



Control, Display & Operating Panel

# **SPECTOR*control* II**

**EN**  
English

Original Installation Instructions

**819410-01**

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## Important notes

### About this user manual

This user manual is a short operating manual containing important information on the installation, function, electrical connection and commissioning of the equipment.

### Additional documents

The Equipment Description EP-370 (SPECTORcontrol) is part of this user manual. This Description - among other documents - is stored in the equipment. In addition you can find all pertinent documents on the supplied documentation CD "SPECTORcontrol".

### Usage for the intended purpose

SPECTOR*control* is used for controlling, viewing and parameterizing GESTRA CANopen equipment. However, it is not only designed for GESTRA CANopen equipment but can also be used for third-party devices approved by GESTRA and connected to the plant system.

### Terms and definitions

#### 3-element controller

Large, momentary spikes in steam consumption cause the water in the steam boiler to boil up and effervesce, resulting in abnormally high readings of the level electrode.

To correct this error not only the liquid level but also the amount of steam and feedwater are measured and their difference is used to determine an appropriate weighing factor. This factor evaluates the influence of the difference (steam flowrate - feedwater flowrate) on the level reading.

#### Creep flow

Very low flowrates due to creep flow do not affect flowrate measurements. Creep flow is caused by thermal convection and occurs even if the valve is completely closed (and the output flow should be zero).

#### Switch-off threshold

If the manipulated variable (i. e. the output signal) of the pump control falls below the switch-off threshold the associated pump is switched off. This prevents the pump from constantly being turned on and off.

### Terms and definitions - continued -

#### **Continuous boiler blowdown**

As the boiler water evaporates, the concentration of non-volatile dissolved solids (TDS) left behind in the boiler increases over time as a function of steam consumption. If the TDS (= total dissolved solids) concentration exceeds the limit defined by the boiler manufacturer, foaming and priming occurs as the density of the boiler water increases, resulting in a carry-over of solids with vapour into steam lines and superheaters.

As a consequence, the operational safety is impaired and severe damage to boiler and tubes may occur. To keep the TDS concentration within admissible limits, a certain portion of boiler water must be removed continuously or periodically (by means of a blowdown valve) and fresh make-up water must be added to the boiler feed to compensate for the water lost through blowdown.

Electrical conductivity - here as a result of the TDS content of boiler water - is measured in microSiemens/cm ( $\mu\text{S}/\text{cm}$ ). However, in some countries ppm (parts per million) is used for conductivity readings. Conversion:  $1\mu\text{S}/\text{cm} = 0.5\text{ ppm}$ .

#### **Intermittent boiler blowdown**

During the evaporation process fine sludge deposits settle on heating surfaces and in the lowest part of the steam boiler. Boiler sludge is caused e. g. by oxygen-scavenging agents. Sludge deposits can form an insulating layer that retards the flow of heat and cause the boiler walls to become dangerously overheated.

To perform a bottom blowdown the intermittent blowdown valve must be opened abruptly. The resulting suction effect occurs only at the moment when the valve is being opened, the opening time should therefore not exceed 3 seconds. Longer blowdown periods will merely waste boiler water.

The timed pulse/interval control of the intermittent blowdown valve optimises sludge removal while minimising loss of boiler water. The interval between the intermittent blowdown pulses and the duration of the boiler blowdown can be set accordingly.

Large boilers often require more frequent boiler blowdowns. In this mode the frequency and the interval between the pulses can be adjusted.

#### **Operating position of the continuous blowdown valve**

To keep the TDS concentration within certain limits a small quantity of boiler water is discharged continuously via the top blowdown valve. To ensure continuous blow-off the valve is always slightly open (= operating position).

This operating position can be adjusted accordingly. For the corresponding amount of boiler blowdown refer to the capacity charts of the continuous blowdown valve.

#### **Compensation for steam bubbles (conductivity control)**

The presence of steam bubbles can lead to greatly fluctuating conductivity readings. An attenuator will damp the oscillations in the measurements.

#### **Switching hysteresis (conductivity control)**

If the controller is configured as 2-position controller, the valve will OPEN if there is a positive deviation ( $X > w$ ). The conductivity must then decrease until a new value that is lower than the setpoint minus the adjusted hysteresis is reached. Once this value is reached the valve will be motored into the operating position.

## Important notes - continued -

### Terms and definitions - continued -

#### **Stand-by mode (conductivity control)**

To avoid loss of water, the continuous blowdown control and the programme-controlled intermittent boiler blowdown (if activated) can be de-activated during stand-by operation or when the burner is switched off. An external control command will be triggered and, as a result, the continuous blowdown valve will be closed. During stand-by operation the MIN/MAX limits and the monitoring function remain active.

After the equipment switches back to normal operation the continuous blowdown valve is motored into the OPERATING position or the control position. In addition an intermittent blowdown pulse is triggered off (provided that automatic intermittent boiler blowdown has been activated and an interval period and pulse duration has been set).

#### **Temperature compensation (conductivity control)**

The electrical conductivity changes as the temperature falls or rises. To obtain meaningful readings it is therefore necessary that the measurements are based on the reference temperature of 25 °C and that the measured conductivity values are corrected by the temperature coefficient factor.

For automatic temperature compensation the following three settings are available: TK Linear, TK Norm or TK Auto.

##### **TK (Linear)**

To ensure that the readings are based on 25 °C set the TK value between 0 and 3.0 %/°C (default setting 2.1 %/°C. This setting permits the linear temperature compensation of the measured value over the whole measuring range. This method is usually applied for steam boilers operating at constant service pressure. After the TK is set and the service pressure is reached use a calibrated conductivity meter to measure the conductivity of the boiler water and compare the reading with the indicated conductivity value. If the reading differs from the indicated conductivity change the TK setting until they tally.

##### **TK (Norm)**

Since conductivity is not a linear function of temperature over a larger temperature range, various conditioning agents and different basic conductivities were used in order to ascertain empirical conductivity/temperature curves. These curves are stored as standard curves and can be used for temperature compensation. TK (NORM) is suitable for boilers operating with variable pressure, which means that the boiler does not have a fixed working pressure (e. g. low load 10 bar, full load 15 bar).

##### **TK (Auto)**

For this method a characteristic conductivity/ temperature curve of the plant is used for temperature compensation. The installation specific readings are recorded during the heat-up phase and stored as Auto curve. TK (AUTO) is particularly suitable for steam boilers operating with variable pressures.

#### **Cell constant and correction factor (conductivity control)**

The cell constant is a geometric quantity characteristic of the conductivity electrode and is taken into account when calculating the conductivity. However, in the course of time this constant may change, e. g. due to dirt deposits accumulated on the measuring electrode. Deviations can be compensated by changing the correction factor.

#### **Purging of the continuous blowdown valve**

To prevent the continuous blowdown valve from getting stuck the valve can be rinsed automatically. At regular intervals the continuous blowdown valve is motored into the open position. When the purging time is over, the valve is motored into the OPERATING position or into the required control position.

### Function

SPECTOR*control* (SC) is a control, display and operating panel with integrated programmable logic controller (PLC) for CANopen equipment.

Apart from GESTRA equipment such as level electrodes for conductivity and capacitance readings, temperature limiters and conductivity electrodes, you can also connect equipment produced by other manufacturers such as Jumo CANTransP/T and incorporate it into the system.

Data are exchanged between CANopen equipment and SPECTOR*control* via CAN bus to ISO 11898, using the CANopen protocol.

SPECTOR*control* determines cyclically the current parameter settings and values of CANopen devices. These readings are shown on the display as soon as a node ID has been allocated to the respective equipment. It is then possible to adjust and allocate connected equipment directly via SPECTOR*control*.

The individual inputs can be flexibly allocated to the various CAN nodes. However, the allocation of the IO terminal is dictated by the selected arrangement and cannot be changed. After a restart the equipment is in the initializing phase for approx. 10 seconds. Then it shows up-to-the-minute readings of the associated CAN bus devices.

The system can process digital signals and analog values and allows you to establish alarm and switching limits for them. These signals can be assigned directly to the control units or processed further by using the functions Logic and Calculations. After that the signals are outputted via a digital or analog output (IPO model). These signals can be used to accomplish various switching tasks.

Clear unambiguous signal designations allow quick allocations within the system. Any cryptic designations can be replaced by the name of the equipment or the place of installation. Example: Instead of "LRG 16-41" "Boiler feedwater conductivity". Note that at most 30 characters can be entered.

This designation is then used universally as key identifier. This is particularly advantageous in large installations where not only boiler data but also liquid levels in feedwater and condensate vessels are registered.

## Important notes - continued -

### Safety note

The equipment must only be installed and commissioned by qualified and competent staff. Retrofitting and maintenance work must only be performed by qualified staff who - through adequate training - have achieved a recognised level of competence.

The Equipment Description EP-370 (SPECTORcontrol) is part of this user manual. This Description - among other documents - is stored in the equipment. In addition you can find all pertinent documents on the supplied documentation CD "SPECTORcontrol"

**Please observe the safety instructions stated in these documents!**



### Danger

The parameter settings of the level electrodes NRG 1..-40 (LW), NRG 1..-41, NRG 1..-41.1 (HW) and the temperature transmitter TRV 5-40 can be viewed and monitored.

However, SPECTORcontrol does **not** replace the switching controllers for the low-water level limiter, the high-water level limiter or the safety temperature limiter (NRS 1-40, NRS 1-41, NRS 1-40.1 and NRS 1-40.2).

Data can only be exchanged safely with equipment tested and approved by GESTRA.



## Directives and Standards

### LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)

The equipment meets the requirements of the Low Voltage Directive 2014/35/EC and the EMC Directive 2014/30/EC.

### ATEX (Atmosphère Explosible)

According to the European Directive 2014/34/EU the equipment must **not** be used in explosion risk areas.

### UL/cUL (CSA) Approval

The equipment complies with the requirements of the following standards: UL 60950-1 and CSA C22.2 No. 60950-1-07, Information Technology Equipment - Safety - Part 1: General Requirements. File E176557.

### Note on the Declaration of Conformity / Manufacturer's Declaration **CE**

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity / Declaration of Manufacturer are available in the Internet under [www.gestra.de](http://www.gestra.de) ► Documents or can be requested from us.

# In control cabinet: Installing SPECTORcontrol

## Dimensions Spectorcontrol

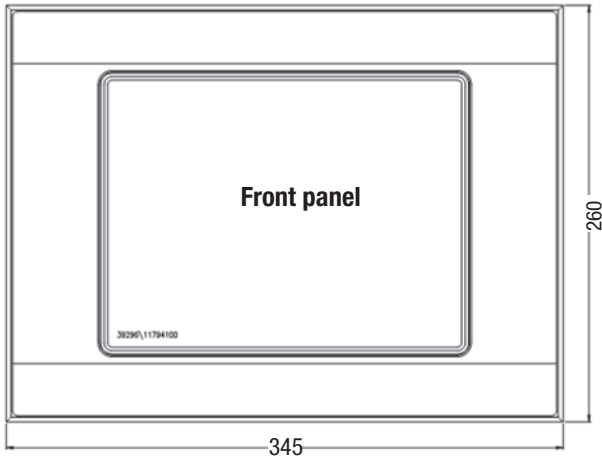


Fig. 1

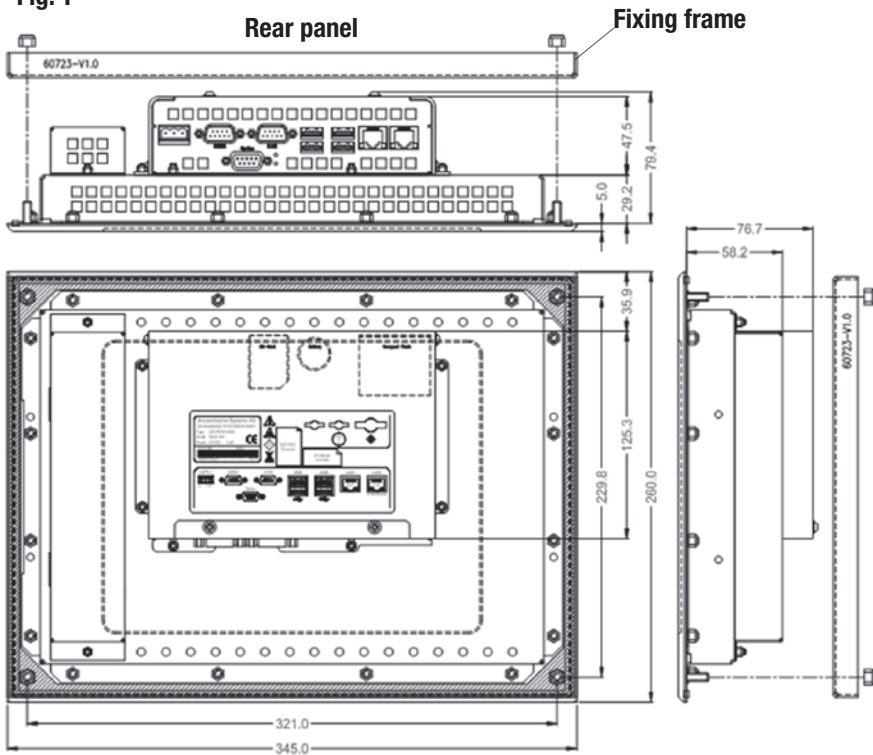


Fig. 2

#### Front panel cut-out

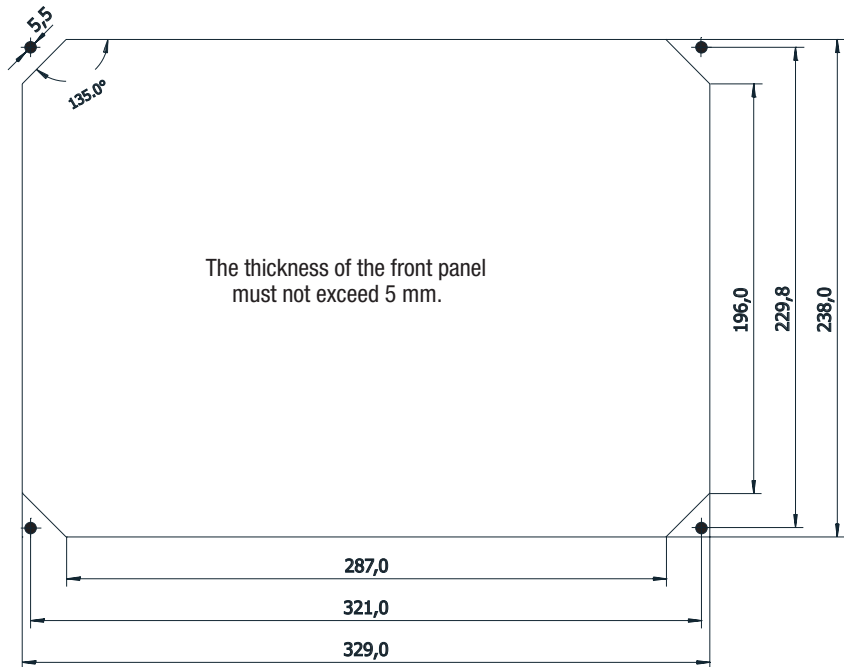


Fig. 3

#### Installation in control cabinet

SPECTOR*control* is designed to be installed in the control cabinet by means of the fixing frame and the integrated stud bolts at the rear panel. SPECTOR*control* can be used with ambient temperatures up to max. 50°C. Note that direct sun light (UV light) reduces the lifespan of the LCD display. Install the SPECTOR*control* as follows:

- Unscrew the fixing nuts and remove the fixing frame.
- Insert the supplied seal into the front panel slot.
- Push the SPECTOR*control* equipment from the front into the front panel cut-out.
- Push the fixing frame back onto the stud bolts. To secure the equipment in place use the four fixing nuts. Make sure the nuts are tightened evenly from the rear until the front frame is flush with the front panel all round .

## In control cabinet: Installing SPECTORcontrol - continued -



### Attention

- Avoid a location where direct sunlight falls on the flat screen.
- The mounting angle must not exceed  $\pm 35^\circ$  from the vertical.
- Ensure that the seal is fitted correctly on the front panel. For devices with a round seal the two ends must be at the lower side of the device and should fit together without a gap.
- Avoid tightening torques of greater than 0.5 Nm as this could otherwise damage the device.
- The thickness of the front panel must not exceed 5 mm.

## In control cabinet: Connecting SPECTORcontrol

### Wiring diagram for Spectorcontrol

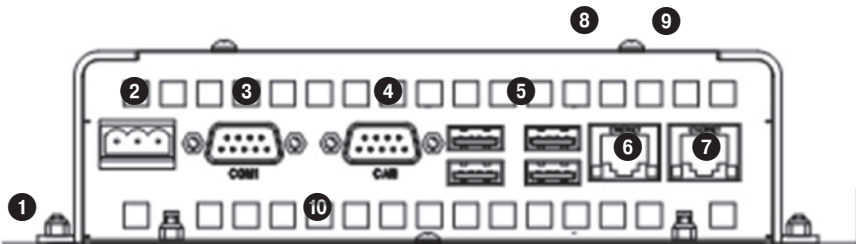


Fig. 4

### Key

- |                             |  |
|-----------------------------|--|
| 1 Functional earth terminal | 6 Network adapter 1: Maintenance / Service         |
| 2 Power supply              | 7 Network adapter 2: Ethernet + Ethernet Field-bus |
| 3 COM1                      | 8 SDCARD slot                                      |
| 4 CAN                       | 9 Battery  |
| 5 4x USB                    | 10 PC/104 slot (optional Profibus)                 |

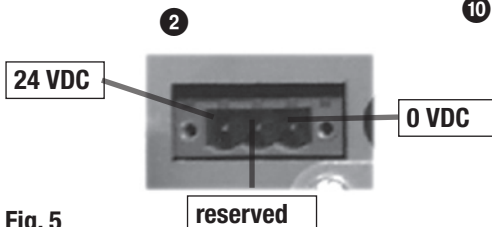


Fig. 5

### Connecting the power supply

SPECTOR*control*, all CANopen devices and the WAGO IO terminal block are supplied with 24 V DC /  $\geq 5$  A. 5 A is the sum current of all CAN bus nodes. Please use a safety power supply unit with safe electrical isolation.

The power supply unit must be electrically isolated from dangerous contact voltages and must meet at least the requirements on double or reinforced isolation according to one of the following standards: DIN EN 50178, DIN EN 61010-1, DIN EN 60730-1 or DIN EN 60950.



#### Attention

- Do NOT use the power supply of GESTRA control devices for the power supply of SPECTOR*control* and connected equipment.

### Connecting the power supply for Spector*control*

SPECTOR*control* belongs to protection class 3. The system power supply must be provided with 24VDC SELV (safety extra-low voltage). The max. disconnection capacity of the fuse must be taken into consideration. The power supply is NOT isolated. The 0 V connection is directly connected to the housing potential. The voltage supply is protected with a melting fuse. A reverse polarity protective device is used to protect the equipment in the event of reversed poles. Operation, however, is only possible if the connection was made correctly.

The connection must be made as follows:

- The cross section of the power supply cable must be at least 0.75 mm<sup>2</sup> and a maximum of 2.5 mm<sup>2</sup>.
- A flexible lead or wire can be used for the connection.
- The current consumption must be taken into account when implementing the power supply.
- The functional earth can help to avoid disturbance caused by potential differences. The cross section must not be less than 2.5mm<sup>2</sup>.
- The GND connection is directly connected to the housing potential.

For safety reasons the wires should be fixed together near by the connector.

The plug connector (socket connector with screw terminals) for the power supply connection is supplied with the equipment. (WAGO 1757022).



#### Attention

- In the event of reverse connection and simultaneous connection of a further 0 connection, e. g. GND connection of the COM1 interface, the fault current flows via this 0 V connection. If the housing is not lying well set on the 0 V potential, the result can be destruction of the equipment or of external components!
- For safety reasons the wires should be fixed together near by the connector.



### WAGO-I/O system 750 power supply

If the sum of the internal power consumption exceeds the sum current for bus modules, then an internal system supply module (750-613) must be placed before the module where the permissible residual current was exceeded.

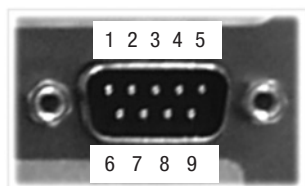
Example:

In a node with a CANbus coupler 750-337 10 relay modules (750-513) will be used. Current consumption:  $18 \times 100 \text{ mA} = 1800 \text{ mA}$ . The coupler can provide 1650 mA for the bus modules. Consequently, an internal system supply module (750-613, max. 2 A output current) must be added from the sixteenth module 750-513 of the node. In this case an error message will inform you about this when you are setting the parameters for the module.

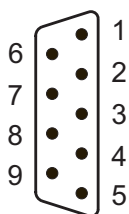
For more information go to the download centre of [www.wago.com](http://www.wago.com) and then download the PDF file "Design Notes WAGO I/O System 750" and other relevant technical documents and tools.

### Connecting the COM1 interface for burner control Modbus

3



#### Connector



Connector 9poles  
SubD

PIN no.	Signal
1	
2	RXD
3	TXD
4	
5	GND
6	
7	
8	
9	

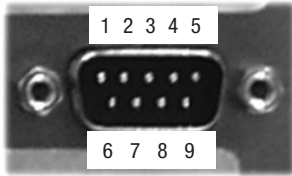
The serial interface COM1 is PC-compatible.



#### Attention

- For the connection use screened multi-core data cable.
- Data cable(s) connected to other equipment must be laid separately from high-voltage cables.
- Connect the screen only once to the central earthing point (CEP) in the control cabinet.

## CAN interface 4



PIN no.	Signal	Description
1	-	-
2	CAN LOW	Negative data signal
3	GND	Signal Ground
4	-	
5	-	
6	GND	Signal Ground
7	CAN HIGH	Positive data signal
8	-	
9	-	
Housing	Case	Cable screen

The connection to the CANopen equipment is implemented via the CAN interface.

A D-Subminiature plug connector in accordance with DIN 41652 must be used for the connection. Use a multi-core flexible control cable as supply line.

Note that screened multi-cored twisted-pair control cable is required as Bus line, e. g. UNITRONIC® BUS CAN 2 x 2 x...mm<sup>2</sup> or RE-2YCYV-fl 2 x 2 x...mm<sup>2</sup>.

Cable length	Number of pairs and conductor size [mm <sup>2</sup> ]
125 m	2 x 2 x 0.34
250 m	2 x 2 x 0.5
335 m	2 x 2 x 0.75
Other lengths available on request.	

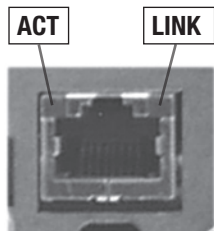


### Note

The design and preparation of the data cable is an important factor for the electromagnetic compatibility (EMC) of SPECTORcontrol. Wiring should therefore be carried out with special care.

- Wire equipment in series. Star-type wiring is not permitted!
- Data cable(s) must be laid separately from high-voltage cables.
- Link screen of the data cable such that electrical continuity is ensured and connect it once to the central earthing point (CEP). If equipotential bonding currents are to be expected, for instance in outdoor installations, make sure that the screen is separated from the central earthing point (CEP).
- If two or more system components are connected in a CAN bus system, provide the first and the last device with a terminating resistor of 120 Ω (terminal CAN LOW/CAN HIGH).

## Connecting the Ethernet 6 + 7



RJ45 connector



Socket, 8pole RJ45

PIN no.	Signal
1	TXD
2	TXD+
3	RXD+
4	-
5	-
6	RXD-
7	
8	

The Ethernet interface complies with the requirements of standard IEEE 802.3 (10/100/1000BASE-T).

The network connection is implemented via a screened Cat-5e cable with RJ45 connectors. The maximum cable length and transfer speed is limited by the cable quality defined in EIA/TIA 568 TSB-36. Cable lengths up to 100 m are possible.

Two diagnosis LEDs are available:

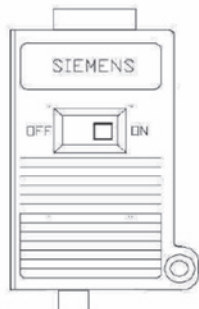
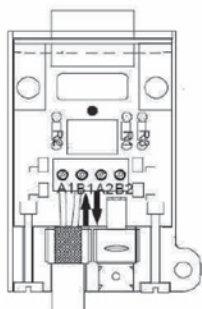
Orange: LINK (connection to HUB or to another device)  
 Green: ACT (sending or receiving)



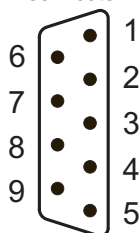
### Attention

- For the connection use screened multi-core data cable.
- Data cable(s) connected to other equipment must be laid separately from high-voltage cables.
- Connect the screen only once to the central earthing point (CEP) in the control cabinet

## Connecting the Profibus (optional) 10



Connector



Connector 9poles SubD

PIN no.	Signal
1	
2	
3	Line B
4	
5	
6	
7	
8	Line A
9	



## Factory setting

### SPECTORcontrol

All adjustable masks are completely available, no matter whether the indicated instruments are part of the bus system or not. Subsequent expansion or modification is therefore possible at any time.

You can find the SPECTORcontrol Runtime Licence at the rear of the equipment. Should it be necessary to re-enter this licence number and the sticker is no longer attached to the equipment please contact GESTRA Bremen (for more information on contact details see last page of this installation & operating manual).

The inputs/outputs of the WAGO IO module can only be defined after having entered the number of modules in [SPECTORcontrol]/System/IO-Module.

The system adjustments for the first commissioning are stored on the CompactFlash card. When SPECTORcontrol is operating, data of the CompactFlash card, too, will be stored in the directory /Data.

The equipment features the following default settings:

■ Date / Time	Current date and time (Daylight saving time DST: de-activated)
■ Startup page	Startup page1 (1..4 freely definable)
■ Language	English
■ IP address 1 (Ether 1)	192.168.0.99
■ IP address 2 (Ether 2)	can be freely allocated
■ Password	Level 1: aaa Level 2: bbb
■ Node ID SC	127
■ Node ID Wago IO	126
■ Baudrate	250 kB
■ Profibus station address	10 (Slave) – other arrangements possible on request



#### Note

After commissioning we recommend that you use a new password. Make sure that the same password is not used twice. Max. length of password: 8 characters.

## Commissioning procedure

### Applying supply voltage

Apply mains voltage to SPECTORcontrol. The startup page 1 appears.

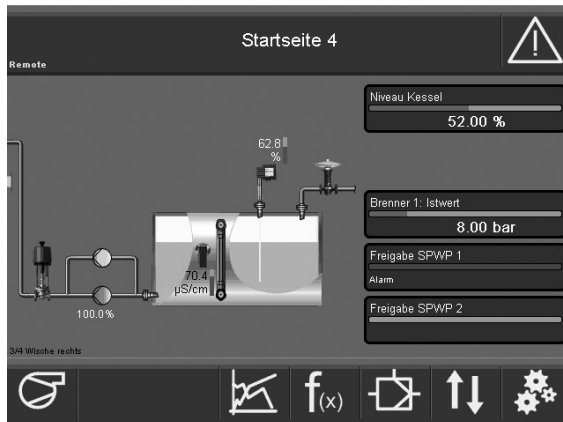
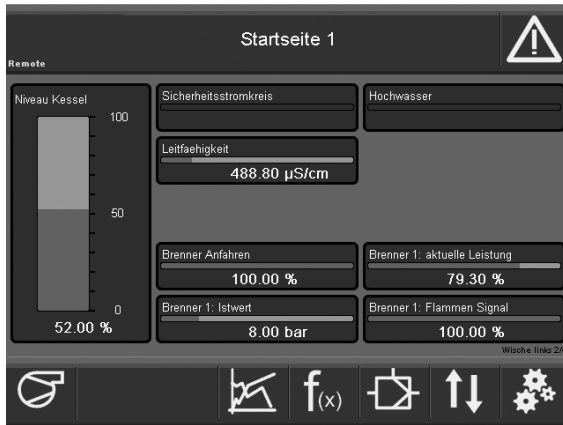


#### Attention

- Please follow the installation and operating instructions of all connected devices.

# Commissioning procedure

## Startup pages



## Operating SPECTOR*control*



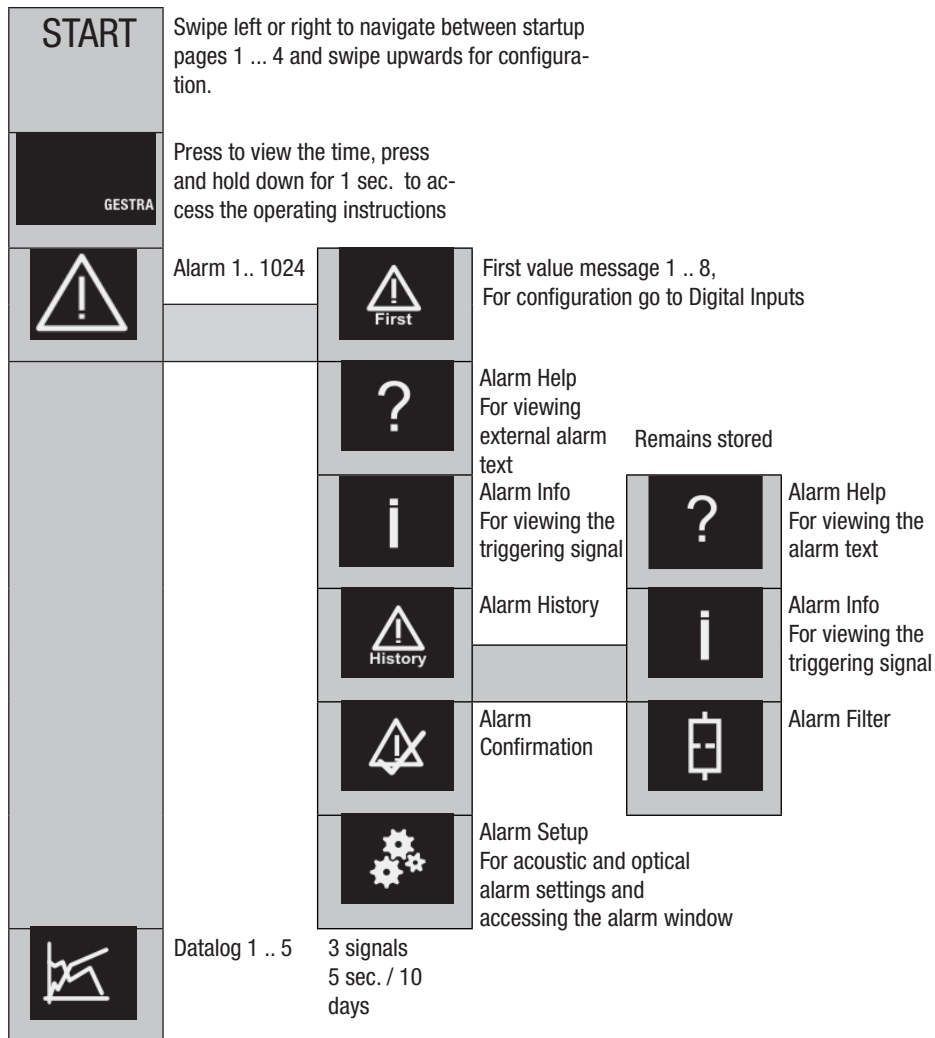
### Note

To operate the SPECTOR*control* press on the respective buttons or use swipe gestures.










### Buttons and their description

Button	Description
	<b>Home:</b> Press this button to go to one of the startup pages (1..4). To define the startup page go to: System/Backlight - Startup Page.../. If there is no user response within 60 minutes the system returns automatically to the startup page.
	<b>Alarm:</b> The symbol is flashing if an alarm has been triggered. Press this button to view the alarm list. If the alarm has stopped but has not been reset the button remains highlighted. To sort the list entries press the yellow title bar. To view the signal name shown at the bottom press one of the lines.
	<b>Back:</b> Press this button to leave or close this page.
	<b>Delete:</b> Press this button to delete signals, lists etc. You will receive a confirmation message on which you need to press "OK".
	<b>Save:</b> Press this button to save the lists (e. g. flowrate or alarm) stored on the CF card in the equipment under [StorageCard]/Data..
	<b>Setup:</b> Press this button to customize values, signals and page settings.
	<b>Displays:</b> Press this button and leave it depressed for more than 1 sec. to view the content of a detailed operating manual.









## Menu structure








## Menu structure - continued -

	Functions		Flowrate 1 .. 10	Analog input Steam signal Digital input etc.
			Steam flow-rate / Capacity 1..5	Saturated steam / superheated steam 0 - 500 °C 0 - 50 bar
			Calculation 1 .. 5	e. g. dTemp for controller setpoint
			Logic function 1 .. 20	e. g. for enabling the controller
			Sequencer 1 .. 5	e. g. burner is started up in time increments
			Timer 1 .. 5	Week timer
			Maintenance 1 .. 5	Run time Switching cycles
		Controller 1 .. 12	Continuous controller Continuous pump controller 3-position stepping controller 2-position controller for valve 2-position controller for pumps Intermittent boiler blowdown 3-element continuous controller 3-element stepping controller Dosage controller	External MIN setpoint (min. pump speed) 3 pumps Dead zone, soft start  With lock-out function  Pulse duration / min. interval time

## Menu structure - continued -

	Inputs/outputs		Establishing CAN inputs 1 .. 30	NRS 1-40/1-41 NRS 1-40.1/1-40.2 LRR 1-40
			Establishing analog inputs 1 ..20	4 ... 20 mA
			Establishing analog outputs 1 ..20 20	Controller CAN input
			Establishing digital inputs 1 .. 40	Alarm On/Off First value message
			Establishing digital outputs 1 .. 40	Controller Limiter Timer
			Switch 1 .. 10	Internal/external switch/button function, also via Modbus TCP/ Profibus, e. g. burner ON
			Setpoint 1 .. 10	Internal/external setpoint, also via Modbus TCP/Profibus, e. g. burner setpoint

## Menu structure - continued -

	System	Date / time	Incl. activating /deactivating daylight saving time
		Backlight / Startup page	Customizing display settings, defining startup page
		Password	PWL 1, 2 and 3
		IO module	Incl. dynamic overview and representation of terminals
		Save configuration	Equipment configuration, saving all settings
		Language	German / English / French
		Network	Unique equipment IP
		CAN bus info	Equipment IDs, type, version
		Communication / interface allocation	Modbus TCP / Profibus Data sheets OPC, Profibus, Modbus
		PLC /Visu / OS / Info	PLC Run / Stop / Reset / Password Info, Visu / OS Info
	Burner manufacturer	Landis&Staefa, Lamtec Two burners possible	
	Help	Help with content navigation links	
	Gestra	PWL 4	
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# System Malfunctions

## Indication, diagnosis and remedy



### Attention

Before carrying out the fault diagnosis please check:

#### Supply voltage:

To ensure troublefree operation make sure that an external power supply provides all bus nodes with 24 V. Do NOT use the power supply of GESTRA control devices for the power supply of SPECTOR<sup>control</sup> and connected equipment.

#### Wiring:

Is the wiring in accordance with the wiring diagram?

Error	Remedy
Internal sum current of WAGO IO terminal too high	If the sum of the internal power consumption exceeds the sum current for bus modules, then an internal system supply module (750-613) must be placed before the module where the permissible residual current was exceeded. This current will be calculated when the IO terminal of Spector-control is being configured.
Warning alarm "Wago IO module: Configuration not plausible"	Always set the correct number of the established IO terminals.
No connection of Wago IO terminal	Is the node ID/ baud rate setting correct (250kB/ ID: 126)? Have you connected the final terminal? Have you observed the internal power consumption?
Warning alarm "Controller xxx: in manual operation mode"	The controller is now in manual operation mode.
Warning message "Display dirty"	The IR grid is contaminated through dirt. Before cleaning the display go to System/Display to ensure that any touching of the screen will not accidentally initiate functions.
A burner Modbus TCP communication cannot be established.	Connected to Ether 2? Are the Modbus parameter settings correct? For more information see Lamtec documentation.
A CAN node cannot be re-allocated.	If a CAN node has been deleted from the list the SPECTOR-control equipment must be re-started before you can allocated the same position to a new CAN node.



### Attention

- Please follow the installation and operating instructions of all connected devices.



## Further Notes

### Action against high frequency interference

High frequency interference can occur for example as a result of out-of-phase switching operations. Should such interference occur and lead to sporadic failures, we recommend the following actions in order to suppress any interference.

- Provide inductive loads with RC combinations according to manufacturer's specification to ensure interference suppression.
- Bus cable(s) must be laid separately from high-voltage cables.
- Increase the distance to sources of interference.
- Check the connection of the screen to the central earthing point (CEP) in the control cabinet.
- HF interference suppression of bus line by means of hinged-shell ferrite rings.

### Decommissioning / replacing the SPECTOR*control*

- Cut off supply voltage.
- Detach all connections. **Fig. 4**
- Unscrew the four fixing nuts on the rear and remove the fixing frame.
- Push the equipment out of the front panel cut-out.

### Disposal

For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.







Agencies all over the world: [www.gestra.de](http://www.gestra.de)

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