ZS1060138**

Spare parts

Fuse T0.16A 250V 5x20mm	10001 6883
Fuse T0.5A 250V 5x20mm	A11270574
Cable to connect current transducer to the compressor module	10001 6227

Extension module 110V / 50-60Hz **ZS1060139**

Spare parts

Fuse T0.16A 250V 5x20mm	10001 6883
Fuse T0.5A 250V 5x20mm	A11270574
Cable to connect current transducer to the compressor module	10001 6227

PROFIBUS module **ZS1060052**

Accessories

RS485/RS232 converter (Flash program adapter)	100004858
USB/RS232 converter (Flash program adapter)	ZS1073178
Adapter for software update of compressor module (STD) or (VSD)	ZS1047721
Key lock for GD Connect 12	ZS1049510
Volume flow sensor (kit)	ZS1060132
Dew point sensor (4..20mA)	10001 4803
Temperature sensor (4..20mA)	10001 6229

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