SCHNEIDER
MESSTECHNIK

Operating instruction
high pressure calibrator PPS 1210 / L

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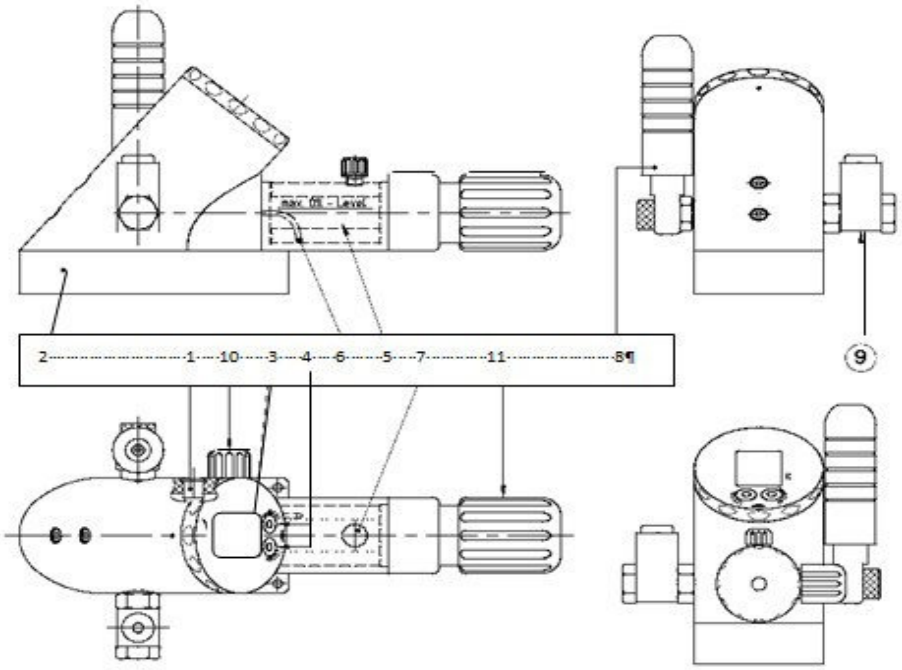
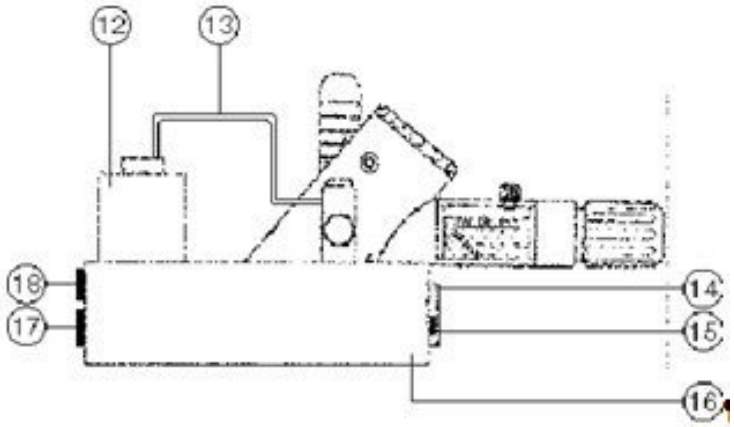
Components of High Pressure Calibrator PPS 1110



1 PC connection (without function)
2 Device base (only PPS1110)
3 Display
4 SELECT and ENTER buttons
5 Oil chamber
6 Recirculation pipe
7 Screwed sealing plug
8 Manual booster pump
9 Pressure connection for test object (only PPS1110)
10 Drain valve
11 Screw compressor

Additional components of High Pressure Calibrator PPS 1210



12 Heatable pressure port
13 Pressure pipe
14 Temperature controller
15 On / Off switch for pressure port heating
16 Temperature controller casing
17 Electrical connector for test unit adapter
18 Power line plug

Notes on the operating instructions

- The operating instructions are intended for specialist workers and trained personnel.
- Before each stage of work, read the relevant notes and warnings carefully, and keep to the sequence as stated.
- Pay particular attention to the section on ”General safety warnings”.

If you have any problems or questions, please contact your supplier or consult the company MARIANNE MAYER, ELECTRONISCHE SCHALTUNGEN directly.

1. Description of the device

General description

The high pressure calibrator enables pressure to be generated by means of the integrated pressure pump, up to 700 bar relative.
The measurement technology incorporated into this device allows accurate measurement and documentation of the characteristic of a test object that is connected to it. The measured pressure progression can be displayed, evaluated and saved with a computer monitoring program (CCS30).
The calibrator is operated with the two function buttons SELECT and ENTER, located directly below the display. The calibrator itself is powered by a 3,0 V battery.

Commissioning

A pressure-resistant connection for the test object is required in order to use the high pressure calibrator. The pressure connection for the test object is already screwed to the pressure distributor of the high pressure calibrator so that it is pressure resistant when it leaves the factory, and it must not be dismantled.
Recommended torque for the test object pressure connection: 30 Nm

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IMPORTANT!

Nothing must adhere to the surface of the test object (no oil, grease, water, etc). Impurities could pass trough the adapter to reach the high pressure calibrator and damage it.

Overpressure

If the pressure exceeds the measuring range by more than 20%, the measuring cell or the mechanism of the high pressure calibrator may be destroyed

Recalibration

The recalibration cycle depends on the conditions of use. Recommended recalibration cycle: 1 year.

Intended use

The high pressure calibrator may only be used to generate pressure with the type HLP 22 BP hydraulic oil that is supplied with the product. Use of the calibrator with other media will damage it. The operational safety of the device supplied is guaranteed only if it is used as intended. The limit values as stated (see page 9: ”Technical data”) must never be exceeded.

Before installing the high pressure calibrator, check that it is suitable for your applications

2. General safety warnings

The current national regulations on accident prevention and workplacesafety must be followed whenever work is carried out. Internal regulations issued by the operator must be followed, even if they are not mentioned in these instructions.

Never use the high pressure calibrator together with an external pressure source.

Do not remove any connected components (e.g. test objects) when the high pressure calibrator is under pressure. Open the screwed sealing plug before removing parts.

Do use Teflon tape to seal the pressure connection careful. Residues of Teflon tape could penetrate the high- pressure calibrator and damage it.

Only use the adapters and seals that are available as accessories.

Do not store the calibrator under pressure: only store the high pressure calibrator with the drain valve open.

Avoid the action of force of any kind on the high pressure calibrator and its operating controls.

Do not use high pressure calibrators if they are damaged or faulty.

3. Operating the calibrator

Operating the high pressure calibrator is described starting on page 6.

Connect the test object

You can connect your test object to the high pressure calibrator via the pressure connection (9).

Pressure generation

When using the calibrator, the screwed sealing plug (7) must be opened (2 turns), so that overpressure cannot build up in the oil reservoir.
Use the manual booster pump (8) to set the pressure to about 10 bar. You can use the screw compressor (11) to increase or reduce the pressure.

Release pressure

1. Open the screw compressor (11) completely
2. Open the drain valve (10)

IMPORTANT!

Do not open if there is high pressure in the system!

If you can no longer reach the desired pressure, please consult the section on "Maintenance" to find out how to vent the system.

Zeroing the device

Open the drain valve (10) to release any pressure that may have built up.
If the pressure display does not show zero, perform a zeroing procedure (Set Zero) and then close the drain valve.

Information about the display

If no pressure can be shown on the display, it will show OFL (overflow) or UFL (underflow).

If pressure outside the device's measuring range is applied, the last valid pressure value that was measured will flash on the display (overload warning).

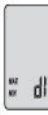
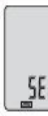
last valid pressure value that was measured will flash on the display (overload warning)

Reset

4. Description of the functions

Menu navigation

If the selected function or unit is not activated by pressing the ENTER button within 5 seconds, the display will return to measuring mode without changing a setting.

Function	Reset	Description
Min. / max. display		Shows the peak and trough pressure values measured thus far. (Display is shown with reduced resolution)
Leak measurement		Leak mode is used to determine the pressure change over a defined period, which can be changed. (Leak measurement period, factory setting: 10 minutes)
Zero the display		Permanently sets the applied pressure as the new pressure zero point.
Reset display		Resets the pressure zero point to the factory setting.
Automatic switch-off function		(Cont = Continuous) The device switches off automatically after a defined period (which can be changed), starting from the last time a button was pressed. (Switch-off period, factory setting: 15 minutes)
Select units		mbar, bar, hPa, kPa, MPa, cmH2O, mH2O, inH2O, ftH2O, PSI, kp/cm², mmHg, inHg

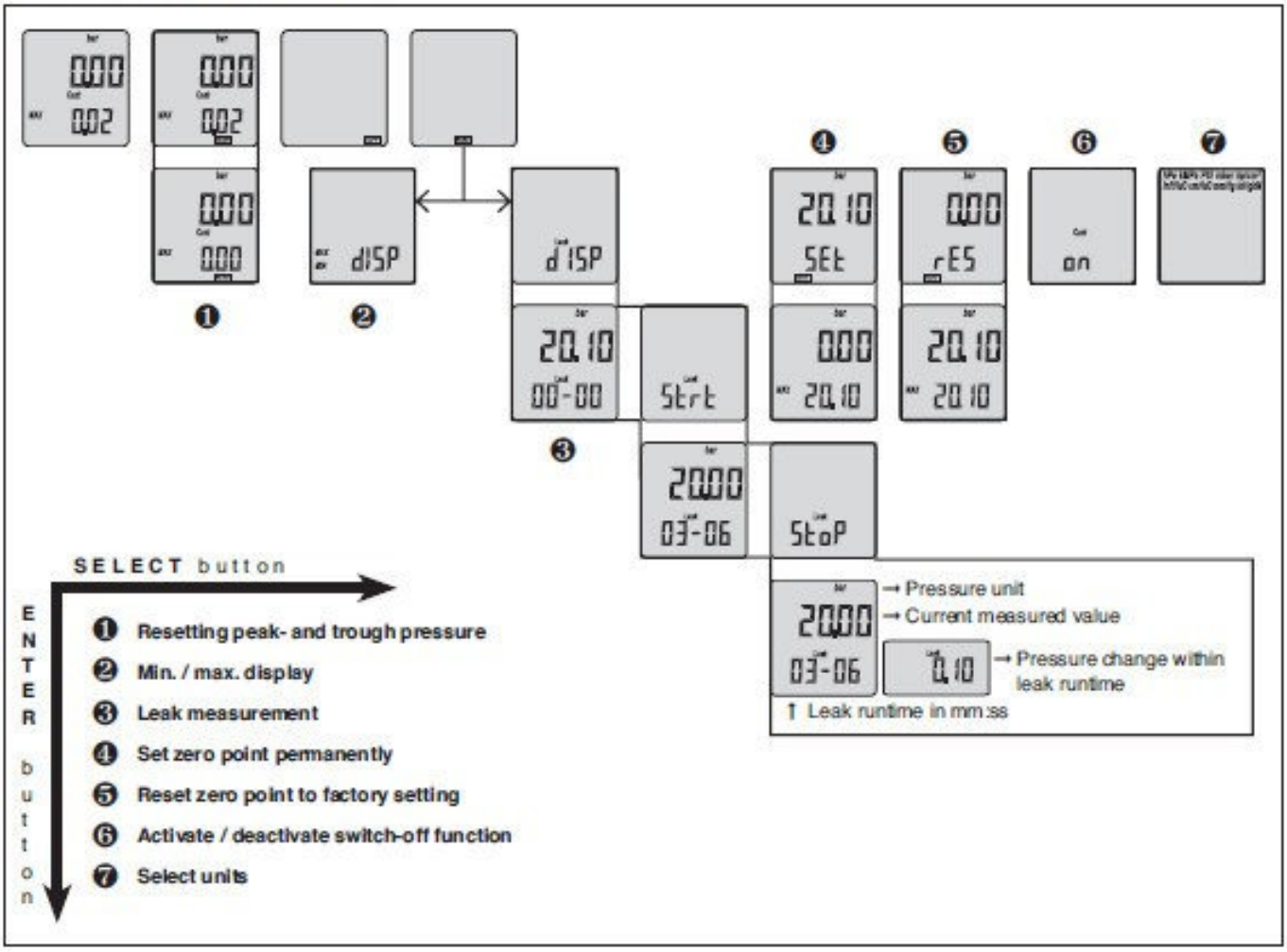
SELECT button

The SELECT button positioned on the front is used to switch the device on, to select a function and to select the various pressure units.

ENTER button

The ENTER button positioned on the front is used to activate the selected function or pressure unit on the device. You can also press the ENTER button to switch between the minimum and maximum pressure values measured thus far.

5. Menu navigation for calibrators



6. Commissioning

Switch the device on

Press the SELECT button to switch the device on. Initially, the device shows the pressure range calibrated in the factory (top) and the software version (year / week).

Switch the device off

Keep the SELECT button pressed down until the display shows *OFF*.

Press the ENTER button to execute the shutdown.

→ The settings made previously are retained when you switch the device on and off.

Display mode

Display mode is the calibrator's basic mode. The upper part of the display shows the pressure unit and the pressure that is currently measured. The lower part of the display shows the last function that was used, either the min./max. display or the Leak function.

Using the functions

Written descriptions of the individual functions are given below (in addition to the diagram above).

Selecting functions

The individual sub-functions are called up from the MANO menu. Keep the SELECT button pressed until *MANO* is

shown, and press ENTER to activate. You can now use SELECT to choose the function you want, and ENTER to execute the function. Depending on the current setting, the first function to be shown is either min/max disp or LEAK disp.

Leak measurement function

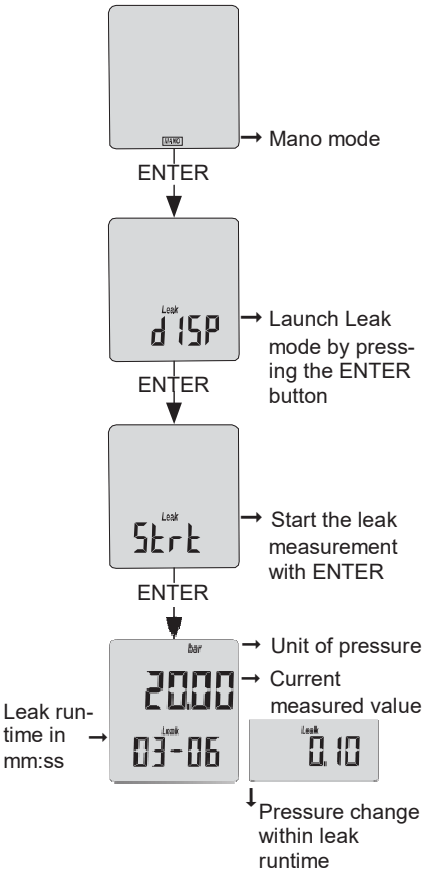
Leak mode is used to determine the pressure change over a defined period, which can be adjusted. The unit to be tested must be connected to the high pressure calibrator on the pressure side.

Start leak measurement

Activate the MANO menu. The display shows Leak dISP. Press the ENTER button and then the SELECT button. Press ENTER to confirm Leak Start. The leak measurement starts, and the display alternates between the current leak time and the pressure change measured thus far.

Active leak measurement

During leak measurement, the lower part of the display alternates each second between the measurement time that has now elapsed [mm:ss] and the pressure change measured thus far.



End leak measurement early

To end a leak measurement early, press the ENTER button and confirm the "Leak Stop" display by pressing ENTER.

Leak measurement completed

If the leak measurement time has elapsed or if the measurement was manually ended ahead of time, the display alternates between the elapsed leak measurement time and the measured pressure change.

Set leak measurement time

The leak measurement time is preset to 10 minutes in the factory, and it can only be changed with the "Mano Config" software.
(→ Software for calibrators)

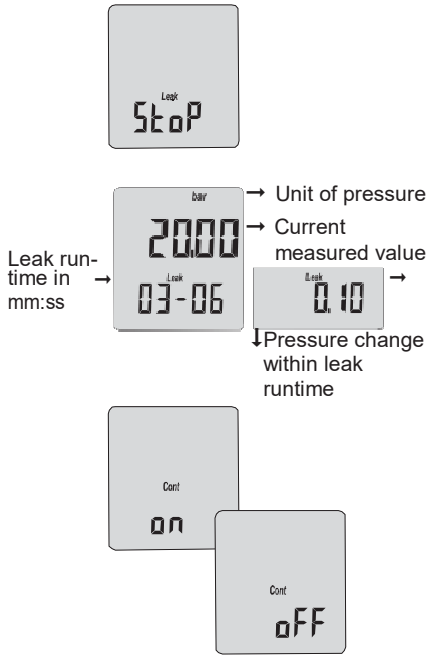
MANO / "Continuous" function

Automatic switch-off function (the device switches off automatically 15 minutes after a button was last pressed). Leak measurements are canceled by the automatic switch-off function if the measurement time is more than the switch-off time.

Cont on: Disables the automatic switch-off function

Cont oFF: Enables the automatic switch-off function

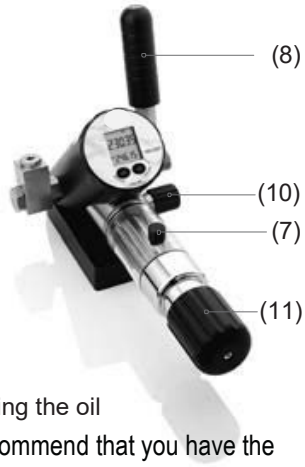
If the "Continuous" function is enabled, Cont flashes on the display.



7 Maintenance / disposal

Venting the pressure system

Release the pressure completely and then open the drain valve (10) and the screwed sealing plug (7). Screw the screw compressor (11) in completely. Pump steadily with the manual booster pump (8) to clear the system of air. When no more bubbles come out of the recirculation pipe (6), close the drain valve (10).



Changing the oil

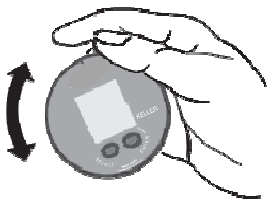
We recommend that you have the company ICS SCHNEIDER, change the oil. The entire system is cleaned at the same time. Only use type HLP 22 BP hydraulic oil.

Battery

The pressure calibrator is powered by a 3 V button-cell battery (behind the display). If the battery is low, the battery symbol on the display BAT LOW lights up.

Replacing the battery

Please switch the device off. Turn the display section ring beyond the limit stop until it is released from the housing section (turn through about 180°). Open the battery compartment and change the battery (type CR 2430).



Disposal

This product must not be disposed of as normal household waste at the end of its useful lifetime. To prevent possible damage to the environment or to health due to uncontrolled waste disposal, this product must be separated from other waste and recycled correctly in order to ensure sustainable use of the raw materials.

8. Evaluation with the PC

Installation

Before the first opening of the Excel sheet, copy the file "s30c.dll" in die folder C:\WINDOWS/SYSTEM (not SYSTEM32). You require administrator rights in order to be able to do this. If necessary, inform your IT administrator.

Measuring and completing the Excel sheets

Connect the USB output of the calibrator with the PC's USB port.
Under Connections in the Device Manager, look for the number of the USB port of the PC, to which the calibrator is connected.
Enter this value in the cell P-31 at the description "Com-Port-N" in the Excel sheet.
In the next step, the cells E-16, L-9, L-11, L-15, L-17, L-19, L-21 and L-23 are completed. The candidate's 100% bar range is entered in the cell L-11 (printing area).

The cells L-11, L-15, L-23 and P-31 are obligatory fields.

The result of the measurement is evident from the cells G-26, G-27 and G-28. This information relates to the data in cell L-15 (accuracy).

Start the measuring by clicking the button "Measurement 1" in the depressurized state.
The data of the reference sensor in the calibration and the candidate's are read. At the measurement 1, the calibrator's data with the serial number and the date, with the time of the measurement, is also automatically read.
Increase the pressure of the calibrator to about 50% of the final value. Wait until the value stabilizes (evident on the calibrator's display). Click the button "Measurement 2".
Increase the pressure in the calibrator to 100% of the candidate's, but only to a maximum of 700 bars.
Caution: The calibrator can be damaged or destroyed with a pressure of more than 700 bars (+ 10% max).
Save the test protocol under a different name.

The read data is deleted by clicking the "Delete All" button.

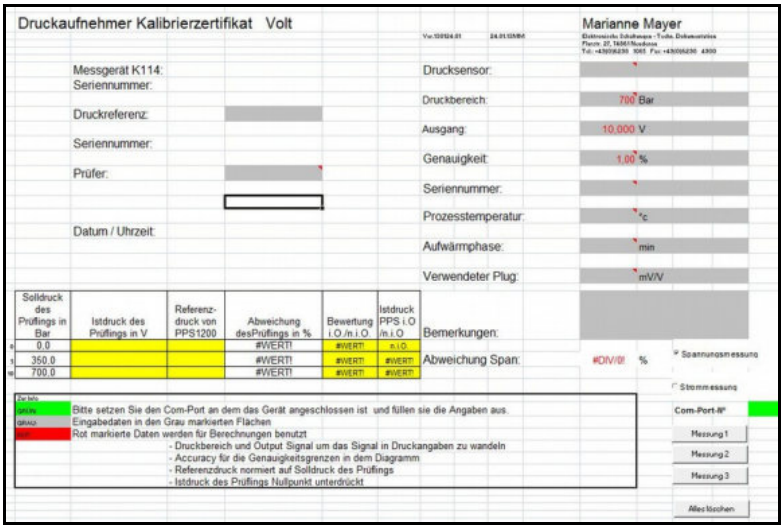


Image: Excel sheet for the evalution of the measurement

Pressure range (FS)	0…700 bar (others on request)
Overpressure	840 bar (FS+20%)
Resolution of display	1mbar
Accuracy, error band [1] (10…40 °C)	< 0,05 %FS
Accuracy, error band [1] (0…50 °C)	< 0,1 %FS
Leak rate*	700 bar: -2 bar @ 10 min.
Number of digits on display	5 digits
Measurement interval	0,5 seconds
Interface	USB (RS485 out of function)
Compensated temperature range	0…50 °C
Operating temperature	0…50 °C
Storage temperature	-10…60 °C
Air humidity	5…95% relative humidity
Power supply heatable pressure port and sensor	115V AC or 230V AC
Display	Button-cell battery, type CR2430
Battery lifetime :	> 2000 h in continuous operation
Hydraulic oil	HLP 22 BP or olive oil
Pressure port	1/2"20UNF or M18x1,5
Media compatibility	Pressure transducer with stainless steel diaphragm
Dimensions (L x W x H)	470 x 170 x 280 mm
Weight	approx. 7,2kg
Degree of protection	IP 54
Selectable pressure units	bar, mbar, hPa, kPa, MPa, PSI, kp/cm^2, cmH2O, mH2O, inH2O, ftH2O, mmHg, inHg

Delivery in a stable aluminium transport case!

[1] including accuracy, temperature coefficients, zero point and range tolerance

* Physical effects caused by a pressure change lead at first to a clear difference in pressure.
Advice: To minimise the influence of these physical effects increase steadily the last 5% of the target pressure and regulate towards the target pressure for the first minutes.

The stated leakage rate is at a thermal balanced condition (when temperature of pressure media and of the environment is equable).

EG - KONFORMITÄTSERKLÄRUNG

im Sinne der EG - Richtlinien

Elektromagnetische Verträglichkeit 89/336/EWG
Niederspannung 73/23/EWG

Bauart der Maschine

Art/Benennung:	Hochdruck-Kalibrator
Typ;	PPS1210 / 1210L-700bar

ist entwickelt, konstruiert und gefertigt in Übereinstimmung mit den oben angeführten EG-Richtlinien.

Folgende harmonisierte Normen sind angewandt:

EN 61326-2-3:2006,	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen
EN 60204.1,	Sicherheit von Maschinen, Elektrische Ausrüstung von Maschinen, Allgemeine Anforderungen

Folgende nationale Normen, Richtlinien und Spezifikationen sind angewandt:

DIN EN 563,	Sicherheit von Maschinen, Temperaturen berührbarer Oberflächen

Eine Technische Dokumentation ist vollständig vorhanden. Die zum Gerät gehörende Betriebsanleitung liegt vor

In der Orginalfassung:	deutsch
In der Landessprache des Anwenders:	deutsch, englisch, französisch

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Datum: 18.12.2012

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OPERATING INSTRUCTION

Temperature regulator

General:

The temperature regulator is a high quality control instrument for both **simple ON/OFF two-position regulation** or, if desired, **PID control systems with autotuning function**.
In the ON/OFF mode, the degree of hysteresis is freely programmable. In the ON/OFF mode, the degree of hysteresis is freely programmable
The temperature regulator has been designed for heating and cooling operations in the range -200°C to +1,750°C. The measurement range is only determined by the type of sensor used.
It is easy to operate and configure, and is ideal for industrial use thanks to the many important customisation options it offers. These include useful additional functions such as sensor break detection with automatic power cutoff, alarm output, maximum or minimum set value setting and password access etc.

Safety notes:

- Do not use the device in explosive atmospheres or in the vicinity of flammable liquids or gases.
- Bear in mind that if you are not qualified to work with electricity, this can result in pain, lasting damage to your health or your death.
- This instruction manual assumes that you are qualified to work with electrical equipment. If you are not qualified to work with electricity, please have an electrician carry out all works on this equipment!.

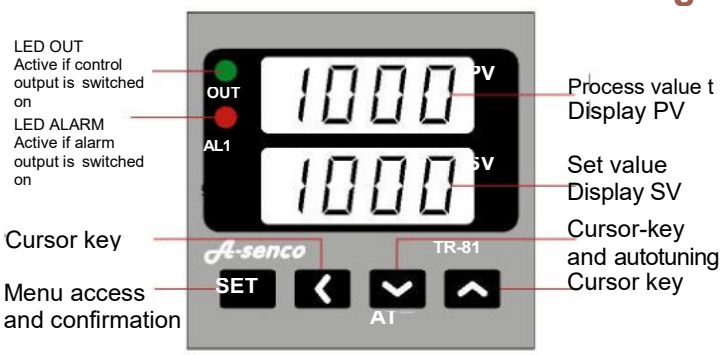
Technical data:

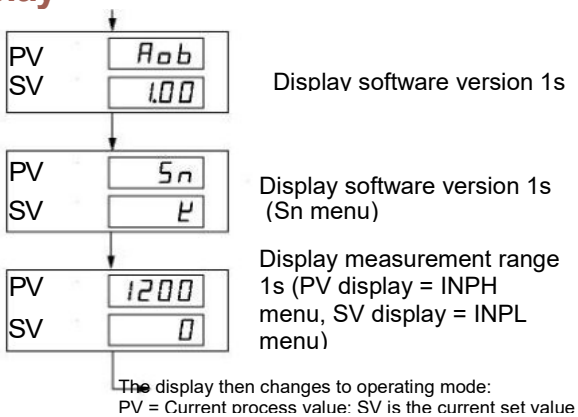
Dimensions	approx 48x48x105 mm (W x H x D) Installation depth approx 100mm	Sampling period:	<3 sek.
Mounting cutout	45 x 45mm (DIN 1/16)	Max output load	approx 2A (resistive load, mechanical relay)
Display viewing area	.. -1999°C bis +9999°C	Max switch voltage	230 V AC
Temperature	-200 ...+1750°C dependent on sensors	Voltage output SSR	approx 12VDC/25mA
Display height	approx 10mm	Environmental temperature ..	max. 45°C
Resolution	0,1°C (Display resolution is customisable)	Humidity of environment	max 85% relative humidity in non-aggressive environment
		Closed-circuit current	< 3W

1

Control/Display elements:

Status message display





Changing the set value and alarm temperature: When the regulator is switched on

Press the button SET SU appears on the PV display, and the last figure on the SV display flashes
Use the arrow keys to set the control set value to the desired temperature, and confirm your selection via the button SET.

The value is saved, and the regulator jumps to the set value setting for the second alarm output. The PV display shows AI1, and the SV display shows the current setting.

Use the arrow keys to set the control set value to the desired temperature, and confirm your selection via pressing the button twice SET

The regulator is now back in operating mode, and has saved the changed values ready for use.

Suggestions for selecting the control mode:

The following information serves to provide an example of temperature regulation for an electric heater, and is intended to illustrate a possible configuration. Custom applications demand expert knowledge of control technology, which is beyond the scope of this instruction manual.

The regulator offers you two different options for regulating a set value that you specify: either a simple ON/OFF regulator with hysteresis, or as a PID control system. Before you put the device into operation, consider which type of regulation would be most appropriate for your particular application.

The ON/OFF regulation with hysteresis is a basic temperature control system in which the regulator allows the load at the exit (eg heater) to be kept switched on until the preselected set value (menu table A value SU) is reached. If a hysteresis value (switching delay) is entered in the DFCT menu, this value is added to the set value. The load is therefore switched off according to the following schema:
Set value + Hysteresis value = Load switched off. The load is switched back on again according to the reverse of that principle: Set value - Hysteresis = Load switched back on.
Example:
If the set value is 100°C and hysteresis is 0.5°C, the load is switched off at 100.5°C and switched back on at 99.5°C.

This basic regulation is ideal for lots of applications. Its advantage lies in its easy to understand functioning, plus in its low switching rate and, if mechanical load protectors are used, protection of the load relays that switch the load.
Switching rates can be minimised by setting as high a rate of hysteresis as possible.
The disadvantage of ON/OFF regulation is that the temperature fluctuates in the range around the set value, due to the hysteresis that was specified and the sluggishness of individual process components (heater follow-up time, sensor reaction times, loss of transmission etc).

A PID control system is ideal for many applications, as it can achieve highly consistent temperature values without fluctuation. In contrast to ON/OFF regulation, this process uses software in the regulator which, when a load is connected, records the process conditions required for controlling (autotuning function, p5). The regulator's software then determines the appropriate PID parameters, which, thanks to special algorithms, reduce the heat output step by step as the temperature converges with that of the set value.
Reduction occurs by pulsing on the controller output. In an ideal scenario, when the temperature reaches the set value, the regulator only releases the heat output that is required to maintain the preselected temperature.

The PID control system is therefore most appropriate when the connected load needs to be triggered at short intervals using on/off intervals. The advantage of this method lies in the fact that the temperature curve achieved is very linear, and generally permits only the most minimal fluctuations, with a tolerance of just a few tenths of a degree.

In many processes, PID regulation requires extremely short switching times, sometimes < 1 sec. Due to regular pulsing, mechanical relays are subject to a high rate of wear and tear. The temperature regulator has been designed for triggering an SSR relay (as used in calibrator PPS1210). This enables you to even switch greater loads with short pulse times, and without wear and tear, thanks to electronic thrysistor switches.
Because certain applications also require the use of regulators with SSR output and semiconductor relays to trigger mechanical load protectors, the regulator also features a function enabling you to preselect a minimum pulse time (menu table B – Switching time output (T). Particularly if you are using mechanical load protectors, this allows you to specify a minimum switching time. The correct setting for your particular application depends on making a considered compromise between the shortest possible switching time, to ensure a linear set value progression, and the shortest possible switching frequency, which will prolong the lifetime of the downstream relay contacts. When using PID controls, a larger safety clearance between the switching load and the mechanical relay's specified nominal load is recommended.

Using the menus:

The temperature regulator is operated via two menus (A and B). Menu A contains the settings for the set value (see also page 19: ‘Changing the set value and alarm temperature’). These settings are easily accessible to any operator by simply pressing the button to call them up. Repeated pressing of the button moves to the next menu item.
The parameters in menu B are settings for configuration of the regulator, along with other advanced parameters. As a rule, these are not operating functions. Access to menu B is therefore password protected, by calling up ‘Loc’ and entering the password 508 (see next page).
The ‘Loc’ menu also provides you with the option to prevent the set value (menu A) being changed, should you wish that operators are not permitted to change it. To do so, set a value other than 0 (not 508).

consec. No.	parameter code	parameter name	adjustment range	description
Menu A				
1	SU	set value setting (SU)	INPL to INPH	switches output terminal 1, 2 (relay contact potential-free)
2	AL I	alarm value setting (AL1)	INPL to INPH	switches output terminal 8, 7, 6 (changeover contact potential-free)
3	Loc	password-protected menu access LOC	0~9999	LOC=0, changes in menu A and autotuning are permitted; LOC=0, Changes in Menu A are not permitted (exception: parameters); LOC=508, Call-up and changes to menu B are permitted. After leaving Menu B, ‘Loc’ jumps back to the value that was originally set.

Making changes in the ‘Advanced parameters’ menu: When the regulator is switched on:

Press the button SET 3x kurz hintereinander.
‘Loc’ appears on the PV display, and the last figure on the SV display flashes (active).)
Use the arrow keys ⌄ ⌃ to enter the password 508 and then confirm it with. SET.

The PV display now shows the first parameter code Sn. In the SV display, the value that has been set flashes (active).

Change the value by pressing the buttons ⌄ ⌃ according to the table, then press

SET again to call up the next parameter.

Confirm you have finished making parameter settings by pressing and holding down the SET button for about 3 seconds.

Customisation is now complete, and the regulator now once again shows the temperature in the PV display and the set value in the SV display.
After about 30 seconds of inactivity, the parameter settings display returns to normal operating mode.
Customisation is now complete, and the regulator now once again shows the temperature in the PV display and the set value in the SV display.
After about 30 seconds of inactivity, the parameter settings display returns to normal operating mode.

consec. No.	Parameter code	Parameter name	adjustment range	description

menu B: "Advanced parameters"

4	*Sn*	Input specification, (SN)	*Y* *S* *E* *J* *Cu50* *Pt* *U0-5* *UI-5* *0-20* *4-20*	K type thermal element / Possible measurement range: -50 ...+1350°C S- type thermal element / Possible measurement range: -50 ...+1750°C E- type thermal element / Possible measurement range: -50 ...+800°C J- type thermal element / Possible measurement range: -50 ...+1000°C Cu50 type RTD (resistance sensors) / Possible measurement range -50 ...+150°C Pt100 type RTD (resistance sensors / Possible measurement range: -200 ...+850°C 0-5V direct voltage (analogue input) / Possible measurement range: -1999 ...+9999 1-5V direct voltage (analogue input) / Possible measurement range: -1999 ...+9999 0-20mA direct current (analogue input)) / Not active 4-20mA direct current (analogue input) / Not active
5	*dP*	Decimal points -display (DP)	0-3	DP=0, display without decimal places ; XXXX DP=1, display with 1 decimal places: XXX.X DP=2, display with 2 decimal places: XX.XX DP=3, display with 3 decimal places: X.XXX When using temperature sensors as input, you can only select Dp0 or Dp1.
6	*inPL*	lower set value limit, (INPL)	-1999 ...+9999	Lower set value limit. The specified value limits how the set value on the regulator and alarm output can be set. (See section 'Changing the set value and alarm temperature' page 2). The value that you enter represents the lowest possible setting that can be made.
7	*inPH*	upper set value limit, (INPH)	-1999 ...+9999	Upper set value limit. The specified value limits how the set value on the regulator and alarm output can be set. (See section 'Changing the set value and alarm temperature' page 2). The value that you enter represents the highest possible setting that can be made.
8	*Sc*	measurement reading calibration (SC)	-1999 ...+9999	Calibration function to compensate for sensor deviations. The value set in °C will be added to the display value. If you desire a decrease, enter the value as a negative value. Recommendation: You will achieve best results if you calibrate to a value near to the set value. The calibration is not officially verifiable!
9	*Ctrl*	regulating mode selection (CTRL)	*oFF* *b it.r* *b it.d* *P id.r* *P id.d*	OFF: Display function only BITR: On/Off regulation for heating operation (switches off after an ascending slope to set value) BITD: On/Off regulation for cooling operation (switches off after a descending slope to set value) PIDR: PID control heating operation PIDD: PID control cooling operation
10	*dFct*	switching hysteresis at both sides (DFCT)	0.1 ...200.0 *(Format XXX.X)* 1 ...2000 *(Format XXXX)*	Only active in on/off operation, on output terminal 1, 2. The specified temperature value is added to both ascending and descending temperature slopes. This therefore doubles the total hysteresis (switching gap). Example of a heating control system on output relay terminal 1, 2: Operating mode ON/OFF (BITR), set value = 200.0°C, DFCT = 0.5°C The output relay will therefore switch off the heating when 200.5°C is reached; The output relay will switch the heating back on after the temperature has cooled to 199.5°C.
11	*AL It*	alarm output (AL1T)	*oFF* *HJ* *HJb* *LJ* *LJb*	OFF: No alarm active (alarm output on terminals 6, 7, 8 is deactivated) HJ: Absolute alarm value excess temperature (high limit) *Alarm is emitted when the alarm value specified is reached. Alarm stops automatically according to the preselected switching hysteresis (DFAL menu)* HJB: Absolute alarm value excess temperature with hold function *As per HJ above, except that when the regulator is switched on (control voltage on), the alarm does not emit immediately, even if at the time of switching on the temperature is such that the alarm would usually be triggered during normal operation (for example, if a refrigerator is still warm).* *The alarm will only be emitted if the temperature moves out of the normal range and heads towards the alarm setting (temperature slope runs up to the alarm setting). Automatic alarm reset in accordance with DFAL menu.* LJ:Absolute alarm value insufficient temperature (low limit) *Alarm is emitted when the lower alarm value specified is reached. Alarm stops automatically according to the preselected switching hysteresis (DFAL menu)* LJB: Absolute alarm value insufficient temperature with hold function Functioning *equivalent to HJB*
12	*dFAL*	alarm hysteresis (DFAL)	1-2000	Switching gap reset alarm output (terminals 8, 7, 6). Only works with AL1T
13	*P*	proportional band (P)	0.1-999.9% of the measuring range	Proportional band parameter (P value). Setting only works in PID control mode (Menu Ctrl)
14	*I*	I integral time (I)	0-9999s	Integral part parameter (I value). Setting only works in PID (Menu Ctrl)
15	*d*	differential time (D)	0-999.9s	Derivative part parameter (D value). Setting only works in PID (Menu Ctrl)
16	*t*	switching time output (T)	2-120s	T represents the minimum period of time in seconds in which the output remains switched on. In principle, when using mechanical relay outputs/switching mechanical load relays, you should select the longest possible switching time, in order to avoid premature wear due to high switching frequency. When using regulators with SSR outputs and so-called SSR relay leads, in many cases selecting a shorter pulse interval results in better linearity of the temperature curve. Thanks to wear-free switching provided by electronically switching SSR relays, it is possible to choose your own switching frequency.

‘Automatic adjustment’ (Autotuning) function

The control panel features a programme that automatically finds the optimum PID settings for the connected load. For this programme to work, it is important that the regulator is ready for operation, the load is connected and that a non-critical temperature set value has already been set. In the ‘Loc’ menu (page 20), the value 0 must be set.

When in autotuning mode, the regulator moves through one or more control cycles so that it can establish the parameters. This can result in considerable deviations from the set value. Bear this in mind when specifying the set value. In consideration of this, it should be as close as possible to the actual control value.

During normal operation when a load is connected, press the button for about 4 seconds.

In the SV display, the set value flashes in alternation with - AT -. The procedure is complete once SV has automatically returned to normal display.

In order to cancel autotuning, press the button again for about 4 seconds, until SV stops flashing. The previous settings are not changed.

Alarm output configuration:

As well as an SSR output, the TR-81 also features an alarm output (terminals 8, 7, 6), which can be provided with its own set value (Menu B, parameter AL1T) as well as its own hysteresis (Menu B, parameter DFAL). When making any such settings, refer to the information provided in menu table B, under parameter point ALT1.
If, when the regulator is switched on, an undesired alarm is emitted (when the set value at the time of switching on corresponds to the alarm value), this can be prevented by the HJB setting (if the alarm range is higher than the set value) or the LJB setting (if the alarm range is below the set value). Both these settings can be found in menu AL1T. These settings enable the alarm to be temporarily bypassed after the control voltage has been switched on.

Maintenance and customer service:

In normal operation, the TR-81 regulator does not require maintenance. Excessive dust deposits should however be avoided. Use in wet rooms is only permitted with the approved housing with protective cover (part no Z-45-KsKap45x45). Electronic components must be protected against condensation moisture.
Dirt on the front and on the housing can be removed with a slightly moistened cloth when the regulator is switched off.

Error code:

HHHH	Measurement signal is above the expected range! If displayed after sensor installation: Wrong sensor type set in the ‘Sn’ parameter (Menu table B). Temperature measured is outside the upper and lower set value range (‘inPL’ and ‘inPH’, page 21). Load is switched off.
LLLL	Measurement signal is below the expected range! If displayed after sensor installation: Wrong sensor type set in the ‘Sn’ parameter (Menu table B). Temperature measured is outside the upper and lower set value range (‘inPL’ and ‘inPH’, page 21). Load is switched off.

We reserve the right to amend the technical specifications.