

Blowdown Timer

PRS 50



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Content of this Manual

Product:

Blowdown timer PRS 50

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Scope of delivery / Product package

- 1 x Blowdown timer PRS 50
- 1 x Installation & Operating Manual

How to use this Manual

This Installation & Operating Manual describes the correct use of the PRS 50 blowdown timer. It applies to persons who integrate this equipment in control systems, install, bring into service, operate, maintain and dispose of this equipment. Anyone carrying out the above-mentioned activities must have read this Installation & Operating Manual and understood its contents.

- Read this Manual in full and follow all instructions.
- Please also read the instructions for use of any accessories.
- The Installation & Operating Manual is part of the product package. Keep it in an easily accessible location.

Availability of this Installation & Operating Manual

- Make sure this Installation & Operating Manual is always available to the operator.
- If you pass on or sell the equipment to a third party, please also hand over the Installation & Operating Manual.

Illustrations and symbols used

- 1. Action to be taken
- 2.
- Lists
 - Bullet points in lists
- A Keys to illustrations



Additional information



Read the relevant Installation & Operating Manual

Hazard symbols in this Manual



Danger zone / Dangerous situation



Danger of death from electric shock

Types of warning

A DANGER

Warning of a dangerous situation that results in death or serious injury.

№ WARNING

Warning of a dangerous situation that may possibly result in death or serious injury.

A CAUTION

Warning of a situation that may result in minor or moderate injury.

ATTENTION

Warning of a situation that results in damage to property or the environment.

Specialist terms / Abbreviations

Here, we explain some abbreviations, specialist terms, etc., which are used in this Manual.

Intermittent boiler blowdown

During the evaporation process, fine sludge is deposited on heating surfaces and on the floor of the steam generating unit. This sludge is caused by adding oxygen-scavenging agents, for example. The accumulated sludge sediments form a thermally insulating layer and can damage the boiler walls due to excessive heat.

Intermittent blowdown is achieved by the abrupt opening of the intermittent blowdown valve. The resulting suction effect occurs only at the moment the valve is first opened. The opening time should last approximately 3 seconds, as longer opening times result in water losses.

Time-based pulse/interval actuation of the intermittent blowdown valve optimises the removal of sludge from the boiler. The interval between the intermittent blowdown pulses can be set between 1 and 96 hours (intermittent blowdown interval). For efficient operation, the intermittent blowdown interval can be configured in line with the sum total of burner firing times.

The duration of intermittent blowdown can be set between 1 and 10 seconds. For large boilers, repeated intermittent blowdown pulses may be required. Repetition can be set between 1 and 10 with an interval from 1-10 seconds (pulse interval).

Standby/burner mode

To prevent loss of water, automatic intermittent blowdown can be disabled in standby mode or when the burner is switched off. To do this, a control signal is applied to the standby input.

When the system has switched to normal operation, a blowdown pulse is triggered with the set parameters (blowdown time and number of pulses).

For demand-based intermittent blowdown, the **standby input can be configured as a burner input**. In this mode, the remaining runtime until the next blowdown only begins counting down if the burner is active (control signal applied to the burner input).

In this mode, the blowdown interval equals the sum total of burner firing times.

PRS ... / MPA ...

GESTRA equipment and type designations.

SELV

Safety Extra Low Voltage

Usage for the intended purpose

The PRS 50 blowdown timer is used to trigger periodic blowdowns by means of the MPA 26, MPA 27, MPA 46, MPA 47, MPA 48 or MPA 110 rapid-closing intermittent blowdown valve.

It is used in pressurised steam plants for keeping the boiler water in good condition, particularly during operation where supervision is limited or not constant.

Configuration, operation and visual display

Configuration, operation and visual display are achieved using the rotary knob and the integrated 4-digit, 7-segment display.



To ensure proper use in all applications, please also read the Installation & Operating Manuals for the system components used.

You will find the latest Installation & Operating Manuals for the system components named here on our website:

www.gestra.com

Improper use

Application in potentially explosive atmospheres

Do not use the equipment in potentially explosive atmospheres.

Basic safety notes



There is a risk of electric shock during work on electrical systems.

- Always switch off the voltage to the equipment before performing work on the terminal strips.
- Check that the system is not carrying live voltage before commencing work.



Faulty equipment is a danger to system safety.

- If the PRS 50 blowdown timer does not behave as described on pages 21 to 26, it may be faulty.
- Perform failure analysis.
- Only replace faulty equipment with identical equipment from GESTRA AG.

Required personnel qualifications

Activity	Personnel		
Integration in control system	Specialist staff	Plant designer	
Installation/electrical connection/ bringing into service	Specialist staff	Electrician/installer	
Operation	Boiler service technician	Staff trained by the plant operator	
Maintenance work	Specialist staff	Electrician	
Setup work	Specialist staff	Plant construction	

Fig. 1

Notes on product liability

The manufacturer cannot accept any liability for damages resulting from improper use of the equipment.

Function

The PRS 50 blowdown timer generates configurable control pulses for opening an intermittent blowdown valve.

When the power supply to the PRS 50 blowdown timer is switched on, a two-minute remaining runtime until the first blowdown begins counting down. Once this time has elapsed, blowdown takes place with the parameters set in the timer. The time until the first intermittent blowdown is fixed at 2 minutes and cannot be changed by the user.

After this, the set interval begins. The remaining runtime until the next blowdown pulse is shown on the 7-segment display.

Standby/burner mode

To prevent loss of water, automatic intermittent blowdown can be disabled in standby mode or when the burner is switched off.

Configuration as standby function

An external 24 V DC command (see **Fig. 4** wiring diagram) switches the PRS 50 blowdown timer to standby.

- The intermittent blowdown valve also closes when intermittent blowdown is active.
- ◆ The S/B LED lights up yellow.
- When the system has switched to normal operation (0 V DC at the terminals), an intermittent blowdown pulse is triggered.
- In normal operation, the remaining runtime until the next intermittent blowdown pulse is counted down and displayed.

Configuration as burner function

An external 24 V DC command (see Fig. 4 wiring diagram) signals burner firing.

- The remaining runtime until the next intermittent blowdown pulse is counted down and displayed.
- ◆ The S/B LED lights up vellow.
- After the remaining runtime has elapsed, an intermittent blowdown pulse is triggered.
- An external 0 V DC command freezes the remaining runtime. The S/B LED does not light up.

Manual intermittent blowdown

To trigger a manual blowdown pulse manually, a button (N/O contact) can be connected to the "Manual intermittent blowdown" input. After this, a new blowdown interval begins and the remaining runtime until the next intermittent blowdown is displayed.

Monitoring by limit switches

Volt-free limit switches can be used to monitor problem-free operation of the intermittent blowdown valve. For this, you need to enable limit switch monitoring (factory setting = Off). The contact is closed in standby mode and open during intermittent blowdown. The opening and closing of the limit switch is monitored during intermittent blowdown. In the event of a malfunction, an alarm is triggered.

Function

Function test and failure diagnosis

Function testing and failure diagnosis can be performed using the rotary knob and the 7-segment display.

Display and actions in the event of errors

- Errors in the PRS 50blowdown timer, the electrical connection or in settings are shown with an error code.
- An alarm is triggered in the event of an error. The alarm relay opens.

By turning the rotary knob, you can change the parameters, simulate the alarm or initiate an intermittent blowdown pulse.

Technical data

Supply voltage

■ 24 V DC +/-20 %

Power consumption

■ Max. 4 W

Current input

■ Max. 0.3 A

Required external fuse

■ M0.5A

Inputs

- 1 x input for manual intermittent blowdown (external button)
- 1 x input for limit switch (volt-free) on intermittent blowdown valve
- 1 x volt-free 24 V DC input (standby/burner) for inputting an external switching command (intermittent blowdown OFF/burner active)

Outputs

Intermittent blowdown valve

■ 1 x volt-free relay contact (changeover relay)

Alarm output

- 1 x volt-free N/O contact (as an alarm contact, open in the event of an error)
- Maximum switching current 8 A at 250 V AC / 30 V DC $\cos \varphi = 1$
- Contact material AgNi0.15, AgSn02
- Inductive loads must have interference suppression (RC combination) as per the manufacturer's specification

Indicators and controls

- 1 x green 4-digit, 7-segment display for showing status information
- 3 x LEDs (2 x yellow, 1 x red)
 - ◆ S/B yellow (standby/burner input active, depending on configuration)
 - ◆ -▼- yellow (intermittent blowdown valve open)
 - ♦

 red (alarm)
- 1 x 4-pole code switch for configuration (standby/burner function)
- 1 x rotary knob with integrated push-button for setting parameters and executing the test function

Technical data

Protection class

Il double insulated

IP rating to EN 60529

■ Housing: IP 40

■ Terminal strips: IP 20

Electrical safety

■ Degree of contamination 2 for installation in control cabinet with protection rating IP 54, fully insulated

Admissible ambient conditions

■ Service temperature: - 10 °C - 55 °C (0 °C - 55 °C at power-on)

■ Storage temperature: - 20 °C - 70 °C *

■ Transport temperature: - 20 °C - 80 °C (< 100 hours) *
 ■ Air humidity: max. 95 %, non-condensing

* Only switch on after a 24-hour defrosting period

Housing

- Housing material: Lower section of black polycarbonate (glass-fibre reinforced), front of grey polycarbonate
- 2 x 8-pole terminal strips, removable separately
- Max. cross-section per screw terminal:
 - ◆ 1 x 4.0 mm² solid, or
 - ◆ 1 x 2.5 mm² stranded with sleeve, or
 - ◆ 2 x 1.5 mm² stranded with sleeve
- Housing attachment: Mounting clip on support rail TH 35 (to EN 60715)

Weight

■ Approx. 0.2 kg

Typical name plate / Identification PRS 50

16		3		4	
17					
18				Λ	Betriebsanleitung beachten!
19	2	5	6		9
1 ₂₀	4			W	See installation
21		•		Z ⁷ \	instruction!
22			•	050	GESTRA AG Münchener Str.77
23		8			Münchener Str.77 28215 Bremen Made in Germany

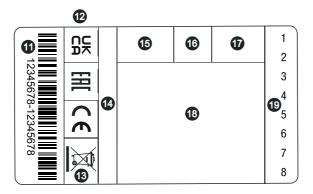


Fig. 2

- 1 Terminals 16 23
- 2 Wiring diagram, terminals 16 23
- 3 Function
- Type designation
- 6 Protection
- 6 Protection class
- Operating data (max. ambient temperature)
- 8 Relay protection
- Safety note
- Manufacturer
- 1 Material number, serial number
- Conformity mark
- Disposal note
- Type approval

- Supply voltage
- **16** Power consumption
- The External fuse for voltage supply
- Wiring diagram, terminals 1 8
- Terminals 1 8



The date of production is printed on the side of the equipment.

Factory settings

The PRS 50 blowdown timer is delivered with the following factory default settings:

Code switch setting:



Sliding switch, white (1 to 4 = 0FF)

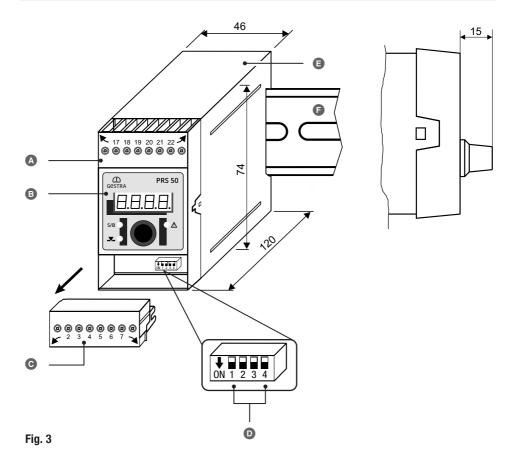
Configuring the standby/burner function, see page 20, Fig. 6.

Interval (Ti): 24 hoursPulse duration (tP): 3 seconds

■ Number of pulses (nP):

Pause between pulses (tb): 2 seconds
 Limit switch monitoring (SW): no
 Password (PW): oFF

Functional elements and dimensions



- A Upper terminal strip
- Operating panel with 7-segment display, status LEDs and rotary knob, see page 21
- Lower terminal strip
- 4-pole code switch for configuring the equipment function
- Housing
- **■** Support rail TH 35



The code switch can be accessed by removing the lower terminal strip.

Equipment settings, see page 20.

Installing the PRS 50 blowdown timer

Installation in control cabinet

The PRS 50 blowdown timer snaps onto a TH 35 support rail in a control cabinet.

Installation in control cabinet door

The Panel Adaptor Small with rotary button enables controller installation in a control cabinet door. It offers the advantage of status visibility and alarm testing without opening the cabinet door. The installed adaptor fulfills the protection class IP65. For more information please refer to the Panel Adaptor Installation Manual.



A DANGER



There is a risk of electric shock during work on electrical systems.

- Switch off the voltage to the system before you install the equipment.
- Check that the system is not carrying live voltage before commencing work.
- Switch off the voltage to the system, or secure the surrounding equipment in the control cabinet, if live, so it cannot be touched.
- 2. Carefully press the unit onto the support rail until the holder clips into place.

Safety notes for maintenance work on the intermittent blowdown valve or blowdown pipes

A DANGER



Severe scalding of the entire body is possible

During maintenance work on the intermittent blowdown valve or pipe, a blowdown pulse can be triggered inadvertently.

- Switch off the supply voltage to the PRS 50 blowdown timer and seal off the control fluid pipe before performing maintenance work.
- Check that the system is not carrying live voltage before commencing work.

Electrical connection safety notes



DANGER



Incorrectly connecting the blowdown timer or any associated components is a danger to plant safety.

- Connect the blowdown timer and all associated components as shown in the wiring diagram in Fig. 4 of this Manual.
- Do not use unused terminals as jumpers or support terminals.

Wiring diagram for the PRS 50 blowdown timer

Standby/burner input for an external command: intermittent blowdown OFF/burner active

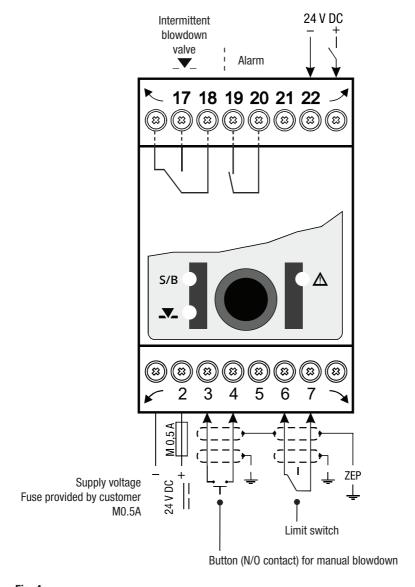


Fig. 4

Electrical connection

Connecting the 24 V DC power supply

- The PRS 50 blowdown timer is supplied with 24 V DC.
- A safety power supply unit that delivers a Safety Extra Low Voltage (SELV) must be used to supply the
 equipment with 24 V DC.
- Use an M0.5A fuse as an external fuse.

Connecting the intermittent blowdown valve/alarm output contacts

- Connect the outputs as shown in the wiring diagram in Fig. 4. The alarm relay is closed in the event of an error. In the wiring diagram, there is no electrical supply.
- Only use the terminals specified in the wiring diagrams.
- Use a T2.5A fuse to protect the switching contacts.

Notes on connecting inductive loads

All connected inductive loads, such as contactors and actuators, must have interference suppression using RC combinations as per the manufacturer's specifications.

Connecting the standby/burner input (24 V DC)

- 24 V DC input, for external command intermittent blowdown OFF/burner active (standby/burner configuration).
- Maximum cable length = 30 m.

Connecting the "Manual intermittent blowdown" input

- Connect a button (N/O contact) here if you require this function.
- Use a shielded, multi-core, twisted-pair control cable with a minimum conductor size of 0.5 mm², e.g. LIYCY 2 x 0.5 mm².
- Apply the shield at both ends.
- Maximum cable length = 100 m.

Connecting the "Limit switch" input

- Connect the volt-free limit switch of the intermittent blowdown valve here.
- Use a shielded, multi-core control cable with a minimum conductor size of 0.5 mm², e.g. LIYCY 2 x 0.5 mm².
- Apply the shield at both ends.
- Maximum cable length = 100 m.

Changing the equipment settings

A DANGER



Danger of death from electric shock if live connections on terminal strips are touched.

- Always switch off the voltage to the equipment before performing work on the terminal strips.
- Check that the system is not carrying live voltage before commencing work.

You can change the standby/burner function of the PRS 50 blowdown timer using code switch **(**see **Fig. 3)** at any time if necessary.



Make changes before installing the blowdown timer, when access is easier.

You will need the following tools:

Slotted screwdriver, size 2.5, fully insulated

Proceed as follows:

- 1. Switch off the supply voltage to the equipment or plant.
- 2. Carefully unscrew the lower terminal strip with a screwdriver, then remove, see Fig. 5.
- 3. Set the code switch as desired, see page 20, Fig. 6.
- 4. When your changes are complete, re-install the terminal strip.

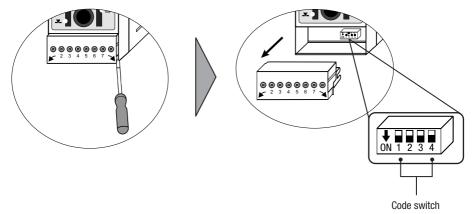


Fig. 5

Changing the equipment settings

Code switch **O** - sliding switch, white, see Fig. 3

Configuring the standby/burner function



PRS 50 blowdown timer

	Code switch ①				
Function	S 1	S2	S3	S4	
Reserve (default)					
Reserve	ON				
Standby function (contacts 22-23) (default)		0FF			
Burner function (contacts 22-23)		ON			
Reserve (default)			0FF		
Reserve			ON		
Reserve (default)				0FF	
Reserve				ON	

Fig. 6

The operating panel and signal LEDs

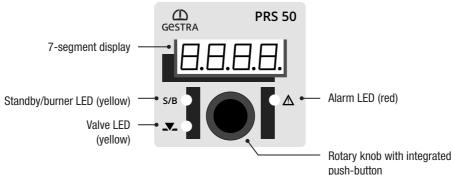


Fig. 7

- Before bringing into service, check that the PRS 50 blowdown timer and all equipment is correctly connected.
- Next, switch on the supply voltage.

Starting				
	The display is on and the LEDs light up briefly.	System test, takes approx. 3 seconds		
Switch on the supply voltage	Display: S-xx = software version t-02 = equipment type PRS 50	Valve output contact 17/18 open. Alarm output contact 19/20 open.		
Countdown of two-minute remaining runtime until intermittent blowdown after startup.	Display:	Valve output contact 17/18 open.		
Configuration: Standby function. No input active.	Remaining runtime = mm.ss	Alarm output contact 19/20 closed.		
The remaining runtime has elapsed. Blowdown after startup is initiated.	Display: Remaining runtime until next intermittent blowdown. Valve LED = On	Valve output contact 17/18 closed. Alarm output contact 19/20 closed.		

Normal operation/configuration = standby function			
Countdown of remaining runtime until next intermittent blowdown. No input active.	Display: Remaining runtime (> 1 h) = hh.mm Remaining runtime (< 1 h) = mm.ss All LEDs = Off	Valve output contact 17/18 open. Alarm output contact 19/20 closed.	

Normal operation/configuration = burner function			
Remaining runtime until next intermittent blowdown is frozen. Burner input not active.	Display: Remaining runtime (> 1 h) = hh.mm Remaining runtime (< 1 h) = mm.ss	Valve output contact 17/18 open. Alarm output contact 19/20 closed.	
Countdown of remaining runtime until next intermittent blowdown. Burner input active.	All LEDs = Off Display: Remaining runtime (> 1 h) = hh.mm Remaining runtime (< 1 h) = mm.ss All LEDs = Off	Valve output contact 17/18 open. Alarm output contact 19/20 closed.	

Behaviour in the event of an alarm (error code display)

If there is an error in the PRS 50 blowdown timer, e.g. the end position was not reached when limit monitoring was switched on, the alarm relay opens and the alarm LED (\triangle) lights up red.

The remaining runtime also counts down when an A.003 error is present, and when this time has elapsed a blowdown pulse is executed. If limit monitoring is OK on the next intermittent blowdown, the error message goes out.

If an error occurs.	1 000	An error code is displayed continuously. Error codes, see page 26. Alarm output contact 19/20 open.
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Changing the equipment settings when required

Selecting and setting a parameter:

1. +

Turn the rotary knob clockwise or anti-clockwise until the desired parameter appears on the display. The set value is then displayed after approx. 3 seconds.

The display alternates between the selected parameter and its current value, e.g. ti -> "value" -> ti (only with parameters than can be changed)

The following parameters are shown one after the other when you turn the knob clockwise:

"Remaining runtime" \rightarrow ti \rightarrow tP \rightarrow nP \rightarrow tb \rightarrow SW \rightarrow SW.In \rightarrow tSt.o \rightarrow

tSt.A → rSt.A → PW → "Remaining runtime"



If you do not enter anything for 30 seconds, the display then automatically returns to "Remaining runtime".

The changed intermittent blowdown interval "ti" is applied after the next blowdown.



When you have selected the parameter, press and hold the rotary knob until the current value of this parameter flashes on the display.



If **password protection** is enabled, you must enter the password before changing a parameter. Password, see page 24.



Set the desired value. Turning clockwise increases the value, turning anti-clockwise reduces the value

Each parameter has an individual, admissible value range.

By pressing the knob briefly, you can jump to the next digit. This is a more convenient way of making large changes to values.



If you do not set a parameter within 10 seconds, the process is aborted ("quit") and the old parameter value is retained.



Press and hold the rotary knob for approx. 3 seconds to save your setting.

The message "donE" is shown and the name of the parameter appears on the display once more.

	Meaning of parameters and value ranges				
Code	Meaning	Value range			
24.00 Example	Remaining runtime > 1h = hh.mm < 1h = mm.ss	Remaining runtime until next intermittent blowdown.			
ti	Interval	1 to 96 hours			
tP	Pulse time	1 to 10 seconds (duration of intermittent blowdown pulse)			
nP	No. of pulses	1 to 10 (pulses per blowdown)			
tb	Pause between pulses	1 to 10 seconds			
sw	Limit switch monitoring	no = monitoring is not active YES = monitoring is active			
SW.In	Limit switch status	Press and hold the rotary knob to ascertain the status of the limit switch open close = switch closed press the rotary knob briefly to exit the display.			
tSt.o	Valve relay test	Testing the valve relay, see page 25.			
tSt.A	Alarm relay test	Testing the alarm relay, see page 25.			
rSt.A	Resetting the alarm	Press the rotary knob to reset the alarm.			
PW	Password	on = password protection is enabled oFF = password protection is disabled			
	Default setting	1902 (cannot be changed)			

Valve relay/alarm relay test

Valve relay test			
During normal operation			
 Select parameter "tSt.o". Press the rotary knob for 3 seconds. 	Display: "donE" Valve LED = On	Valve output contact 17/18 closed.	
 Intermittent blowdown is initiated with the set parameters. A new blowdown interval begins. 			

Alarm relay test			
During normal operation			
 Select parameter "tSt.A". Press the rotary knob and hold until the end of the test. 	Display: "tSt.A" flashes Alarm LED = On/Off	The test takes place in a 3-second interval: 3 s - alarm contact 19/20 open. Alarm LED = On 3 s - alarm contact 19/20 closed. Alarm LED = Off	
The test continues until you release the rotary knob.			

Monitoring the limit switch

If limit switch monitoring is enabled, a test is performed to determine whether the switch is open at the end of the blowdown pulse and closed again at the end of the pause. If not, e.g. because the compressed air supply to the valve is cut off, an alarm is triggered. This way, it is possible to monitor whether the intermittent blowdown valve did actually open.

Indication of malfunctions using error codes

Resetting an alarm

You can reset an ongoing alarm using the rotary knob.

- 1. Select parameter "rSt.A".
- 2. Press the rotary knob until "donE" is displayed.



When no more alarms are present, the alarm LED goes out and the alarm relay closes. The PRS 50 blowdown timer returns to normal operation.

Error code display			
Error code	Internal designation	Possible errors	Remedy
A.003	Error	Limit switch monitoring failed.	Check the configuration: Is a limit switch connected? Check the limit switch setting (use menu item "SW.In" for diagnosis). Initiate manual blowdown and check that the end position has been reached. Reset the alarm.
E.030	Error	RTC error	Replace the PRS 50 blowdown timer.
E.097	Error	Walkthrough application error	Internal error. Replace the PRS 50 blowdown timer.
E.098	Error	Walkthrough test error	Internal error. Replace the PRS 50 blowdown timer.
E.099	Error	Internal test error	Internal error. Replace the PRS 50 blowdown timer.

All error codes not listed here are available as reserves.

Fig. 8



Faulty equipment is a danger to system safety.

- If the PRS 50 blowdown timer does not behave as described on this page, it may be faulty.
- Perform failure analysis.
- Only replace faulty equipment with identical equipment from GESTRA AG.

What to do in the event of system malfunctions



In the event of malfunctions or errors that cannot be remedied with the aid of this Installation & Operating Manual, please contact our service centre or authorised agent in your country.

Taking out of service

- 1. Switch off the supply voltage and switch off the voltage to the equipment.
- 2. Check that the equipment is not live.
- 3. Pull off the upper and lower terminal strips, see Fig. 3 (A); (B)
- Release the slider holder on the base of the equipment and detach the PRS 50 blowdown timer from the support rail.

Disposal

Dispose of the PRS 50 blowdown timer in accordance with statutory waste disposal regulations.

Returning decontaminated equipment

If products have come into contact with media that are hazardous to health, they must be drained and decontaminated before being returned to GESTRA AG.

Such media include solid, liquid or gaseous substances, mixtures of these, or radiation.

GESTRA AG can accept returned products only if accompanied by a completed and signed return note and also a completed and signed declaration of decontamination.



The return confirmation and declaration of decontamination must be attached to the outside of the return package, as processing will otherwise be impossible and the products will be returned to the sender at their expense.

Please proceed as follows:

- 1. Let GESTRA AG know about the return beforehand by e-mail or phone.
- 2. Wait until you have received the return confirmation from GESTRA.
- Fill out the return confirmation (and declaration of decontamination) and send it with the products to GESTRA AG.

Declaration of Conformity; Standards and Directives

You can find details on the conformity of the equipment and the applicable standards and directives in the Declaration of Conformity as well as relevant certificates and approvals.

You can download the latest version of the Declaration of Conformity from www.gestra.com and request relevant certificates and approvals by writing to the following address:

GESTRA AG

Münchener Straße 77 28215 Bremen Germany

Tel. +49 421 3503 0 Fax +49 421 3503 393 E-mail info@de.gestra.com Website www.gestra.com

Modifications to the equipment not approved by us will invalidate the Declarations of Conformity as well as relevant certificates and approvals.

For your notes

For your notes

For your notes



You can find our authorised agents around the world at: www.gestra.com

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