GESTRA®

Logic Unit

SRL 6-40 a

spectorbus

EN
English

Original Installation Instructions

818957-04

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Important Notes

Usage for the intended purpose

Use the logit unit SRL 6-40 only in conjunction with external low-water (LW) level limiters or high-water (HW) alarms for monitoring the independent purging process of the connecting lines for the measuring pot.

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.

ATEX (**At**mosphere **Ex**plosible)

According to the European Directive 2014/34/EU the equipment must not be used in potentially explosive areas.

Note on the Declaration of Conformity / Declaration by the Manufacturer 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.com → Documents or can be requested from us.

Explanatory Notes

Scope of supply

SRL 6-40 a
1 Logic unit in field case for wall mounting
1 Installation & operating manual

Description

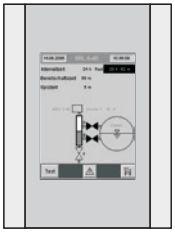
If the **LW / HW** level electrodes are installed in external measuring pots, the periodic purging process of the connecting lines is imperative. Each measuring pot requires its own logic unit.

For purging the connecting lines are isolated one after the other and then opened again and the measuring pot is drained.

The logic unit SRL 6-40 monitors the maintenance of the specified times and the sequence of the valve operations. In order to prevent deactivation of the equipment during the purging process, the associated control unit will ignore the corresponding level information of the level electrode **LW.**

The logic unit SRL 6-40 is designed for use with the compact equipment Micro Innovation XV200.
It consists of a touch screen with embedded HMI-PLC. The equipment uses Windows CE and features 32 MB RAM, Flash for data/program memory and a maintenance-free battery-backed real time clock. This equipment in conjunction with the WAGO I/O system 750 represents the logic unit SRL 6-40.

Its design is in accordance with EN 50156 and the data exchange is effected via CAN bus using the CANopen protocol.



Explanatory Notes – continued –

Function

Fig. 1 shows a water level limiting system using a level electrode installed inside the boiler and a second electrode installed in an external level pot. However it is also possible to install 2 external level electrodes NRG 1x-4x, 2 logic units SRL 6-40, 1 level switch NRS 1-40.1, NRS 1-40.2.

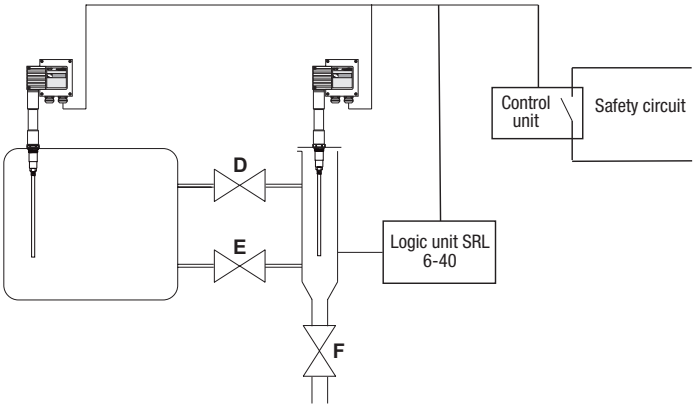


Fig. 1

The logic unit and the control unit monitor the following times:

Interval time: This is the time interval at which, depending on the operating mode (24h / 72h operation), the connecting lines have to be purged.

Standby time: The purging process must be initiated during this time. The standby period begins when the interval time has elapsed.

Purging time: During this period the valves must be operated so as to initiate the purging process. Operation of the valves and exposure of the LW level electrode is sensed and signalled by the limit switches. If a message is not received during the purging time, the safety circuit will be interrupted. The monitoring of the purging time is a safety-relevant function because a water level limiter may be bypassed for a maximum of 5 minutes.

Logic unit SRL 6-40

Every second the logic unit SRL 6-40 sends the following telegram: “Availability message SRL 6-40” to control unit NRS 1-40.1, NRS 1-40.2. The logic unit creates the time basis for the purging interval times and monitors the compliance of the purging intervals. After the interval time has elapsed the standby time is started and the interval time is reset to its initial value. During the standby time the purging process must be started.

If the standby time is exceeded, the logic unit sends the command “Open safety circuit” and “Evaluate limiter signal of LW level electrode 1 (2)” to the control unit. The beginning of the purging process is detected when the valve D or E leaves the limit switch OPEN.

When the purging is started the telegram “Ignore limiter signal from LW level electrode 1 (2)” is sent, and when the purging stops the telegram “Evaluate limiter signal from LW level electrode 1 (2)” is sent to the control unit.

Function – continued –

If the purging time (5 min.) is exceeded, the logic unit sends the command “Open safety circuit” and “Evaluate limiter signal of LW level electrode 1 (2)” to the control unit. The command will only be cancelled when the purging process is successfully finished.

If an external high level alarm is monitored, the signals of the HW level electrode will not be evaluated.

If a purging process is initiated outside the standby time, the interval time will be reset. The factory set interval time (24h or 72h) is stored on a CF card. This also applies to the standby and the purging time.

These settings are shown at the display of the logic unit.

The corresponding menu of the logic unit enables you to select the control unit with which the logic unit shall communicate and the level electrode to be monitored. Observe the following specification:

Control unit	ID control unit	ID level electrode 1	ID SRL	ID level electrode 2	ID SRL
NRS 1-40 NRS 1-40.1	1	2	4*)	3	5*)
NRS 1-41 NRS 1-40.2	6	7	9*)		

*) The software automatically allocates the node ID to the SRL when the control unit (see page 23) is selected.

Control units NRS 1-40.1, NRS 1-40.2

In conjunction with the logic unit the control units process the following telegrams:

- “Open safety circuit”
- “Ignore message from LW level electrode 1 (2)”

  For max. 5 minutes the control unit will not evaluate the information coming from the level electrode. If after 5 minutes the telegram “Evaluate message from LW level electrode 1 (2)” is not received, the control unit will open the safety circuit. The messages of the other electrode remain valid and will lead to an interruption of the safety circuit in the event of low water level. If purging takes place at both electrodes at the same time, the control unit will also interrupt the safety circuit.
- “Evaluate message from LW level electrode 1 (2)”

  The information from the level electrode will be evaluated as usual. The logic unit sends these telegrams after the purging process is finished.
- “Availability message of the SRL 6-40, level electrode 1(2)”

  If one or two logic units are used in the system, the control unit expects the availability messages of the logic units every second. If these messages fail to appear, the safety circuit will be interrupted.

The configuration (NRS 1-40.1, NRS 1-40.2) of the control unit during the commissioning procedure determines, whether one or two logic units are to work with the control unit.

Explanatory Notes – continued –

Equipment approved for operation with logic unit SRL 6-40

Water level limiter (low water), consisting of
Level electrode NRG 1x-4x, control unit NRS 1-40.1

High water level alarm, consisting of
Level electrode NRG 1x-41, control unit NRS 1-40.2

Technical Data

SRL 6-40 a

Interface
Interface for CAN bus to ISO 11898, CANopen protocol
Ethernet (RJ 45) for remote operation (optional)

Supply voltage
24 VDC SELV (safety extra low voltage) + 20 % / – 15 %

Inputs
1 four-channel digital input terminal DC 24 V
1 two-channel digital input terminal DC 24 V
for 5 volt-free contacts of the limit switches mounted in valves

Outputs
1 two-channel relay output terminal AC 230 V, DC 30 V
2 make contacts, volt-free, contact rating max. AC/DC 2A
for external indication “Stand-by time running” and “Stop”

Interval time
Factory-set default range: 2 to 336 hours

Standby time
Factory-set default range: 15 minutes to 2 hours

Purging time
Factory setting: 5 minutes

Baud rate
Factory set default (data transfer rate) 250 kbit/s (length of line up to 125 m).
Other baud rates available on request.

Indicators and adjustors
1 touch screen display

Power consumption
10 W

Protection
IP 65 to EN 60529

Admissible ambient temperature
0 – 50 °C

Enclosure
Field case for wall mounting
Case material: polycarbonate, colour: light gray

Cable entry / electrical connection
M 12 male connector, 5 poles, A coded
M 12 female connector, 5 poles, A coded
M 12 female connector, 8 poles, for connecting the limit switches

Weight
approx. 2.1 kg

Name plate / Marking

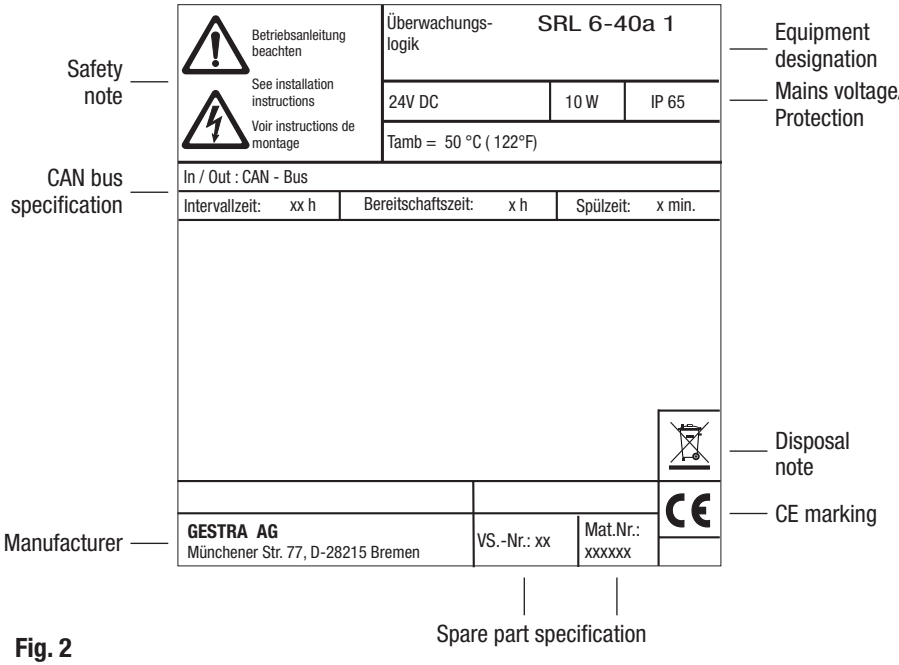


Fig. 2

Dimensions

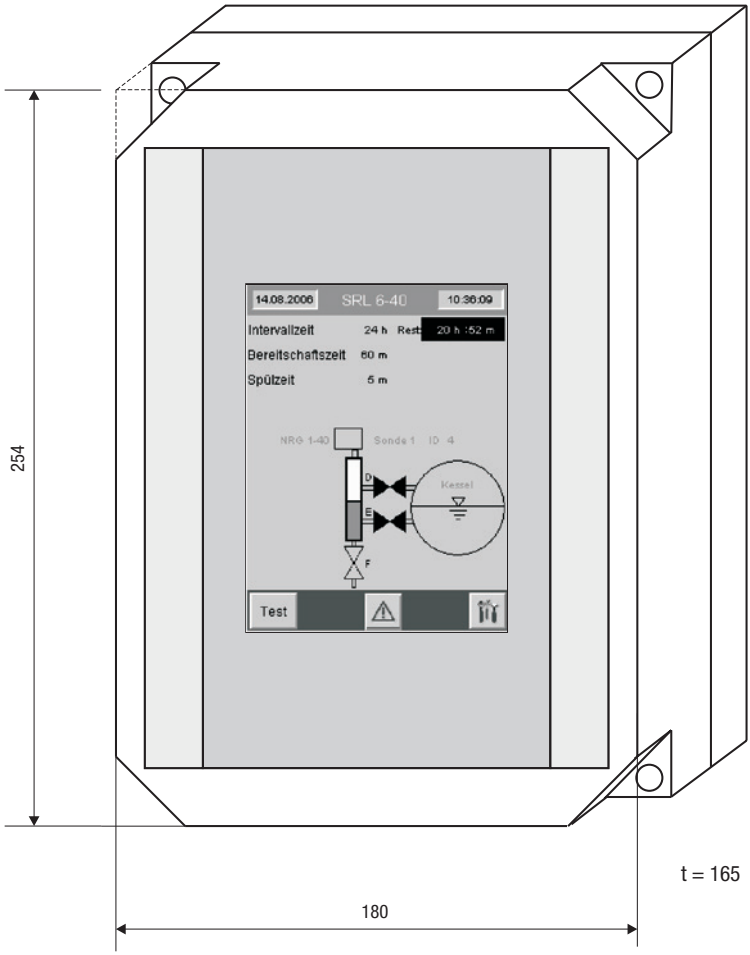


Fig. 3

Installation

Installing logic unit SRL 6-40 – 1

The enclosure of the logic unit is designed for wall mounting and should be installed close to the external level pot. The four fixing holes are freely accessible after removing the upper part of the enclosure. The dimensions of the fixing holes are embossed on the back of the case.

Electrical Connection

Connecting limit switch and relay output terminals

The level pot is provided with three shut-off valves. Both valves D and E are fitted with two limit switches for “OPEN” position (D 1 / E 1) and “CLOSED” position (D 2 / E 2).
The drain valve F is fitted with only one limit switch for the “CLOSED” position.

The limit switches must be provided with volt-free relay contacts.

For connecting the limit switches we recommend a control cable, e. g. Ölflex 110 H, 7 x 1 mm^2 and the installation of an intermediate distribution frame (IDF) close to the level pot. For connecting the IDF to the logic unit a control cable assembly (with connector) is supplied with the equipment.

External indicators for “Stand-by time running” and “Stop” can be connected directly to the relay output terminal. Use the cable gland in the housing for the conntecting cables.

Bus cable, cable length and size

Screened multi-core twisted-pair control cable, e. g. UNITRONIC® BUS CAN 2 x 2 x .. mm^2;
Li 2YCY 2 x 2 x .. mm^2 must be used for the bus line.

Control cable assemblies (with male and female connectors) of various lengths are available as add-on equipment.

The cable length dictates the baud rate (data transfer rate) between the bus nodes, and the total power consumption of the sensor dictates the conductor size. **Factory set default** baud rate: 250 kbit/s (cable length up to 125 m).

Attention

All bus-based equipment must feature the baud rate setting 250 kbit/s (with cable length up to 125 m).

If the logic unit has a different baud rate when supplied you have to change the baud rate settings of the other bus-based devices so that they all feature the same baud rate.

Electrical Connection – continued –

CAN bus voltage supply

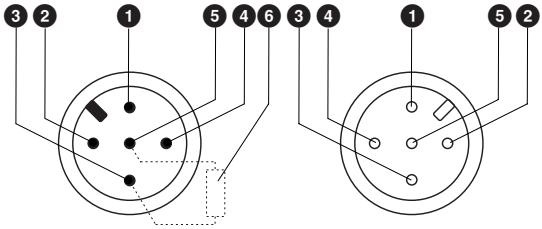
To ensure the troublefree operation of the CAN bus system make sure that the voltage supply is sufficient.

If the logic unit SRL 6-40 is used, a separate stabilized safety power supply unit (e. g. SITOP Smart 24 V 2.5 A) must supply the CAN bus with 24 V DC.

The safety power supply unit must be electrically isolated from dangerous contact voltages and must meet at least the requirements on double or reinforced isolation acc. to DIN EN 50178 or DIN EN 61010-1 or DIN EN 60950 (safe electrical isolation). The power supply unit must be provided with an overcurrent protective device in accordance with EN 61010-1/VDE 0411.

Do not connect the CAN bus supply to the control units (terminals 1 and 5).

Wiring diagram for logic unit SRL 6-40 a



Male connector Female connector

❶ Screen
❷ Voltage supply 24V DC+
❸ Voltage supply 24V DC–
❹ CAN data line C_H
❺ CAN data line C_L
❻ Terminating resistor 120 Ω

Connection diagram for the male and female connectors of CAN bus lines

Fig. 4

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680-1.
- Screwdriver for cross head screws, size 2

Wiring diagram for logic unit SRL 6-40 a – continued –

Wiring

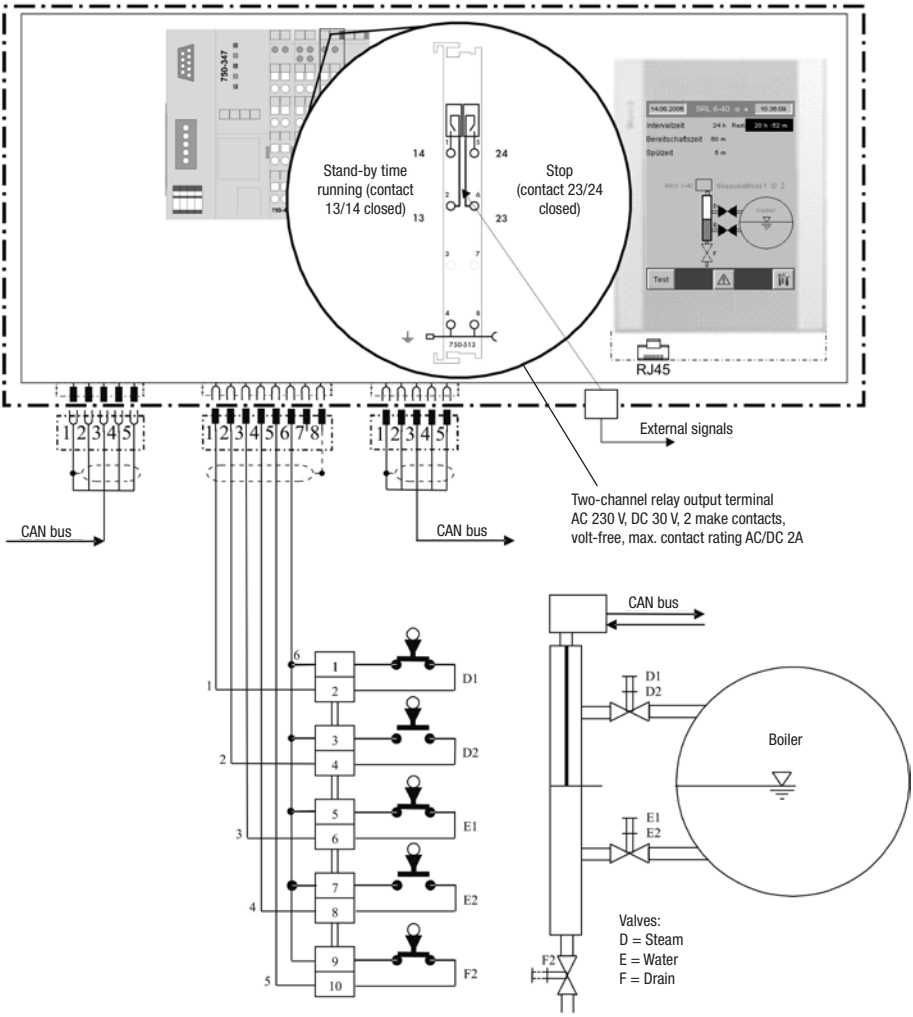


Fig. 5

Attention

Drawn position of valve limit switches: Valves in normal operating position.

Setting the Control Units

Control units NRS 1-40.1, NRS 1-40.2

Please configure the control units NRS 1-40.1, NRS 1-40.2 as specified in the following tables:

Control unit NRS 1-40.1

Toggle switch, white

Code switch E						Limiting function			
S1	S2	S3	S4	S5	S6	1	2	3	4
OFF	OFF	OFF	OFF	ON	ON	Water level LW 1 outside		Logic unit SRL 6-40	
ON	ON	ON	ON	OFF	OFF	Water level LW 1 Inside	Water level LW 2 outside		Logic unit SRL 6-40
ON	**ON**	**OFF**	**OFF**	**OFF**	**OFF**	**Water level LW 1 outside**	**Water level LW 2 outside**	**Logic unit SRL 6-40**	**Logic unit SRL 6-40**

Control unit NRS 1-40.2

Code switch E						Limiting function			
S1	S2	S3	S4	S5	S6	1	2	3	4
OFF	OFF	OFF	OFF	ON	ON	High level HW outside		Logic unit SRL 6-40	

Basic Settings

Factory setting

Logic unit SRL 6-40 a

The logic unit features the following factory set default values:

- Interval time: 24 hours
- Standby time: 1 hour
- Purging time: 5 minutes

Start, Operation, Alarm and Test

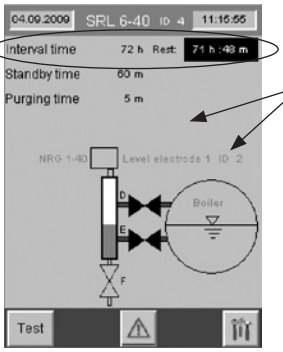
Switching equipment on

The interval time starts running once the system is switched on.

The interval time can be synchronized any time by closing one of the connecting valves (E or D), which means that the purging time starts running and the interval time is reset to its initial value (e. g. 24 h or 72 h etc.).

During operation the standby time will always be started after the interval time has elapsed. The interval time is immediately reset to its initial value (e. g. 24 h or 72 h etc.).

Interval time



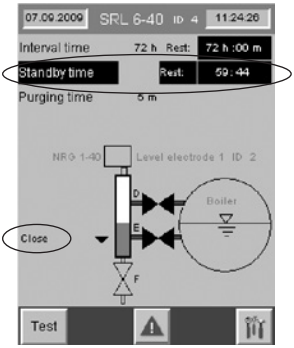
The preset interval time and the remaining runtime are shown in the start window of the display.

Note: Indication of the level electrode (with ID) with its associated control unit that is monitored by this logic unit.

Menu:

Test	Starts a test run
⚠	Shows the message table
	Shows the settings

Standby time



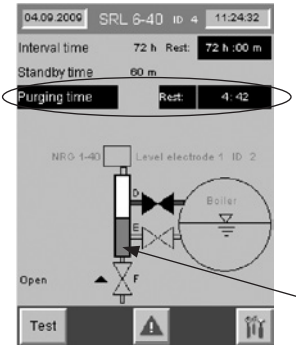
The standby time is indicated by the flashing text line and the remaining standby time is shown.

The flashing valve symbol ▼ prompts the boiler attendant to close the water valve (E) in order to initiate the purging process.

During the standby time the purging process must be started. The process is started when one connecting valve (E or D) leaves the final position “OPEN”. If the purging process is not initiated a stop command will be sent to the control unit (NRS 1-40.1, NRS 1-40.2) after the standby time has elapsed. The safety circuit will be interrupted.

Start, Operation, Alarm and Test – continued –

Purging time



The purging time is indicated by the flashing text line and the remaining purging time is shown.

The logic units informs the control unit NRS 1-40.1, NRS 1-40.2 via CAN bus that the purging process has started.

During purging the control unit NRS 1-40.1, NRS 1-40.2 ignores the signal from the level electrode. The purging time is limited to max. 5 minutes.

The status of the level electrode is shown dynamically.

Purging

Purge the level pot according to the requirements of your installation. For this purpose observe the following sequence of operations.

Purging **Steam boiler**	**Purging** **Hot-water installation**
Purging Valve D OPEN Valve E CLOSED Valve F CLOSED	Purging Valve D CLOSED Valve E CLOSED Valve F CLOSED
Purging Valve D OPEN Valve E CLOSED Valve F OPEN	Purging Valve D CLOSED Valve E CLOSED Valve F OPEN Open vent valve I *).
Purging Waiting for LW message ..37 sec.	
Purging Valve D CLOSED Valve E CLOSED Valve F OPEN	Purging Valve D CLOSED Valve E CLOSED Valve F CLOSED
Purging Valve D CLOSED Valve E OPEN Valve F OPEN	Purging Valve D OPEN Valve E OPEN Valve F CLOSED Close vent valve I *).
Purging Valve D OPEN Valve E OPEN Valve F CLOSED	Purging Waiting for message “normal water level”

*) Vent valve at level pot (if installed)

Purging – continued –

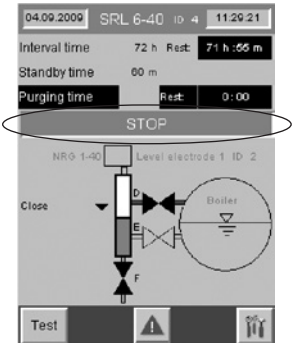
The required sequence of operations are indicated by text or symbols shown on the screen (open / close; ▲ / ▼).

The purging process is finished when all valves signal that they are in their initial positions.

Specify the type of installation (steam boiler or hot-water plant) when entering the settings.

Stop

The logic units informs the control unit NRS 1-40.1, NRS 1-40.2 via CAN bus if the standby time or the purging time is exceeded and the safety circuit will be opened.



The flashing STOP message indicates this deactivation.

For safety reasons the control unit NRS 1-40.1, NRS 1-40.2 monitors simultaneously the purging time and will also interrupt the safety circuit if the purging time is exceeded. The interruption and the STOP message will only be undone when the purging process is successfully finished.

Due to the interruption the safety circuit for the heating will be deactivated and interlocked. After the purging process the interlock must therefore be reset.

Special function

If both level electrodes **LW** are installed in a level pot outside the boiler, it is not permissible to purge them both at the same time.

If the second logic unit sends the message “Start purging” to the control unit NRS 1-40.1, NRS 1-40.2 while purging is effected by the first logic unit SRL 6-40, the safety circuit will be interrupted instantaneously and the red LED for bus status on the the control unit NRS 1-40.1, NRS 1-40.2 will be illuminated.

This interruption will only stop when the purging process is successfully finished by both devices and the mains voltage is switched off and switched on again after about 5 seconds.

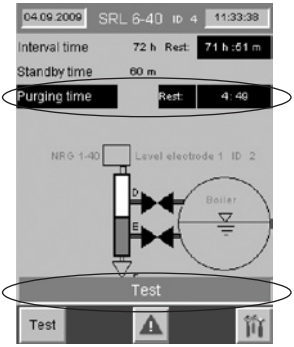
Start, Operation, Alarm and Test – continued –

Test

Checking the functional chain

Press button “TEST” on the screen of the logic unit to start the purging time outside the interval time.

Hold down the button for at least 3 sec.



The beginning of the TEST run is indicated by the flashing text messages “TEST” and “Purging time”.

During the TEST run no valve must be operated as this would restart the interval time.

When the purging time has elapsed the safety circuit will be deactivated and interlocked. 10 seconds later the safety circuit will automatically be switched on again and the interlock can be undone.

A TEST run is not possible during standby time. In this case the functional chain must be checked by delaying the purging process.

Monitoring

If the logic unit switches to STOP the data exchange with the control unit will be interrupted.
This means: The safety circuit is interrupted by the control unit NRS 1-40.1, NRS 1-40.2 and the bridging (if activated) will be cancelled.

Power failure, restoration of power supply

In the event of power failure the data exchange with the control unit will be interrupted.
This means: The safety circuit is interrupted by the control unit NRS 1-40.1, NRS 1-40.2 and the bridging (if activated) will be cancelled.
If power failure occurs during the interval time, when the power is restored the system will check whether the time for the next purging process has passed (time stamp for sytem time).
If this is the case, the standby time will be started. The interval time starts again at this point in time. It must be synchronised again at the desired moment by initiating the purging process.
If power failure occurs during the standby time, when the power is restored the command “Open safety circuit” will be sent to the control unit. The purging process must be carried out immediately so that the command can be cancelled.
If power failure occurs during the purging time, when the power is restored the command “Open safety circuit” will be sent to the control unit. The purging process must be continued and finished so that the command can be cancelled.

Settings

Start window

Press button  in the start window to open the following window:

Press touch screen buttons to change the following settings:

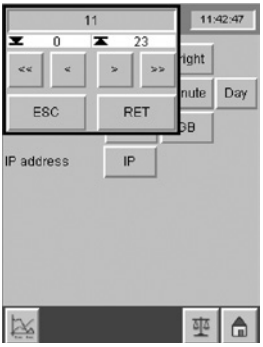
Brightness:	The setting “Dark” increases the service life of the backlight considerably!
Date / time:	Here you can set the system time. Additional operating windows will appear.
Language:	German or English
IP address:	Important for remote operation: An additional network mask will appear.

Press button  in the footer to open the window with SRL specific settings.

Press button  to return to the start window.

Date / time

When pressing the buttons Hour, Minute or Day an input mask (shown here for Hour) for changing the data pops up.



<< = –10

< = –1

> = +1

>> = +10

ESC = Escape

RET = Return

Settings – continued –

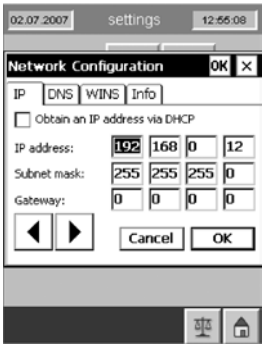
Language

Language: German or English

D = German
GB = English

IP address

IP address: For remote operation (optional)
If you want to have remote access to the equipment via ethernet, change the IP address here.



Touch the field that you want to modify.

◀: decrements the entry

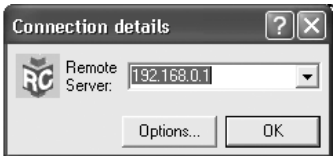
▶: increments the entry

Cancel: undoes the modification

OK: confirms the new entry

X: closes mask

The PC utility program *Remote Client Version 2.13.0*



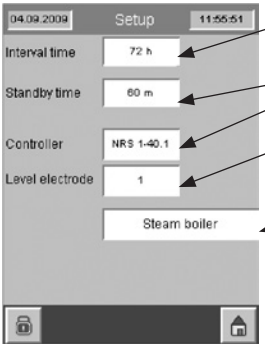
enables a PC to access the logic unit by using the IP address entered here.

The user interface of the logic unit that can be remotely accessed via PC appears.
The PC utility program *Remote Client Version 2.13.0* will be supplied on request.

Settings – continued –

Setup

In the window “Settings” press button t en the window with the SRL specific settings.



Adjusted times: Interval time
Standby time

Control unit with which the SRL communicates.

Number of level electrode that is monitored.
The equipment automatically ascertains the associated ID.

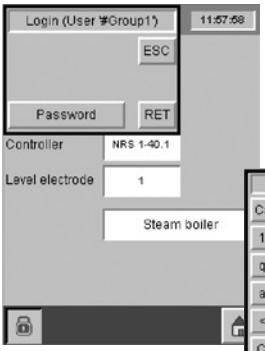
Specified type of installation

You have to enter your password if you want to change these settings.

Press button to return to the start window.

Press button to open the password box.

Password



ESC = Escape
RET = Return
Password = opens the on-screen keypad

Enter your password, press RET to confirm.

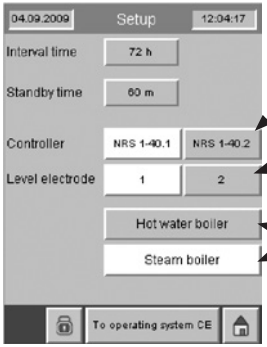
Press RET to close the previous window.

Factory-set password: 3503.
Other passwords available on request

Settings – continued –

Setting the control unit, number of level electrode and type of installation

After you have entered your password (3503) you can change the SRL specific settings.



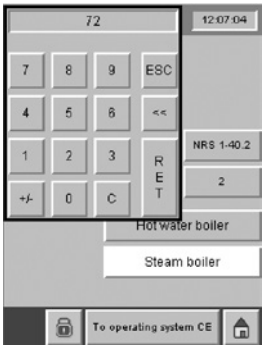
Here you can select the control unit that shall monitor the level electrode.

Here you can select the number of the electrode which will be monitored by the logic unit.

Here you can select the type of installation.

Setting the interval and standby times

Press button “Interval time” or “Standby time”. The following box will pop up:



Use the number pad to set the time.

<< = deletes last digit

ESC = Escape

RET = Return

Press button  to return to the start window.

Control unit	ID of control unit	ID of level electrode 1	ID of SRL	ID of level electrode 2	ID of SRL
NRS 1-40.1	1	2	4*)	3	5*)
NRS 1-40.2	6	7	9*)		

*) When selecting the control unit (see page 24) the software will automatically allocate the node ID to the SRL.

Messages

Setting the control unit, number of level electrode and type of installation

Press button ⚠ in the start window to open the following window:

This window shows all current messages with their time stamps.

To view a box that explains the message select the message and press button ?

The following status messages may be indicated:

1. Standby time
2. Purging time
3. Restoration of power supply
4. Switch of valve D defective
5. Switch of valve E defective
6. Stopped by SRL 6-40
7. Low water level alarm
8. Electrode offline
9. Test run SRL 6-40

Press button “Historical” to view old messages which are marked with the time stamps “came” and “went”.

The last 1000 messages are shown.

Use buttons ▲▼ to browse through the message table.

Press button “Current” to return to the display showing the current messages.

Press button ⌂ to return to the start window.

Decommissioning Procedure and Disposal

Decommissioning

Unplug the male and female connectors of the CAN bus line and plug them together.

Attention: If the CAN bus line is interrupted, the control unit will raise an alarm and the safety circuit will be interrupted.

Also unplug the connector of the connecting cable leading to the intermediate distribution frame.

Remove the logic unit SRL 6-40 a.

Disposal

Dismantle the logic unit SRL 6-40 a and separate the waste materials, using the material specification as a reference. Electronic components (circuit boards) must be disposed of separately.

For the disposal of the logic unit observe the pertinent legal regulations concerning waste disposal.

Annex

TÜV Confirmation

TÜV SÜD Industrie Service

Mehr Sicherheit. Mehr Wert.

BESTÄTIGUNG

über die

Prüfung einer Einrichtung zur Steuerung und Überwachung des getrennten periodischen Durchspülens der Verbindungsleitungen von außenliegenden Meßgefäßen für Niveauelektroden von Wasserstandbegrenzern und Hochwasserstandsicherungen in Dampfkesselanlagen

Datum: 2007-05-24

Unsere Zeichen:
IS-TAF-MUC/ku

Auftrags-Nr. 975278

Dokument:
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Seite 1

Prüfstelle:	TÜV SÜD Industrie Service GmbH Abteilung Feuerungs- und Wärmetechnik
Prüfgegenstand:	Überwachungslogik Typ SRL 6-40
Auftraggeber:	Gestra AG D-28215 Bremen
Grundlage der Prüfung:	DIN EN 50156-1:2005-03; TRD 604 (Bl. 1/2, 24/72 Std. Betrieb, Ausgabe 1993-10), Abschnitt 3; VdTÜV-Merkblatt Wasserstand 100:2006-07; Normen der Reihen EN 12952 und EN 12953; jeweils in Anlehnung
Prüfbericht:	Nr. C 1348-00/07 vom 2007-05-24

Das Dokument besteht aus 2 Seiten

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

Die Prüfung wurde mit positivem Ergebnis abgeschlossen.
Die Funktion der Überwachungseinrichtung ist innerhalb des zulässigen Spannungs- und Temperaturbereiches gegeben.
Die Rückwirkungsfreiheit der Überwachungseinrichtung auf den Sicherheitsstromkreis ist bei Auftreten von internen Fehlern gegeben.

Die einzelnen Ergebnisse der Prüfung, deren Bewertung und die sich daraus ergebenden Maßgaben sind in dem angegebenen Prüfbericht sowie auszugsweise auf der Rückseite dieser Bestätigung wiedergegeben.

Feuerungs- und Wärmetechnik

Johannes Steiglechner

Sitz: München
Amtsgericht: München HRB 96 869

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TÜV Confirmation – continued –

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Unser Zeichen, Erstelldatum, Kennzeichnung: IS-TAF-MUC/ku, 2007-05-24 ,
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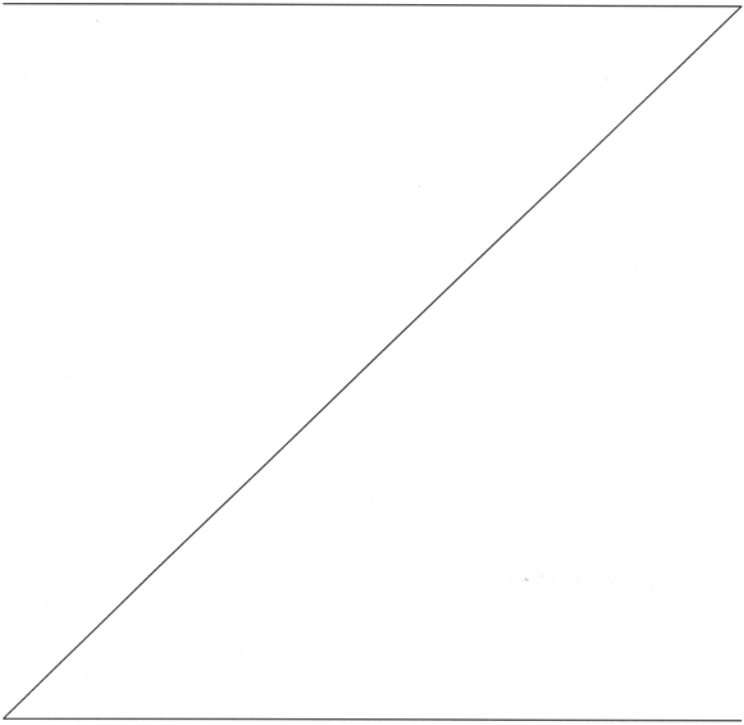
Industrie Service

Die Verwendung der Überwachungslogik Typ SRL 6-40 ist vorgesehen in Verbindung mit einem Sicherheits-Steuergerät Typ NRS 1-40, NRS 1-40.1, NRS 1-41 oder NRS 1-40.2.

Bei der Verwendung sind die nachfolgenden Maßgaben zu berücksichtigen:

1. Die Überwachungslogik hat werksseitig eine eingestellte Spülzeit von 5 Minuten, eine Intervallzeit von 24 bzw. 72 Stunden und eine Bereitschaftszeit von 1 Stunde.
   Eine andere Einstellung der Intervallzeit bzw. der Bereitschaftszeit muß in Übereinstimmung mit den Anforderungen an die Applikation erfolgen.
2. Der Sicherheitsstromkreis ist mit maximal T 2,5 A (bzw. T 1 A für TRD 604, 72 h-B.o.B.) abzusichern.



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