1 YEAR WARRANTY

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User's Guide

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DRST-UR
Universal Transmitter with Relays

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Table of Contents

Table of Contents

GENERAL

WARNING

This device is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage. To avoid the risk of electric shock and fire, the safety instructions of this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following. Prior to the commissioning of the device, this manual must be examined carefully. Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

HAZARDOUS VOLTAGE

WARNING

Until the device is fixed, do not connect hazardous voltages to the device. The following operations should only be carried out on a disconnected device and under ESD safe conditions:

- Dismantlement of the device for setting of DIP-switches and jumpers.
- General mounting, connection and disconnection of wires. Troubleshooting the device.

Repair of the device and replacement of circuit breakers must be done by A/S only.

INSTALLATION

WARNING

To keep the safety distances, the relay contacts on the device must not be connected to both hazardous and non-hazardous voltages at the same time. SYSTEM 4000 must be mounted on a DIN rail according to DIN 46277.

WARNING

Do not open the front plate of the device as this will cause damage to the connector for the display/programming front Omega **DRSL-DISPLAY**. This device contains no DIP-switches or jumpers.

Section 2.1 - Symbol Identification

Triangle with an exclamation mark: Warning/demand. Potentially lethal situations.

The CE mark proves the compliance of the device with the essential requirements of the directives.

The double insulation symbol shows that the device is protected by double or reinforced insulation.

Section 2.2 - Safety instructions

Definitions

Hazardous voltages have been defined as the ranges: 75 to 1500 Volt DC, and 50 to 1000 Volt AC.

Technicians are qualified persons educated or trained to mount, operate, and also troubleshoot technically correct and in accordance with safety regulations.

Operators, being familiar with the contents of this manual, adjust and operate the knobs or potentiometers during normal operation.

Receipt and unpacking

Unpack the module without damaging it. The packing should always follow the module until this has been permanently mounted. Check at the receipt of the module whether the type corresponds to the one ordered.

Environment

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation. All devices fall under Installation Category II, Pollution Degree 1, and Insulation Class II.

Mounting

Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the device. Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location. Descriptions of input / output and supply connections are shown in the block diagram and side label.

The following apply to fixed hazardous voltages-connected devices:

The max. size of the protective fuse is 10 A and, together with a power switch, it should be easily accessible and close to the device. The power switch should be marked with a label telling it will switch off the voltage to the device.

Year of manufacture can be taken from the first two digits in the serial number.

UL INSTALLATION REQUIREMENTS
Use 60/75°C copper conducters only
For use only in pollution degree 2 or better
Max. ambient temperature ..... 60°C
Max. wire size..... AWG 26-14
UL file number E231911

Calibration and Adjustment

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

Normal operation

Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.

Cleaning

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

Liability

To the extent that the instructions in this manual are not strictly observed, the customer cannot advance a demand against Omega Engineering A/S that would otherwise exist according to the concluded sales agreement.

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against Omega Engineering A/S that would otherwise exist according to the concluded sales agreement.

Section 3.1 - How to Dismantle DRST-UR

First, remember to demount the connectors with hazardous voltages.
Picture 1: Detach the device from the DIN rail by lifting the bottom lock.

Section 3.2 - When front LED lights red / display shows AO.ER

Omega DRST-UR is designed as a SIL 2 device with a high safety level. Therefore, a continuous measurement of the outgoing current is carried out on a 4...20 mA and 20...4 mA output signal. If the current output signal is different from the internal calculated output value or the current output is 0 (due to e.g. an open circuit breakage), an error mode switches on the red front LED and disables the relays. This function is not a default option but must be actively selected via the programming menu (S4-20 & S20-4).
The error mode can only be reset by switching off and then switching on the supply voltage to the device.

Section 4.1 - Universal Transmitter DRST-UR

- Input for RTD, TC, Ohm, potentiometer, mA and V
- 2-wire supply > 16 V
- Output for current, voltage and 2 relays
- Universal AC or DC supply

Section 4.2 - Advanced features

- Programmable via detachable display front (**DRSL-DISPLAY**), process calibration, signal and relay simulation, password protection, error diagnostics and selection of help text in several languages.

Section 4.3 - Application

- Linearised, electronic temperature measurement with RTD or TC sensor.
- Conversion of linear resistance variation to a standard analogue current / voltage signal, i.e. from solenoids and butterfly valves or linear movements with attached potentiometer.
- Power supply and signal isolator for 2-wire transmitters.
- Process control with 2 pairs of potential-free relay contacts and analogue output.
- Galvanic separation of analogue signals and measurement of floating signals.
- The DRST-UR is designed according to strict safety requirements and is thus suitable for application in SIL 2 installations.

Section 4.4 - Technical characteristics

- When DRST-UR is used in combination with the **DRSL-DISPLAY**/programming front, all operational parameters can be modified to suit any application. As the DRST-UR is designed with electronic hardware switches, it is not necessary to open the device for setting of DIP switches.
- A green / red front LED indicates normal operation and malfunction. A yellow LED is ON for each active output relay.
- Continuous check of vital stored data for safety reasons.
- 4-port 2.3 kVAC galvanic isolation.

Section 5.1- Display / programming front

Functionality

The simple and easily understandable menu structure and the explanatory help texts guide you effortlessly and automatically through the configuration steps, thus making the product very easy to use. Functions and configuration options are described in the section "Configuration / operating the function keys".

Section 5.2 - Application

- Communications interface for modification of operational parameters in DRST-UR.
- Can be moved from one DRST-UR device to another and download the configuration of the first transmitter to subsequent transmitters.
- Fixed display for readout of process data and status.

Section 5.3 - Technical characteristics

- LCD display with 4 lines; Line 1 (H=5.57 mm) shows input signal, line 2 (H=3.33 mm) shows units, line 3 (H=3.33 mm) shows analogue output or tag no. and line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration.

Section 5.4 - Mounting / installation

- Click **DRSL-DISPLAY** onto the front of DRST-UR.

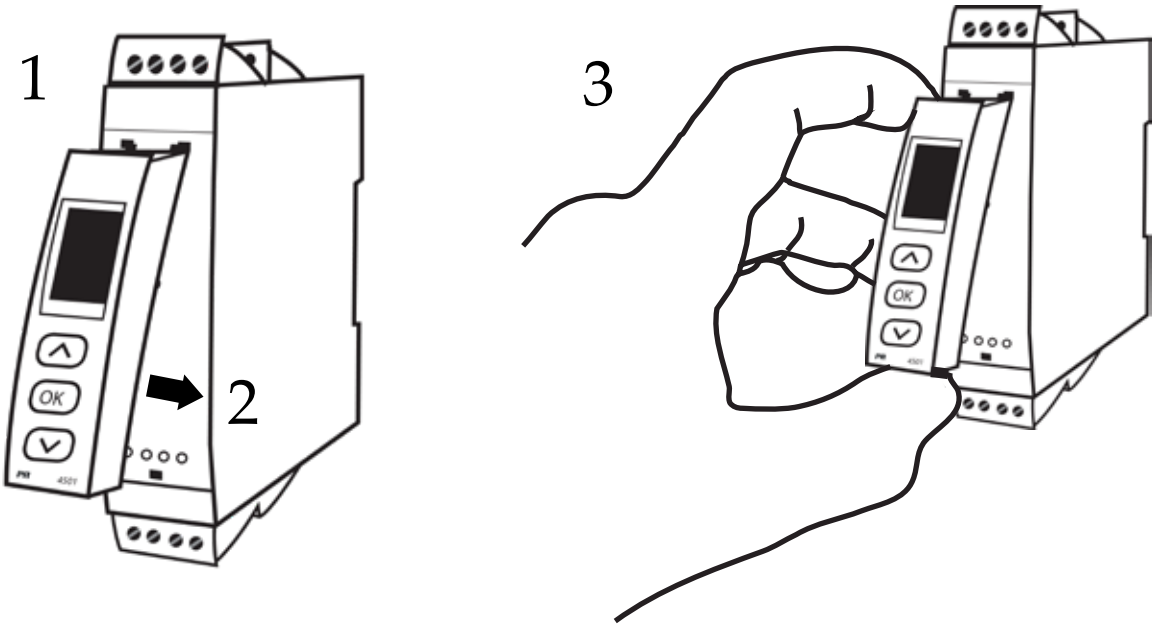
Mounting / Demounting the DRSL-DISPLAY/DRST-UR

1: Insert the taps of **DRSL-DISPLAY**/DRST-CM into the holes at the top of the device.

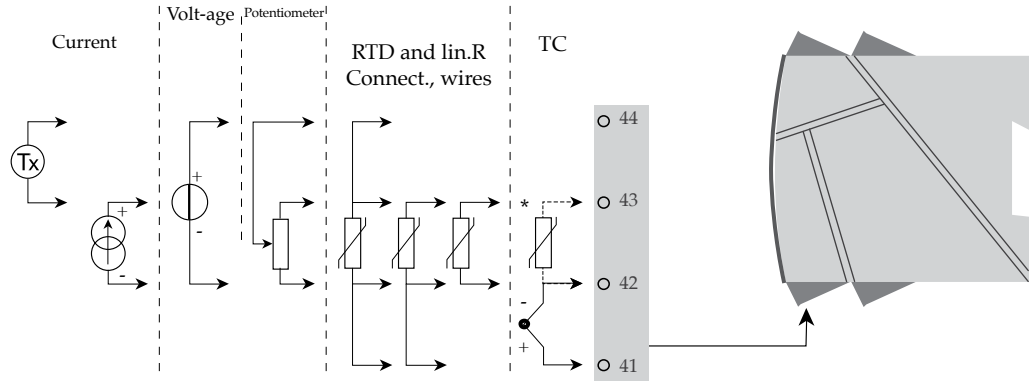
2: Swing **DRSL-DISPLAY**/DRST-CM into place.

Demounting of DRSL-DISPLAY/DRST-UR

3: Push the release button on the bottom of **DRSL-DISPLAY/DRST-UR** and swing **DRSL-DISPLAY/DRST-UR** up.

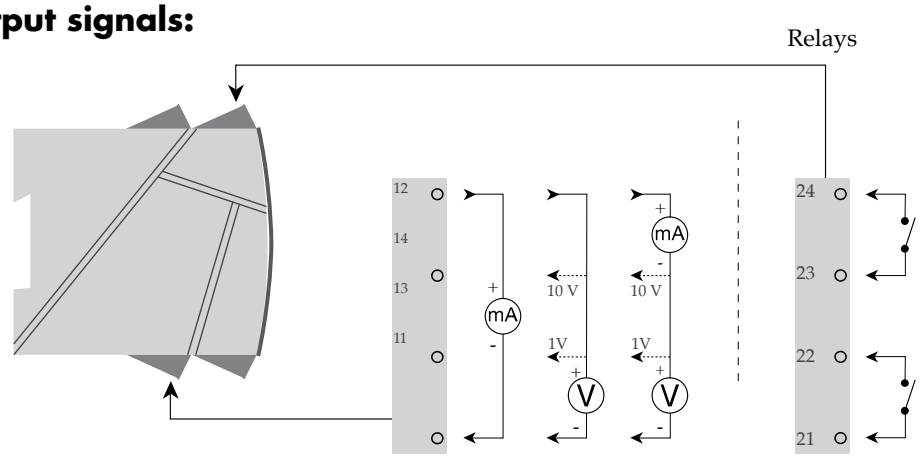


Input signals:



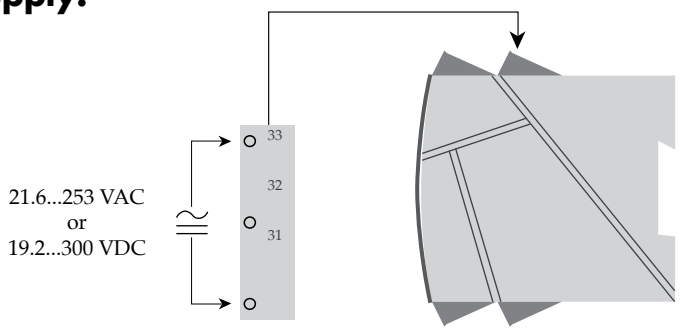
Order separately: 5910 CJC connector.
See the connection drawing on page 16.

Output signals:



Analogue, 0/4...20 mA and voltage

Supply:



Order codes

DRST-UR = Universal transmitter
DRSL-DISPLAY = Display / programming front

Electrical specifications

Environmental conditions

Specifications range ..... -20°C to +60°C
Calibration temperature..... 20...28°C
Relative humidity..... < 95% RH (non-cond.)
Protection degree IP20

Mechanical specifications

Dimensions (HxBxD)..... 109 x 23.5 x 104 mm
Dimensions, with **DRSL-DISPLAY/DRST-CM** (H x B x D), 109 x 23.5 x 116/131 mm
Weight..... 170 g
Weight with **DRSL-DISPLAY/DRST-CM** 185 g / 270 g
Max. wire size..... 1 x 2.5 mm^2 stranded wire
Screw terminal torque ..... 0.5 Nm
Vibration..... IEC 60068-2-6 : 2007
2...13.2 Hz ..... ±1 mm
13.2...100 Hz ..... ±0.7 g

Common specifications

Supply voltage, universal ..... 21.6...253 VAC, 50...60 Hz
or 19.2...300 VDC
Max. consumption ..... ≤ 2.5 W
Fuse ..... 400 mA SB/250 VAC
Isolation voltage, test / operation 2.3 k VAC/250 VAC
Communications interface..... Communication enabler **DRST-CM**
Programming front **DRSL-DISPLAY**
Signal / noise ratio..... Min. 60 dB (0...100 kHz)
Response time (0...90%, 100...10%):
Temperature input ..... ≤ 1 s
mA / V input ..... ≤ 400 ms

Accuracy, the greater of the general and basic values:

General values		
Input type	**Absolute accuracy**	**Temperature coefficient**
All	≤ ±0.1% of span	≤ ±0.01% of span/°C

Section 8 - Inputs

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	≤ ±4 μA	≤ ±0.4 μA / °C
Volt	≤ ±20 μV	≤ ±2 μV / °C
Pt100	≤ ±0.2°C	≤ ±0.01°C / °C
Linear resistance	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
Potentiometer	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
TC type: E, J, K, L, N, T, U	≤ ±1°C	≤ ±0.05°C / °C
TC type: R, S, W3, W5, LR	≤ ±2°C	≤ ±0.2°C / °C
TC type: B 85...200°C	≤ ±4°C	≤ ±0.4°C / °C
TC type: B 200...1820°C	≤ ±2°C	≤ ±0.2°C / °C

EMC immunity influence ..... < ±0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst ..... < ±1% of span

Auxiliary supplies:
2-wire supply (terminal 44...43) ... 25...16 VDC / 0...20 mA

RTD, linear resistance and potentiometer input

Input for RTD types:
Pt10, Pt20, Pt50, Pt100, Pt200, PT250, Pt300, Pt400, Pt500, Pt1000
Ni50, Ni100, Ni120, Ni1000, Cu10, Cu20, Cu50, Cu100

Input type	Min. value	Max. value	Standard
Pt10...Pt1000	-200°C	+850°C	IEC 60751
Ni50...Ni1000	-60°C	+250°C	DIN 43760
Cu10...Cu100	-200°C	+260°C	α = 0,00427
Lin. R	0 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-

Cable resistance per wire (max.), RTD 50 Ω
Sensor current, RTD..... Nom. 0.2 mA
Effect of sensor cable resistance
(3- / 4-wire), RTD..... < 0.002 Ω / Ω
Sensor error detection, RTD ..... Yes
Short circuit detection, RTD ..... < 15 Ω

Section 8.2 - TC Input

Type	Min. value	Max. value	Standard
B	0°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

Cold junction compensation (CJC):
via external sensor in connector 5910 20...28°C ≤ ±1°C
-20...20°C / 28...70°C ≤±2°C
via internal CJC sensor..... ±(2.0°C + 0.4°C * Δt)
Δt = internal temperature - ambient temperature
Sensor error detection, all TC types: Yes
Sensor error current:
when detecting ..... Nom. 2 μA
else ..... 0 μA
Current input
Measurement range ..... 0...20 mA
Programmable measurement ranges 0...20 and 4...20 mA
Input resistance ..... Nom. 20 Ω + PTC 50 Ω
Sensor error detection:
Loop break 4...20 mA..... Yes
Voltage input
Measurement range ..... 0...12 VDC
Programmable measurement ranges 0...1 / 0.2...1 / 0...5 / 1...5 /
0...10 and 2...10 VDC
Input resistance ..... Nom. 10 MΩ

Current output

Signal range (span)	0...20 mA
Programmable signal ranges	0...20 / 4...20 / 20...0 and 20...4 mA
Load (max.)	20 mA / 800 Ω / 16 VDC
Load stability	≤ 0.01% of span / 100 Ω
Sensor error detection	0 / 3.5 / 23 mA / none
NAMUR NE 43 Upscale / Downscale	23 mA / 3.5 mA
Output limitation:	
on 4...20 and 20...4 mA signals	3.8...20.5 mA
on 0...20 and 20...0 mA signals	0...20.5 mA
Current limit	≤ 28 mA

Voltage output

Signal range	0...10 VDC
Programmable signal ranges	0...1 / 0.2...1 / 0...10 / 0...5 / 1...5 / 2...10 / 1...0 / 1...0.2 / 5...0 / 5...1 / 10...0 og 10...2 V
Load (min.)	500 kΩ

Relay outputs

Relay functions	Setpoint, Window, Sensor error, Latch, Power and Off
Hysteresis	0...100%
On and Off delay	0...3600 s
Sensor error detection	Break / Make / Hold
Max. voltage	250 VRMS
Max. current	2 A / AC or 1 A / DC
Max. AC power	500 VA

Ex / I.S. approval

FM, applicable in	Class I, Div. 2, Group A, B, C, D Class I, Div. 2, Group IIC Zone 2
Max. ambient temperature for T5	60°C

Marine approval

Det Norske Veritas, Ships & Offshore	Standard for Certification No. 2.4

Observed authority requirements	**Standard**
EMC 2004/108/EC	EN 61326-1
LVD 2006/95/EC	EN 61010-1
FM	3600, 3611, 3810 and ISA 82.02.01
UL, Standard for Safety	UL 508
EAC TR-CU 020/2011	EN 61326-1

of span = of the currently selected measurement range

Section 9 - Visualisation in the DRSL-DISPLAY of sensor error detection and input signal outside range

Sensor error check:		
Device:	**Configuration**	**Sensor error detection:**
DRST-UR	R1, ERR.ACT=NONE - R2, ERR. ACT=NONE, OUT.ERR=NONE.	OFF
	Else:	ON

Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded			
Input	**Range**	**Readout**	**Limit**
VOLT	0...1 V / 0.2...1 V	IN.LO	< -25 mV
		IN.HI	> 1.2 V
	0...10 V / 2...10 V	IN.LO	< -25 mV
		IN.HI	> 12 V
CURR	0...20 mA / 4...20 mA	IN.LO	< -1.05 mA
		IN.HI	> 25.05 mA
LIN.R	0...800 Ω	IN.LO	< 0 Ω
		IN.HI	> 1075 Ω
	0...10 kΩ	IN.LO	< 0 Ω
		IN.HI	< 110 kΩ
POTM	-	IN.LO	< -0.5 %
		IN.HI	> 100.5 %
TEMP	TC / RTD	IN.LO	< temperature range -2°C
		IN.HI	> temperature range +2°C

Display readout below min.- / above max. (-1999, 9999):			
Input	**Range**	**Readout**	**Limit**
All	All	-1999	Display readout <-1999
		9999	Display readout >9999

Sensor error detection limits

Sensor error detection (SE.BR, SE.SH):			
Input	**Range**	**Readout**	**Limit**
CURR	Loop break (4..20 mA)	SE.BR	<= 3.6 mA; > = 21 mA
POTM	All, SE.BR on all 3-wire	SE.BR	> ca. 126 kΩ
LIN.R	0...800 Ω	SE.BR	> ca. 875 Ω
	0...10 kΩ	SE.BR	> ca. 11 kΩ
TEMP	TC	SE.BR	> ca. 750 kΩ / (1.25 V)
	RTD, 2-, 3-, and 4-wire No SE.SH for Cuxx, Pt10, Pt20 and Pt50	SE.BR	> ca. 15 kΩ
		SE.SH	< ca. 15 Ω

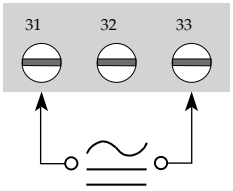
Section 10.1 - Error indications

Readout at hardware error		
Error search	Readout	Error cause
Test of internal CJC sensor	CJ.ER	CJC sensor defect or temperature outside range
Checksum test of the configuration in FLASH	FL.ER	Error in FLASH
Check measurement of analogue output current	AO.ER	1) No load on the current output (only S4...20/S20...4 mA)
Communications test **DRSL-DISPLAY/DRST-UR**	NO.CO	Connection error
Check that input signal matches input configuration	IN.ER	1) Error levels on input
Check that saved configuration in **DRSL-DISPLAY** matches device	TY.ER	Configuration is not DRST-UR

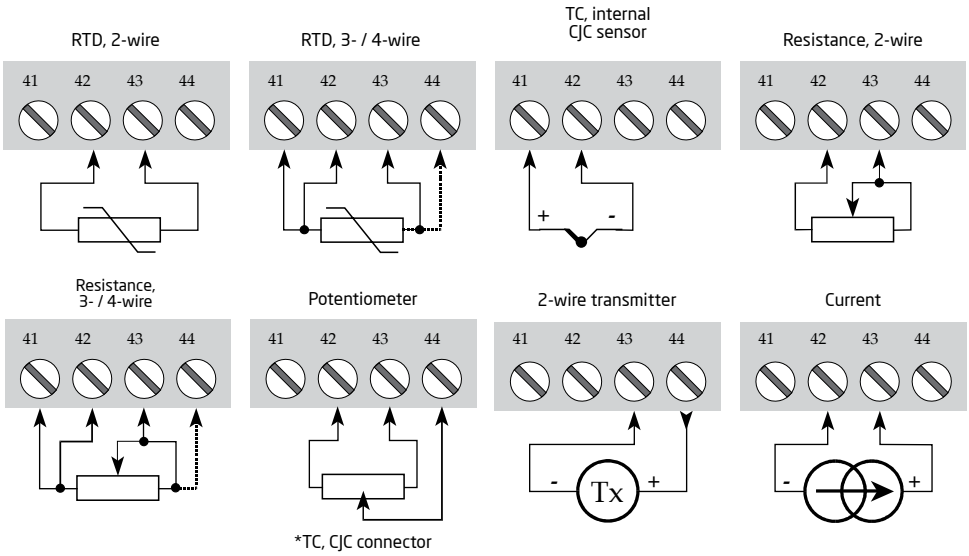
! Error indications in the display flash once per second. The help text explains the error.
1) The error is reset by switching off and then switching on the supply voltage to the device.

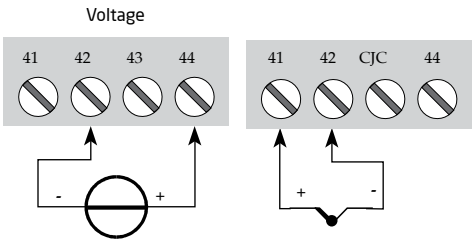
Section 11 - Connections

Supply:



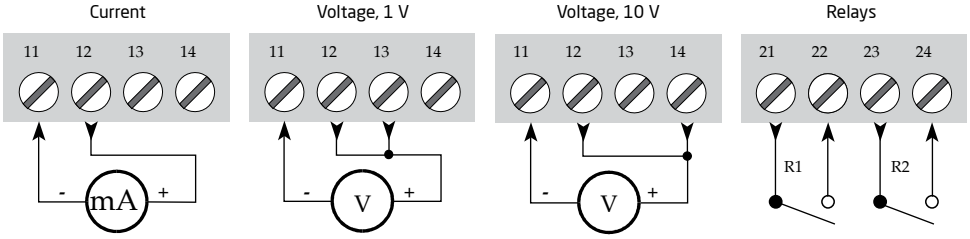
Inputs:



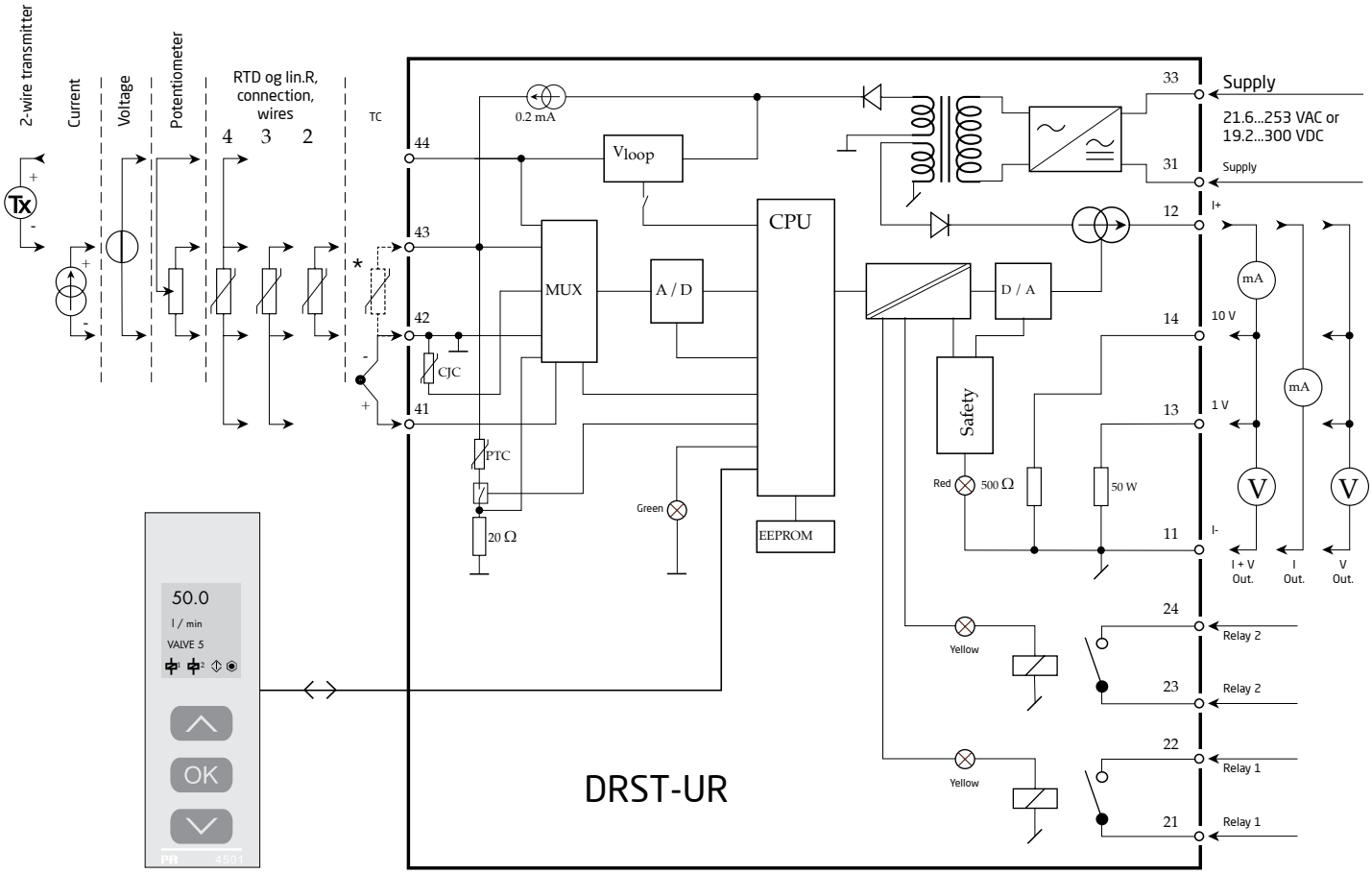


* Order separately:
CJC connector 5910

Outputs:



Order separately: CJC connector 5910



Section 13.1 - Configuration / operating the function keys

Documentation for routing diagram.

In general

When configuring the DRST-UR, you will be guided through all parameters and you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

Configuration is carried out by use of the 3 function keys:

- ⌃ will increase the numerical value or choose the next parameter
- ⌄ will decrease the numerical value or choose the previous parameter
- OK will accept the chosen value and proceed to the next menu

When configuration is completed, the display will return to the default state 1.0.

Pressing and holding OK will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

If no key is activated for 1 minute, the display will return to the default state (1.0) without saving the changed values or parameters.

Further explanations

Fast setpoint adjustment and relay test: These menus allow you to make a quick setpoint change and relay test when the FastSet menu is activated. This function can only be activated when the relays are set for setpoint function and are controlled by a setpoint.

Pressing ⌃ and ⌄ simultaneously will activate a relay test and change the state of the relay.

Pressing OK will save the setpoint change.

Holding down OK for more than 1 second will return the unit to the default state without saving the setpoint change.

Password protection: Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration. Default password 2008 allows access to all configuration menus.

Section 13.1 - Signal and sensor error info via display front DRSL-DISPLAY

Sensor error (see limits in the table) is displayed as SE.BR (sensor break) or SE.SH (sensor short). Signals outside the selected range (not sensor error, see table for limits) are displayed as IN.LO indicating low input signal or IN.HI indicating high input signal. The error indication is displayed in line 3 as text and at the same time the backlight flashes. Line 4 of the display is a status line which displays status of relay 1 and relay 2, COM (flashing bullet) indicating correct functioning of **DRSL-DISPLAY** and arrow up/down which indicates tendency readout of the input signal. If the figure 1 or figure 2 flashes, the unit has detected that the setpoint has been exceeded and that the relay is in "delay" mode. When the delay time has passed and the relay makes/breakes, the relay sign either displays or disappears.

Signal and sensor error indication without display front

Status of the unit can also be read from the red/green LED in the front of the device.

Green flashing LED 13 Hz indicates normal operation.
Green flashing LED 1 Hz indicates sensor error.
Steady red LED indicates internal error.

Relay functions

6 different settings of relay function can be selected.

Setpoint: The unit works as a single limit switch
Window: The relay has a window that is defined by a low and a high setpoint. On both sides of the window the relay has the same status.

Error function: The relay is activated by sensor error.
Power: The relay is activated as long as the power is on.
Off: The relay is deactivated.
Latch: The relay is latched. Only valid for setpoint and window function.

Increasing/decreasing: The relays can be set to activate at increasing or decreasing input signal.

Delay: An ON and an OFF delay can be set on both relays in the range 0...3600 s.

Hysteresis: 0.0...100.0%.

Latch

When the setpoint is exceeded the relay outputs enters an alarm state. The latch function of the DRST-UR will hold the relays in this state until the function is deactivated manually. The latch function can be applied when the relay function setpoint or window is selected.

The latch function can be selected separately for each relay output. If the configuration is copied from one device to another by way of the **DRSL-DISPLAY**, the latch function must be reconfigured.

The latch function activates and holds the relays when the input signal rises above or falls below the selected setpoints and the relay action has been selected as increasing or decreasing.

The window function is selected by choosing ”window” in the menu and defining a high and a low setpoint.

It can be selected for each relay contact whether the contact is open or closed inside the window. This selection is made in the menu R1.cont and R2.cont.

The setpoint function is selected by choosing ”setpoint” in the menu and entering the desired limit. The device then works as a single limit switch.

An activated relay means that the contact is closed if the contact function ”normally open” is selected, and the contact is open if the contact function ”normally closed” is selected.

The delay time for activation and deactivation can be set independently of each other in the menus ON.DEL and OFF DEL respectively.

If the relay function ”Error” is active, the relay will latch when a sensor error occurs and will not be deactivated automatically when the sensor error is rectified.

The relay can only be deactivated by an operator and only when the normal conditions for deactivation are met. If the input signal still has a value that will activate the relay, the relay will latch again.

See the graphic depiction of the setpoint and window functions on pages 34 and 35.

Section 15.1 - Manual deactivation of the latch function

If the relay outputs are activated and thereby latched, it will be indicated in the display. The backlight flashes and the scrolling help text tells you how to deactivate the output. Manual deactivation is carried out by way of the front buttons on the **DRSL-DISPLAY**. Use ⌃ and ⌄ to navigate in the menu and OK to validate your selection. If the password protection has been activated, the password must be entered in order to access the deactivation menu. See the menu structure on page 29.

Section 15.2 - Advanced functions

The device gives access to a number of advanced functions which can be reached by answering "Yes" to the point "adv.set".

Section 15.3 - Display setup:

Here you can adjust the brightness contrast and the backlight. Setup of TAG numbers with 6 alphanumerics. Selection of functional readout in line 3 of the display - choose between readout of analogue output or tag no.

Section 15.4 - Two-point process calibration:

The device can be process-calibrated in 2 points to fit a given input signal . A low input signal (not necessarily 0%) is applied and the actual value is entered via **DRSL-DISPLAY**. Then a high signal (not necessarily 100%) is applied and the actual value is entered via **DRSL-DISPLAY**. If you accept to use the calibration, the device will work according to this new adjustment. If you later reject this menu point or choose another type of input signal the device will return to factory calibration.

Section 15.5 - Process simulation function:

If you agree to the point "EN.SIM" it is possible to simulate an input signal by means of the arrow keys and thus control the output signal up or down. When you finalise the point with OK , the device returns to normal mode. The following point allows you to activate relay 1 and relay 2 by means of the arrow-keys up/down. You must exit the menu by pressing OK (no time-out).

Section 15.6 - Password:

Here you can choose a password between 0000 and 9999 in order to protect the device against unauthorised modifications to the configuration. The device is delivered default without password. If you have locked the device with a password by mistake, you can always open the menu by using the master password 2008.

Section 15.7 - Language:

In the menu "lang.setup" you can choose between 7 different language versions of help texts that will appear in the menu. You can choose between UK, DE, FR, IT, ES, SE and DK.

Section 16 - Auto diagnosis

The device performs an advanced auto diagnosis of the internal circuits.

The following possible errors can by displayed in the front unit **DRSL-DISPLAY**.

CJ.ER -CJC sensor defect or CJC temperature outside range

FL.ER - Flash error

AO.ER - No load on the current output (only for S4...20 mA / S20...4 mA)

NO.CO - Connection error

IN.ER - Error levels on input

TY.ER - Configuration in **DRSL-DISPLAY** does not match this product type

Section 17.1 - Selection of units

After choosing the input signal type you can choose which process units should be displayed in text line 2 (see table). By selection of temperature input the process value is always displayed in Celsius or Fahrenheit. This is selected in the menu point after selection of temperature input.

Section 17.2 - Safety readback

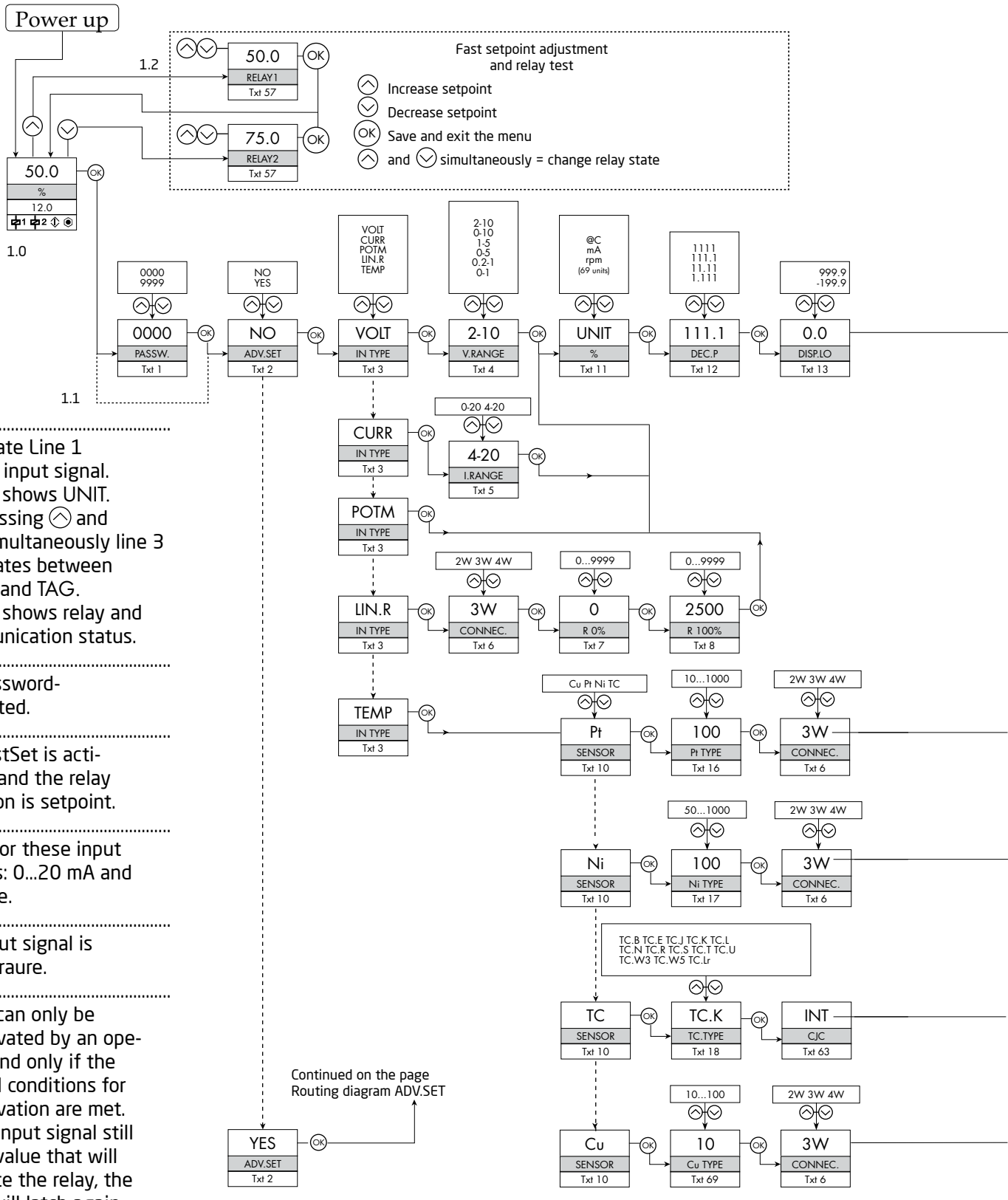
When the device is delivered with default configuration, the SIL function is disabled. The safety readback function (loop surveillance) can be selected in the menu O.RANGE, thus enabling the device to run in SIL mode. In order to enable the SIL functionality, the menu item S4...20 mA must be selected. Please note, however, that when safety readback is enabled, a sensor error will be indicated as an error on the analogue output signal.

Section 17.3 - CJC

In the CJC menu you can choose between CJC connector and internal cold junction compensation. The CJC connecter must be ordered separately.

Section 17.4 - Memory

In the memory menu you can save the configuration of the device in the **DRSL-DISPLAY**, and then move the **DRSL-DISPLAY** onto another device of the same type and download the configuration in the new device.



1.0 =.....
Default state Line 1 shows input signal. Line 2 shows UNIT. By pressing ⌃ and ⌄ simultaneously line 3 alternates between A.Out and TAG. Line 4 shows relay and communication status.

1.1 =.....
Only if password-protected.

1.2 =.....
Only if FastSet is activated and the relay function is setpoint.

1.3 =.....
Not valid for these input signals: 0...20 mA and voltage.

1.4 =.....
Only if input signal is temperaure.

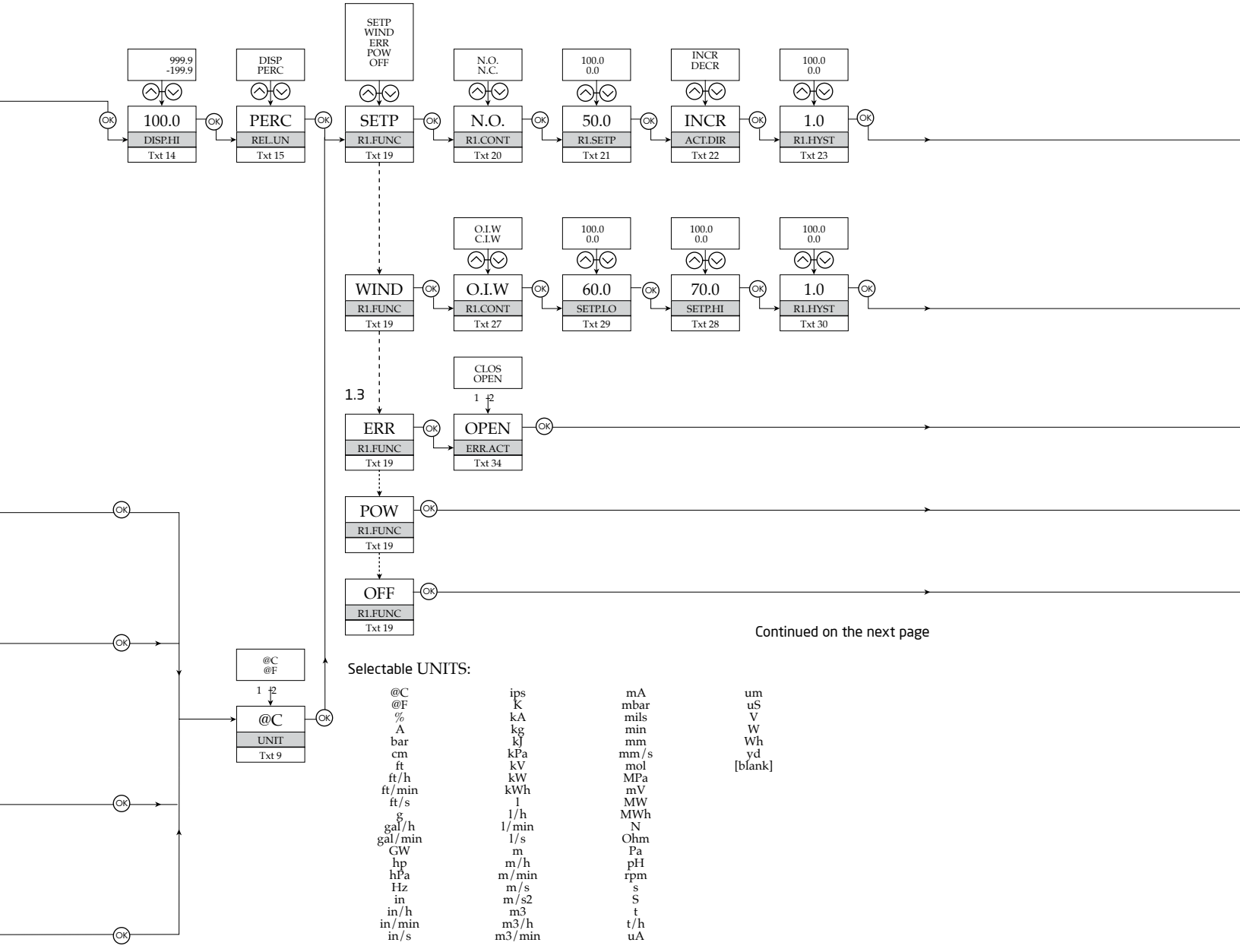
1.5 =.....
The relay can only be deactivated by an operator and only if the normal conditions for deactivation are met. If the input signal still has a value that will activate the relay, the relay will latch again.

Section 18.1 - Routing diagram

If no key is activated for 1 minute, the display will return to the default state 1.0 without saving configuration changes.

- ⌃ Increase value / choose next parameter
- ⌄ Decrease value / choose previous parameter
- OK Accept the chosen value and proceed to the next menu

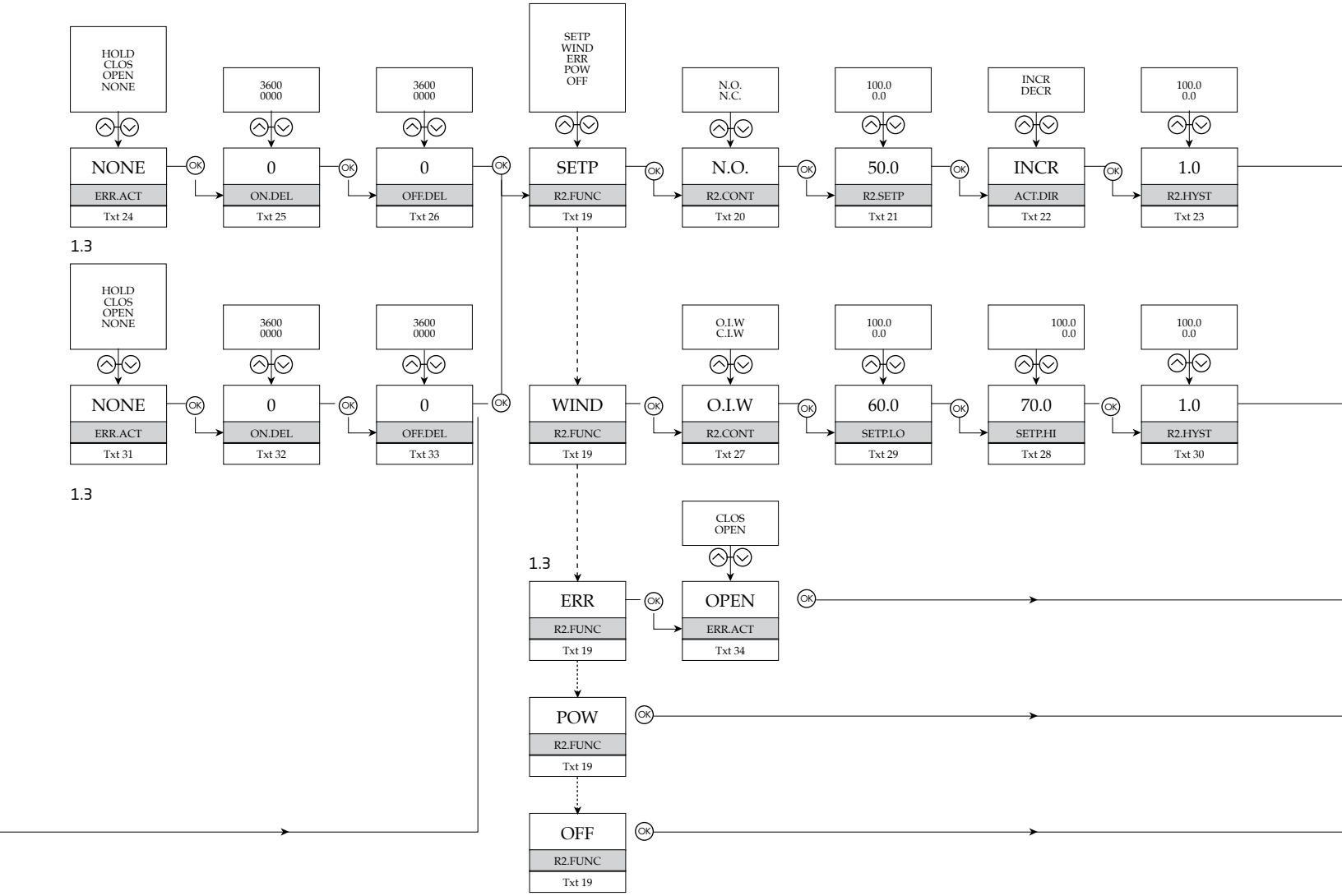
  Hold OK Back to previous menu / return to menu 1.0 without saving

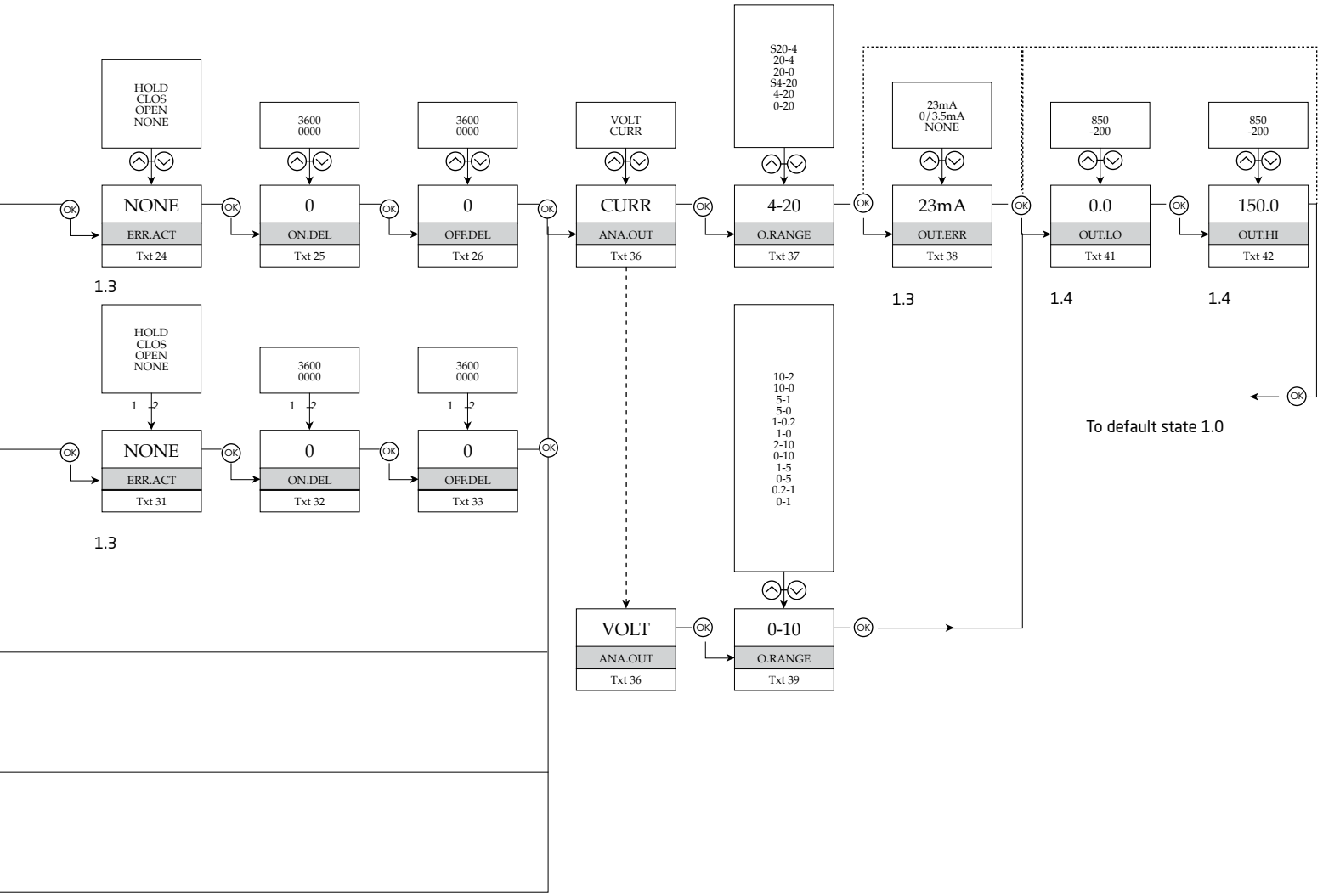


Continued on the next page

Selectable UNITS:

@C	ips	mA	um
@F	K	mbar	uS
%	kA	mils	V
A	kg	min	W
bar	kJ	mm	Wh
cm	kPa	mm/s	yd
ft	kV	mol	[blank]
ft/h	kW	MPa	
ft/min	kWh	mV	
ft/s	l	MW	
g	l/h	MWh	
gal/h	l/min	N	
gal/min	l/s	Ohm	
GW	m	Pa	
hp	m/h	pH	
hPa	m/min	rpm	
Hz	m/s	s	
in	m/s2	S	
in/h	m3	t	
in/min	m3/h	t/h	
in/s	m3/min	uA	

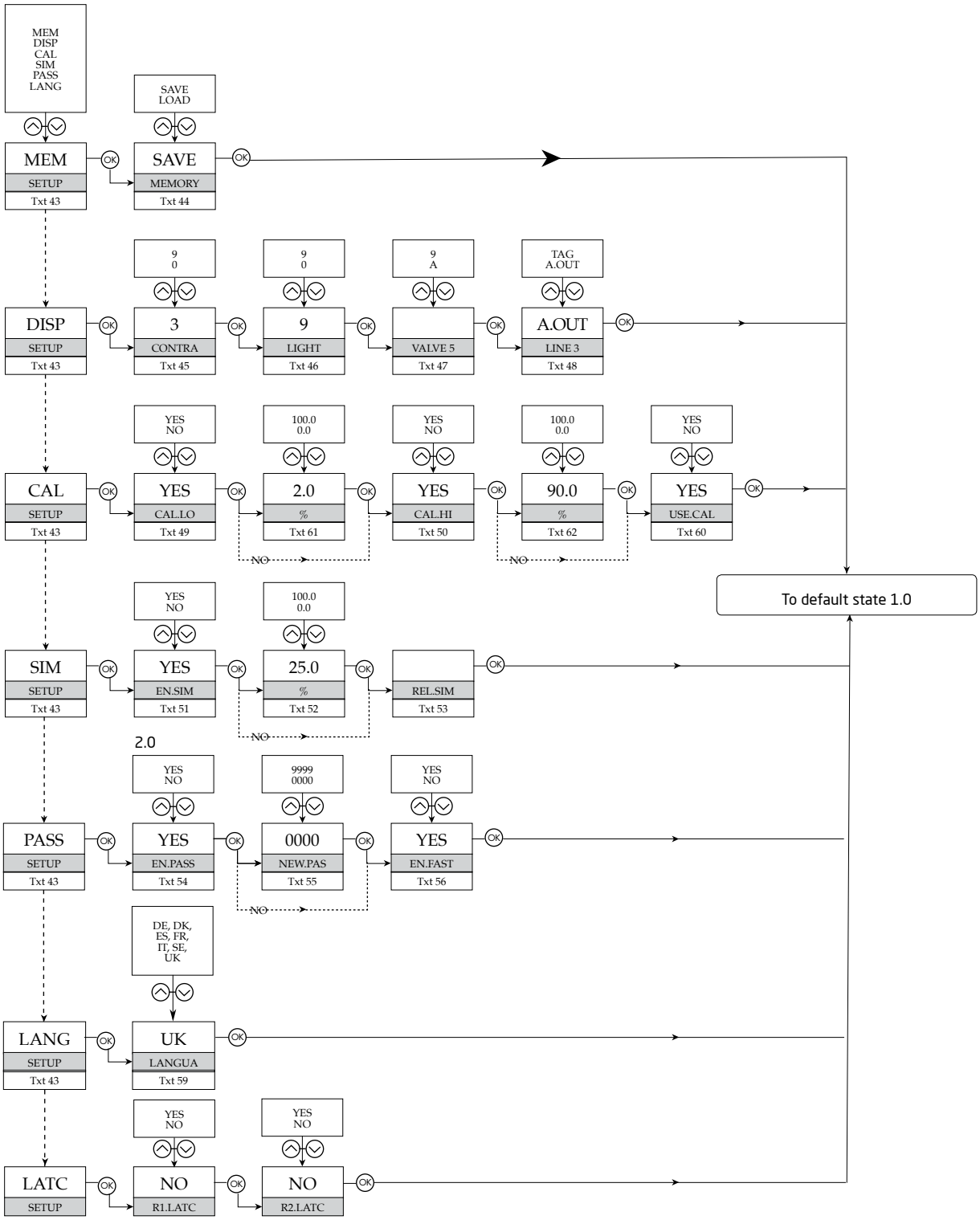

HOLD
CLOS
OPEN
NONE
3600
0000
3600
0000
SETP
WIND
ERR
POW
OFF
N.O.
N.C.
100.0
0.0
INCR
DECR
100.0
0.0
NONE
ERR.ACT
Txt 24
0
ON.DEL
Txt 25
0
OFF.DEL
Txt 26
SETP
R2.FUNC
Txt 19
N.O.
R2.CONT
Txt 20
50.0
R2.SETP
Txt 21
INCR
ACT.DIR
Txt 22
1.0
R2.HYST
Txt 23
OK
1.3
HOLD
CLOS
OPEN
NONE
3600
0000
3600
0000
O.I.W
C.I.W
100.0
0.0
100.0
0.0
100.0
0.0
NONE
ERR.ACT
Txt 31
0
ON.DEL
Txt 32
0
OFF.DEL
Txt 33
WIND
R2.FUNC
Txt 19
O.I.W
R2.CONT
Txt 27
60.0
SETP.LO
Txt 29
70.0
SETP.HI
Txt 28
1.0
R2.HYST
Txt 30
1.3
CLOS
OPEN
1.3
ERR
R2.FUNC
Txt 19
OPEN
ERR.ACT
Txt 34
POW
R2.FUNC
Txt 19
OFF
R2.FUNC
Txt 19


HOLD
CLOS
OPEN
NONE
3600
0000
3600
0000
VOLT
CURR
S20-4
20-4
20-0
S4-20
4-20
0-20
23mA
0/3.5mA
NONE
850
-200
850
-200
NONE
ERR.ACT
Txt 24
0
ON.DEL
Txt 25
0
OFF.DEL
Txt 26
CURR
ANA.OUT
Txt 36
4-20
O.RANGE
Txt 37
23mA
OUT.ERR
Txt 38
0.0
OUT.LO
Txt 41
150.0
OUT.HI
Txt 42
1.3
1.3
1.4
1.4
HOLD
CLOS
OPEN
NONE
1 2
3600
0000
1 2
3600
0000
1 2
10-2
10-0
5-1
5-0
1-0.2
1-0
2-10
0-10
1-5
0-5
0.2-1
0-1
NONE
ERR.ACT
Txt 31
0
ON.DEL
Txt 32
0
OFF.DEL
Txt 33
VOLT
ANA.OUT
Txt 36
0-10
O.RANGE
Txt 39
1.3
To default state 1.0

Section 18.2 - Advanced settings (Routing diagram)

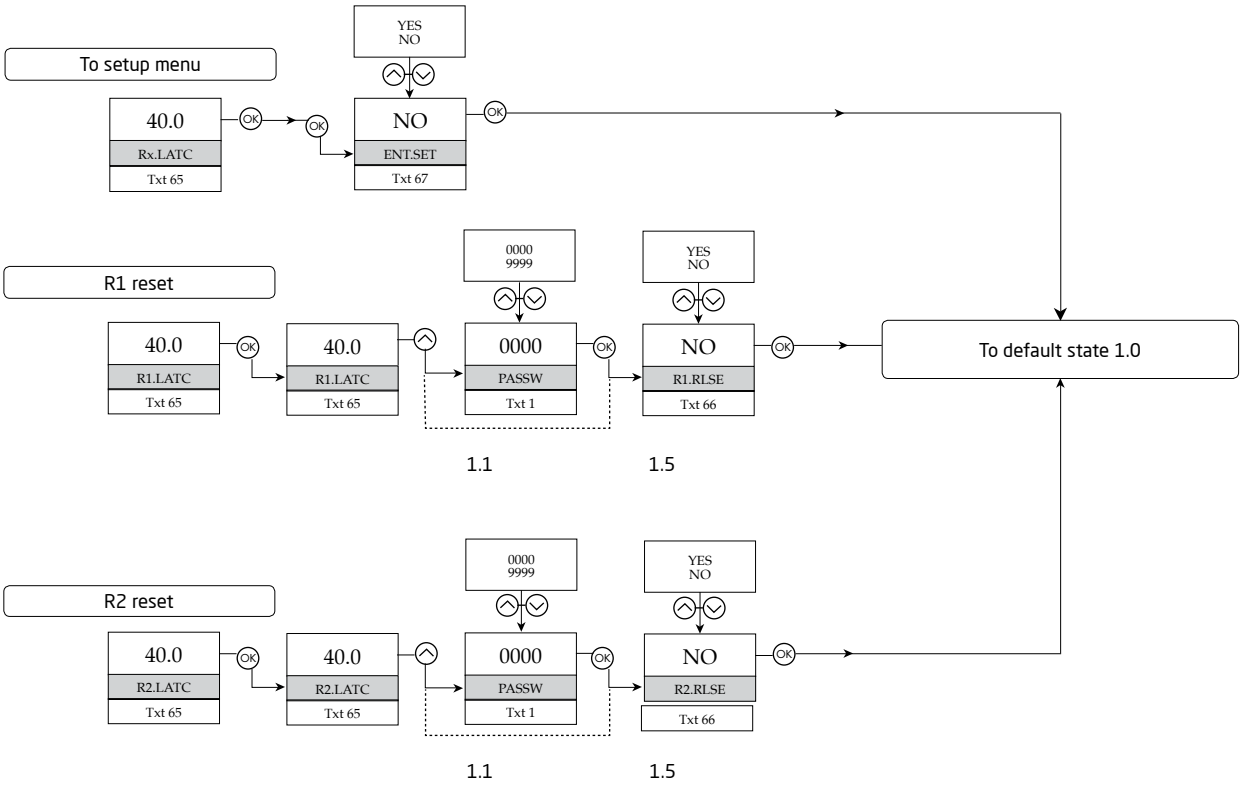
Advanced settings (ADV.SET)

2.0 In the submenu simulation (SIM) you must press (OK) to return to the default state 1.0.



Section 18.3 - Manual deactivation (Routing diagram)

Manual deactivation of the latch function



Section 19 - Scrolling help text in display line 3

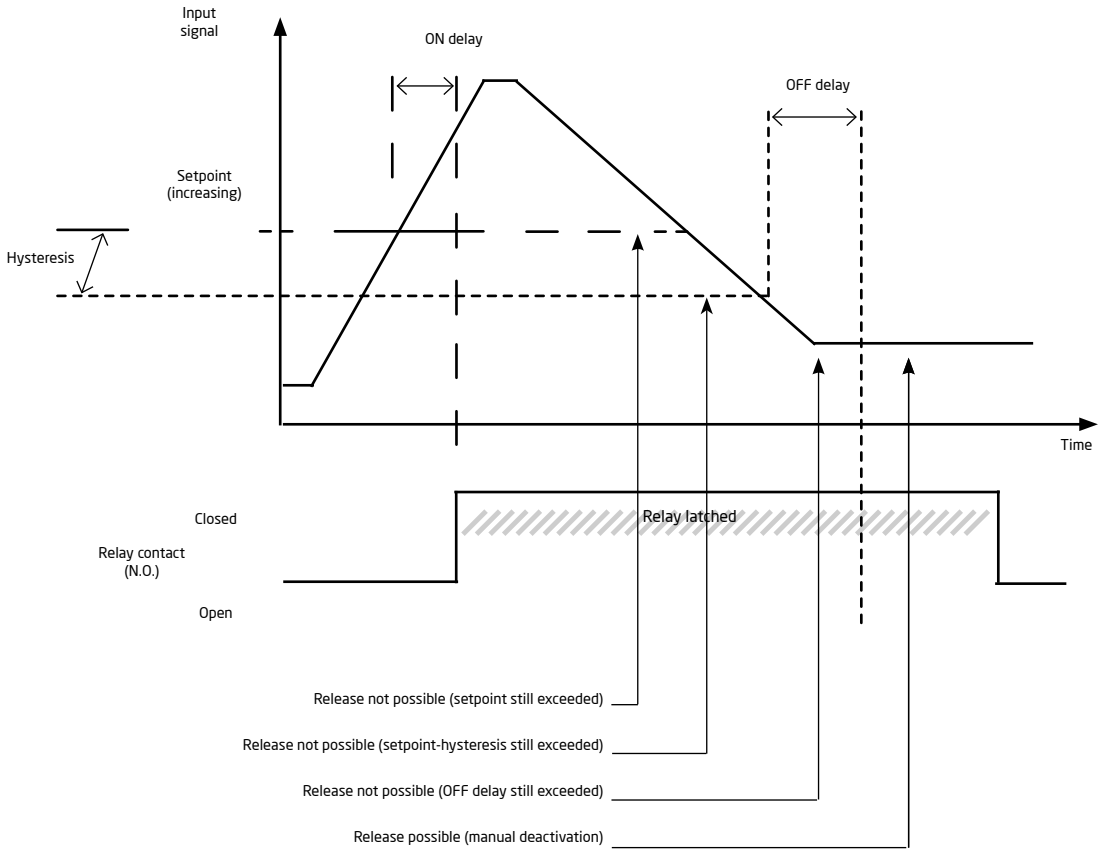
[01] Set correct password
[02] Enter advanced setup menu?
[03] Select temperature input
Select potentiometer input
Select linear resistance input
Select current input
Select voltage input
[04] Select 0.0-1 V input range
Select 0.2-1 V input range
Select 0-5 V input range
Select 1-5 V input range
Select 0-10 V input range
Select 2-10 V input range
[05] Select 0-20 mA input range
Select 4-20 mA input range
[06] Select 2-wire sensor connection
Select 3-wire sensor connection
Select 4-wire sensor connection
[07] Set resistance value low
[08] Set resistance value high
[09] Select Celsius as temperature unit
Select Fahrenheit as temperature unit
[10] Select TC sensor type
Select Ni sensor type
Select Pt sensor type
Select Cu sensor type
[11] Select display unit
[12] Select decimal point position
[13] Set display range low
[14] Set display range high
[15] Set relays in % of input range
Set relays in display units
[16] Select Pt10 as sensor type
Select Pt20 as sensor type
Select Pt50 as sensor type
Select Pt100 as sensor type
Select Pt200 as sensor type
Select Pt250 as sensor type
Select Pt300 as sensor type
Select Pt400 as sensor type
Select Pt500 as sensor type
Select Pt1000 as sensor type
[17] Select Ni50 as sensor type
Select Ni100 as sensor type
Select Ni120 as sensor type
Select Ni1000 as sensor type
[69] Select Cu10 as sensor type
Select Cu20 as sensor type
Select Cu50 as sensor type
Select Cu100 as sensor type
[18] Select TC-B as sensor type
Select TC-E as sensor type
Select TC-J as sensor type
Select TC-K as sensor type
Select TC-L as sensor type
Select TC-N as sensor type
Select TC-R as sensor type
Select TC-S as sensor type
Select TC-T as sensor type
Select TC-U as sensor type
Select TC-W3 as sensor type
Select TC-W5 as sensor type
Select TC-Lr as sensor type

[19] Select OFF function - relay is permanently off
Select POWER function - relay indicates power status OK
Select ERROR function - relay indicates sensor error only
Select WINDOW function - relay controlled by 2 setpoints
Select SETPOINT function - relay controlled by 1 setpoint
[20] Select Normally Closed contact
Select Normally Open contact
[21] Set relay setpoint
[22] Activate relay on decreasing signal
Activate relay on increasing signal
[23] Set relay hysteresis
[24] No error action - undefined status at error
Open relay contact at error
Close relay contact at error
Hold relay status at error
[25] Set relay ON delay in seconds
[26] Set relay OFF delay in seconds
[27] Relay contact is Closed Inside Window
Relay contact is Open Inside Window
[28] Set relay window setpoint high
[29] Set relay window setpoint low
[30] Set relay window hysteresis
[31] No error action - undefined status at error
Open relay contact at error
Close relay contact at error
Hold relay status at error
[32] Set relay ON delay in seconds
[33] Set relay OFF delay in seconds
[34] Open relay contact at error
Close relay contact at error
[36] Select current as analogue output type
Select voltage as analogue output type
[37] Select 0-20 mA output range
Select 4-20 mA output range
Select S4-20 mA with safety readback
Select 20-0 mA output range
Select 20-4 mA output range
Select S20-4 mA with safety readback
[38] Select no error action - output undefined at error
Select downscale at error
Select NAMUR NE43 downscale at error
Select NAMUR NE43 upscale at error
[39] Select 0.0-1 V output range
Select 0.2-1 V output range
Select 0-5 V output range
Select 1-5 V output range
Select 0-10 V output range
Select 2-10 V output range
Select 1-0.0 V output range
Select 1-0.2 V output range
Select 5-0 V output range
Select 5-1 V output range
Select 10-0 V output range
Select 10-2 V output range
[41] Set temperature for analogue output low
[42] Set temperature for analogue output high

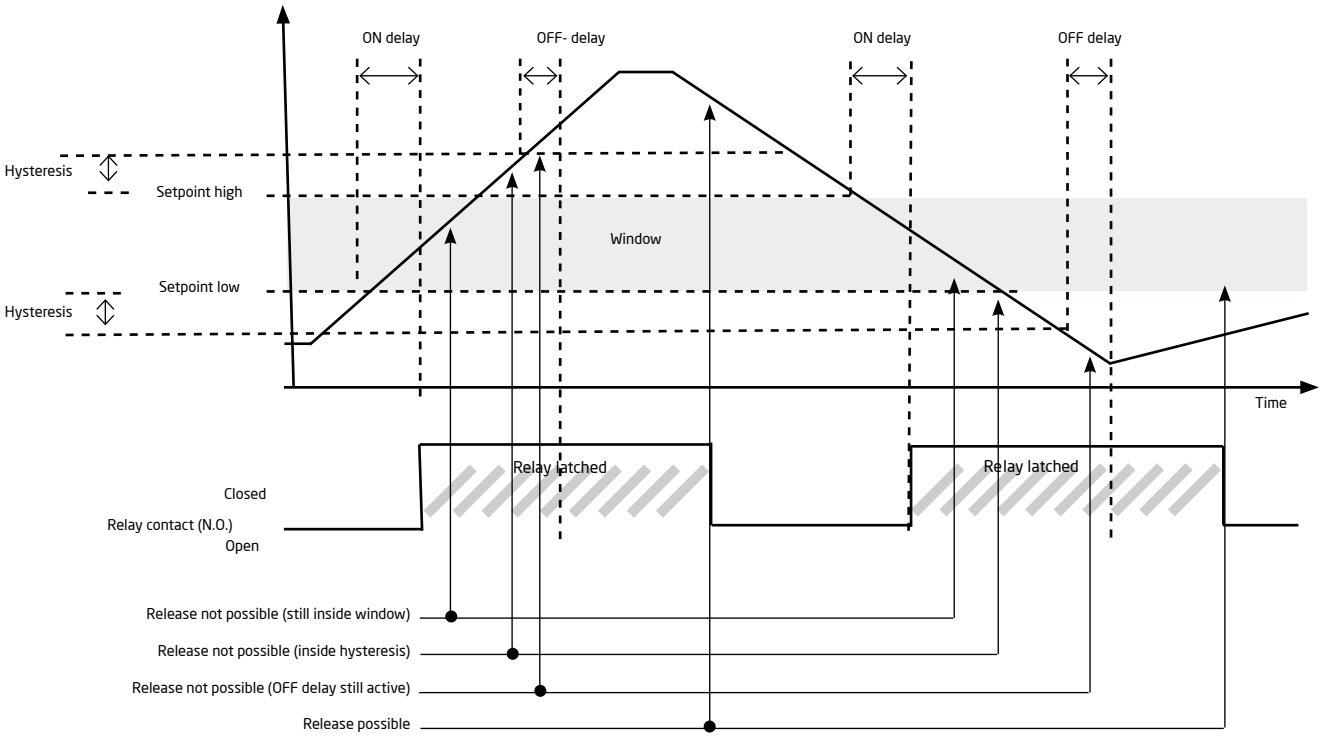
[43] Enter password setup
Enter simulation mode
Perform process calibration
Enter display setup
Perform memory operations
Enter relay latch setup
[44] Load saved configuration into DRST-UR

[45] Save DRST-UR configuration in **DRSL-DISPLAY**
[46] Adjust LCD contrast
[47] Adjust LCD backlight
[48] Write a 6-character device TAG
Analogue output value is shown in display line 3
[49] Device TAG is shown in display line 3
[50] Calibrate input low to process value?
[51] Calibrate input high to process value?
[52] Enable simulation mode?
[53] Set the input simulation value
[54] Relay simulation - use 1 and 2 to toggle relay 1 and 2
[55] Enable password protection?
[56] Set new password
[57] Enable Fastset functionality?
[58] Relay setpoint - press 3 to save
[59] Relay setpoint - Read only
[60] Select language
[61] Use process calibration values?
[62] Set value for low calibration point
[63] Set value for high calibration point
Select CJC connector (accessory)
[64] Select internal temperature sensor
[65] Enable relay latch function?
Relay is latched - press 3 to acknowledge
Relay 1 is latched - press 1 to release
Relay 2 is latched - press 2 to release
Relays are latched - press 1 or 2 tor release relay 1 or relay 2
[66]
[67] Release relay? (if conditions allow)
Enter setup menu? (latched relays may release!)

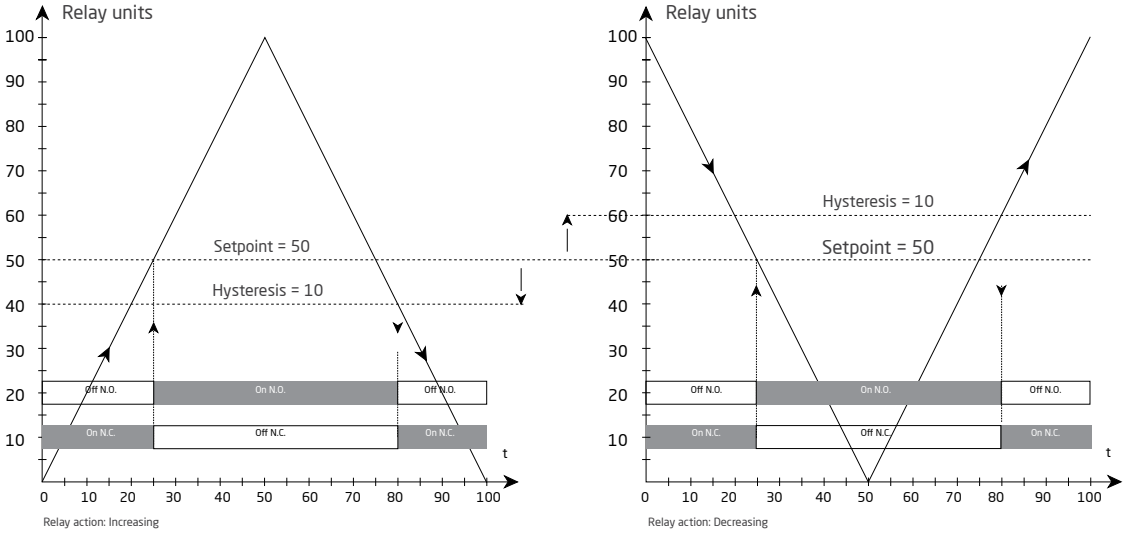
Section 20.1 - Graphic depiction of latch function setpoint



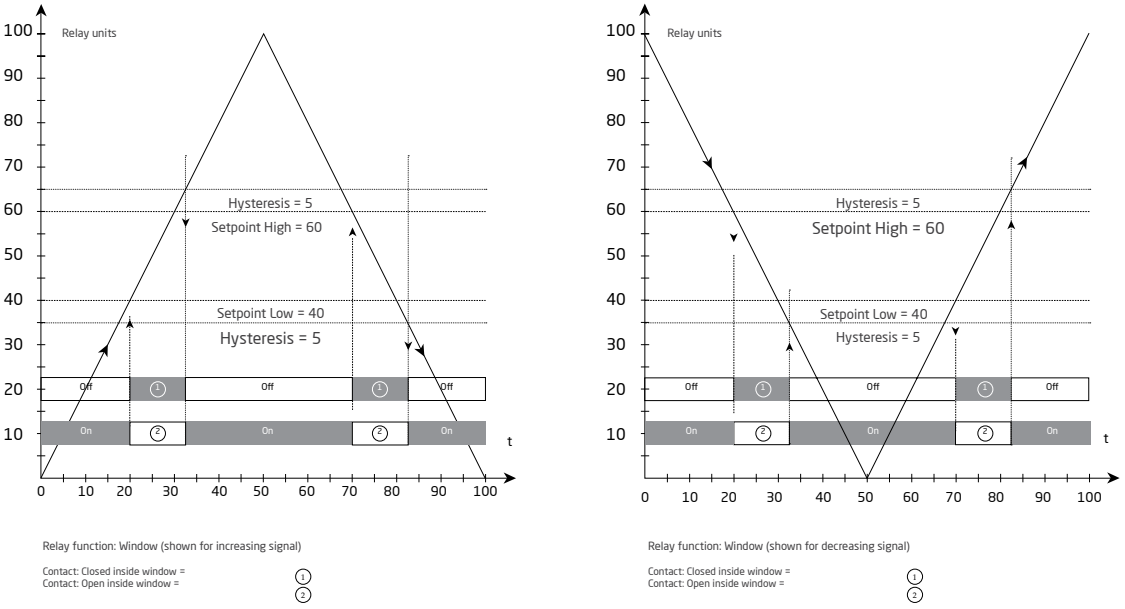
Section 20.2 - Graphic depiction of latch function window



Section 20.3 - Graphic of relay action setpoint



Section 20.4 - Graphic depiction of relay action window

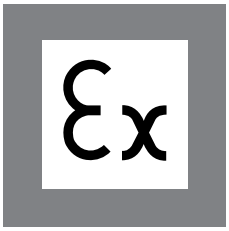


Section 21.1 - Displays

Programmable displays with a wide selection of inputs and outputs for display of temperature, volume and weight, etc. Feature linearization, scaling, and difference measurement functions for programming via OMset software.

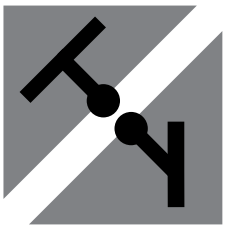
21.2 - EX Interfaces

Interfaces for analog and digital signals as well as HART® signals between sensors/I/P converters / frequency signals and control systems in Ex zone 0, 1 & 2 and for some devices in zone 20, 21 & 22.



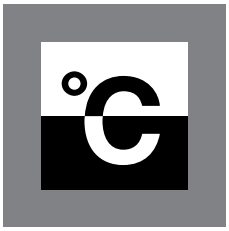
21.3 - Isolation

Galvanic isolators for analog and digital signals as well as HART® signals. A wide product range with both loop powered and universal isolators featuring linearization, inversion, and scaling of output signals.



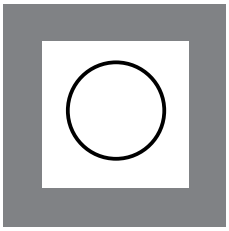
21.4 - Temperature

A wide selection of transmitters for DIN form B mounting and DIN rail devices with analog and digital bus communication ranging from application-specific to universal transmitters.



21.5 - Universal

PC or front programmable devices with universal options for input, output and supply. This range offers a number of advanced features such as process calibration, linearization and auto-diagnosis.



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OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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