HE 5722

Solenoid valve controller

Operating Instructions

(Original German version)

HESCH
AUTOMATION
AXXERON
TECHNOLOGIES MEMBER

Imprint

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General Safety Instructions

Safety of the unit

This unit was built and tested in accordance with the manufacturing documents. It left the factory safety-tested and in perfect condition. It complies with the safety class specified in the Instruction Manual.
All information and warnings contained in these safety instructions must be observed, in order to preserve this condition and guarantee safe operation.
The unit is only allowed to be operated by appropriately instructed persons. It may only be maintained and repaired by suitably trained, qualified and competent persons who are familiar with the potential dangers.
The unit can be operated under the approved ambient conditions (see data sheet) without any impairment to safety.
Panel-mounted units are protected against accidental contact, providing they are installed safe from touch inside a housing or a control cabinet.

Unpacking the unit

Remove the unit and all accessories from the packaging. The standard accessories supplied with the unit comprise information for the operator or an Instruction Manual as well as any necessary fastening elements.
The shipment should be checked to make sure it is correct and complete. The unit should be inspected for damage attributable to inexpert handling during transport or storage.
One copy of the information for the operator or one Instruction Manual is enclosed with each shipment.

Warning!

If the unit has been damaged in a way that is liable to impair safe operation, it is not allowed to be put into service.
We recommend that you keep the original packaging in case the unit needs to be returned to the manufacturer for maintenance or repair at a later date.

Caution!

The unit contains electrostatic sensitive components. The rules for protection against electrostatic discharge (ESD) must be observed at all times during transport and installation.

Installation

The unit should be installed in a dry, dust-free room. It can either be mounted in a panel or, in the case of 19” plug-in modules, inserted in the slots provided for this purpose in an instrument rack.
The ambient temperature at the place of installation must not exceed the maximum value specified in the data sheet for the nominal range of use. If several units are installed at the same time with a high packing density, steps must be taken to ensure adequate heat dissipation in the interests of reliable operation. In addition, the necessary sealing components (e.g. seals) for the stipulated protection class must be fitted.
Two captive screws are provided on the front panel of the unit for locking a 19” plug-in module in the instrument rack. The enclosed fastening elements should be used for all other units.

Interference suppression should be implemented for all contactors in the control cabinet in the form of RC assemblies.

General Safety Instructions

Electrical connections

All electrical wiring should be laid in accordance with the relevant EMC standards as well as any nationally valid regulations (VDE 0100 in Germany). Measuring lines should be laid separately from signal and power lines. The protective conductor terminal (inside the instrument rack) must be connected to a protective earth conductor.
We recommend using twisted and screened measuring lines to prevent disturbances from interference fields. The electrical connections should correspond to the connection / terminal diagrams for the unit concerned.

Start-up

The following points should be checked prior to starting up the unit.
The supply voltage must match the voltage indicated on the name-plate. All covers necessary for contact protection must be fitted.
If the unit is interconnected with other units and/or equipment, you should consider the potential consequences prior to switching it on and take appropriate precautions.
The protective conductor terminal inside the instrument rack must be conductively connected to the protective earth conductor (class I units).
The unit is only allowed to be operated if installed.

Operation

The unit is ready to operate as soon as the power supply is switched on. It may require approximately 15 minutes settling time.

Warning

General Safety Instructions

Removal from service

If the unit must be removed from service, all poles of the power supply must be disconnected.
Steps must be taken to prevent the unit from being started up again inadvertently.
If the unit is interconnected with other units and/or equipment, you should consider the potential consequences prior to switching it off and take appropriate precautions.

Maintenance, repair and retrofitting

The unit does not require any special maintenance.
Units containing electromechanical relays have a limited service life (see data sheet).

Warning!

Live parts may be exposed if the unit is opened or if covers or parts are removed. Terminals could be energised.
The unit must be disconnected from all power sources before any work is carried out on it.
After completing the work, the unit must be closed again and all covers or parts that were removed re-fitted. Check whether any of the values indicated on the name-plate need to be altered. Correct this information if necessary.

Components that are sensitive to electrostatic discharge (ESD) may be exposed when the unit is opened. In this case, all subsequent work is only allowed to be carried out at a workplace that is adequately protected against electrostatic discharge.
All retrofitting, maintenance or repair work must be performed by suitably trained, qualified and competent persons.
If the unit is tampered with during the warranty period, all warranty claims are rendered invalid.
The unit must no be used under conditions which deviate from those described in this document.
If a fuse is found to have tripped, the cause must be identified and cleared. The replacement fuse which is fitted must have the same ratings as the original one.
The use of rewired fuses is prohibited, as is short-circuiting the fuse holder.

Explosion protectio

E Explosion protection

Units with the following marking are suitable for use in explosion

General Description

1 General description

The HE 5722 filter controller is used to measure differential pressure and to pulse magnetic valves of the kind encountered in industrial dust removing applications.
The use of an MB90F347 microprocessor facilitates flexible selection of functions and extensive monitoring functionality.

- **Visual indication:**

  The unit has a four-digit display for the differential pressure. This display shows either the value measured with the pressure sensor or that measured via the current input. The current valve appears on a two-digit display. States and errors are indicated by twelve LEDs.

- **Differential pressure measurement:**

  The differential pressure across the filter is measured by means of a pressure sensor integrated in the unit. The standard measuring range is 0 to 100 mbar; other measuring ranges are possible on request. The actual differential pressure is indicated on a four-digit display with one decimal place.

- **Valve actuation:**

  Up to 24 valves can be actuated. The valve current is monitored, which means overcurrent or interruptions at the valve controller output can be detected. The following valve control functions are freely selectable:
  - Threshold-controlled cleaning
  - Post-cleaning of the complete filter
  - Time-controlled forced cleaning
  - Cleaning with separately settable control times
  - Multiple pulse actuation of a valve
  - Interval time proportional to differential pressure

- **Inputs:**

  The filter controller has four electrically isolated inputs via which the “Stop”, “Rapid cleaning”, “Post-cleaning” and “Acknowledge fault” commands are forwarded to the microprocessor. The controller has a USB port for software updates. A standard signal (0 (4) to 20 mA) can be measured via an analogue input. The external signal and the internal differential pressure signal can be used simultaneously. The stronger signal takes priority, in other words a cleaning cycle can be started even if the programmed thresholds are not yet exceeded.

- **Outputs:**

  Three relays are provided for status, error and cleaning messages as well as special functions (cycle counter and lag time for discharge devices). These functions and the FAILSAFE and HOLD switching modes are freely selectable.
  The differential pressure is output via a non-isolated analogue output (0 (4) to 20 mA).

- **Cleaning thresholds:**

  A high and low threshold can be set on the unit. Cleaning starts when the high threshold is exceeded and ends when the low threshold is exceeded.

- **Alarm thresholds:**

  You can program two alarm thresholds, which are indicated by means of LEDs.
  The alarms can be assigned to the relays.

- **Parameter protection:**

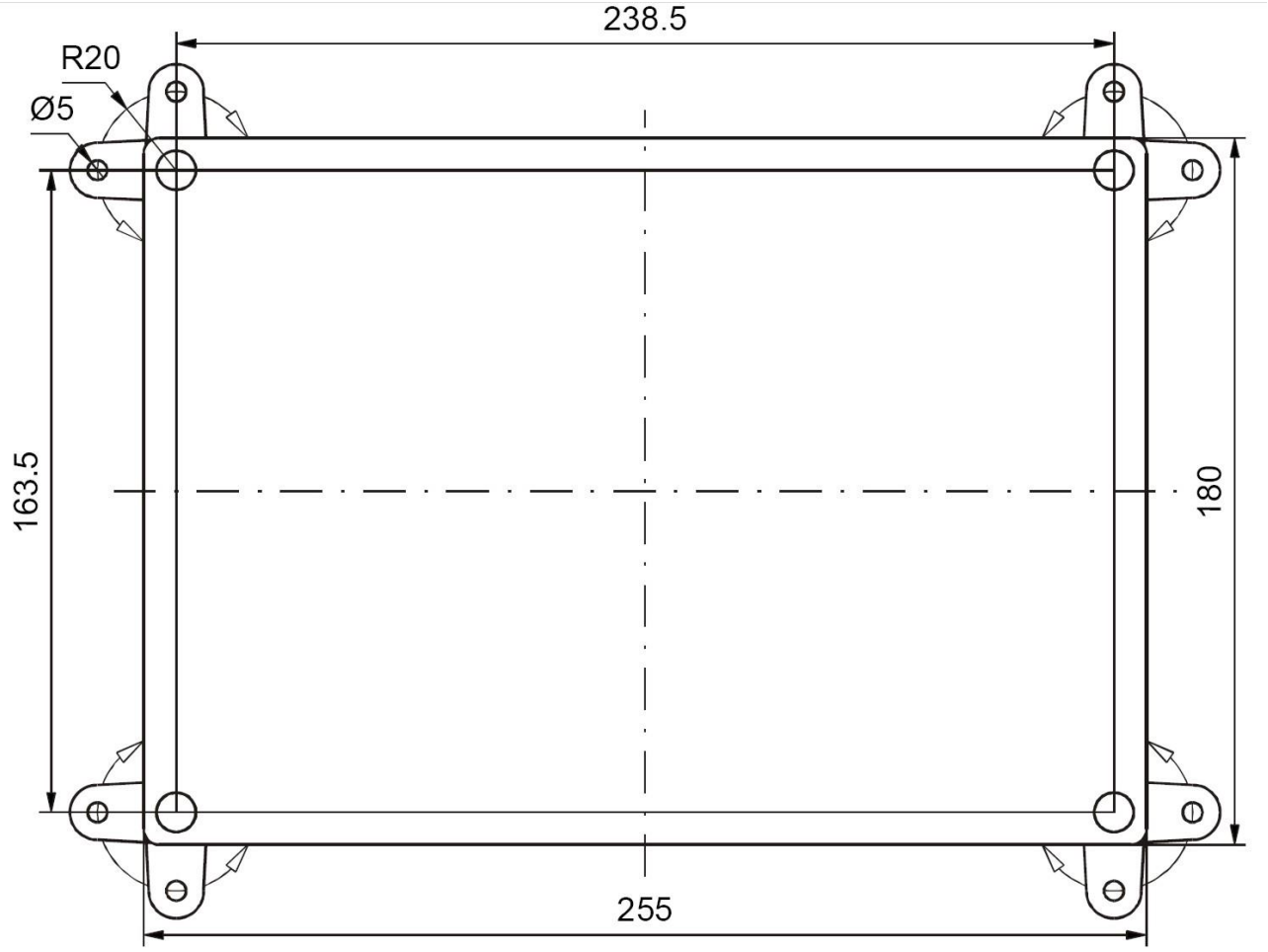
  The parameters can be protected with an access code.

2.1 Installation of the equipment

The unit should be installed in such a way that it is protected against moisture and fouling. Conformity with the approved ambient conditions must be ensured.
The electrical connections must comply with the relevant VDE specifications as well as any locally valid regulations. All fittings must be expertly assembled. The pneumatic connections are intended for hoses with an inside diameter of 4 mm on the sensor and 6 mm on the housing.
The temperature of the gas (raw gas, clean gas) must not exceed 50°C on the unit.

Housing material: Polycarbonate (PC), Makrolon
Housing colour: Bottom part: light grey RAL 7035; cover: transparent smoked glass

Housing dimensions: 255 x 180 x 100 mm (W x H x D)
Fixing dimensions: 238.5 x 163.5 mm (W x H)



Max. 4x	Cable gland M32 with 6x seal insert	Valves
2x	Plastic bulkhead connector for 4 mm hose	Differential Pressure
1x	Diaphragm for pressure compensation M12	

2.3 Electrical connections

Terminals
Spring-loaded PCB terminals, max 15 A, max. 1.5 mm^2 core cross-section, rigid / flexible.

Infeed
The valve controller can be operated with 115 V AC (± 10%), 230 V AC (± 10%) or 24 V DC (± 10%), depending on the version. Terminals: L/+; N/-; PE

Valve outputs
24 valves for 24 V DC can be connected
Type: High-side driver, i.e. switched + output Valve
voltage: 24 V DC (± 20%)
Switching current: 1 A min. per output
Protection: Short-circuit resistant, protection against polarity reversal, temperature resistant
Terminals: Valve+; valve-; PE arranged vertically

Analogue input
1x 0 (4) to 20 mA for external differential pressure measurement Basic accuracy: ± 1%
Temperature drift / full-scale value: ± 0.05% / K Sensor supply +Ub: terminal 27; Ain: terminal 38; GND: terminal 47

Analogue output
1x 0 (4) to 20 mA for measured differential pressure
Aout: terminal 25; GND: terminal 36

Digital inputs
4x connection for control command keys
Type: Electrically isolated with optocouplers
Supply voltage: 24 V DC (± 10%)
Current consumption: < 6 mA
+Ub: terminal 26; Stop: terminal 28; Rapid cleaning: terminal 29; Post-cleaning: terminal 39; Acknowledge fault: terminal 40

Relay outputs
3x connection, e.g. for lamps for signalling operating states Operation K1: terminal 41; Fault K2: terminal 43; Cleaning K2: terminal 45
You can also assign other events to the relays, e.g. “Alarm threshold reached”.

2.4 Ambient conditions

Ambient temperature

Operation	0 to +50°C
Storage	-25 to +70°C
Transport	-25 to +70°C

Climatic category
KUF to DIN 40040
Relative humidity: 75% (annual average), no condensation allowed

Air pressure

Operation and storage	80 kPa to 106 kPa
Transport	70 kPa to 106 kPa

Condensation
Not allowed

Icing
Not allowed

Vibrations
Sine wave vibrations to EN 60068-2-6
Load: 5 g, 2 h in each spatial direction

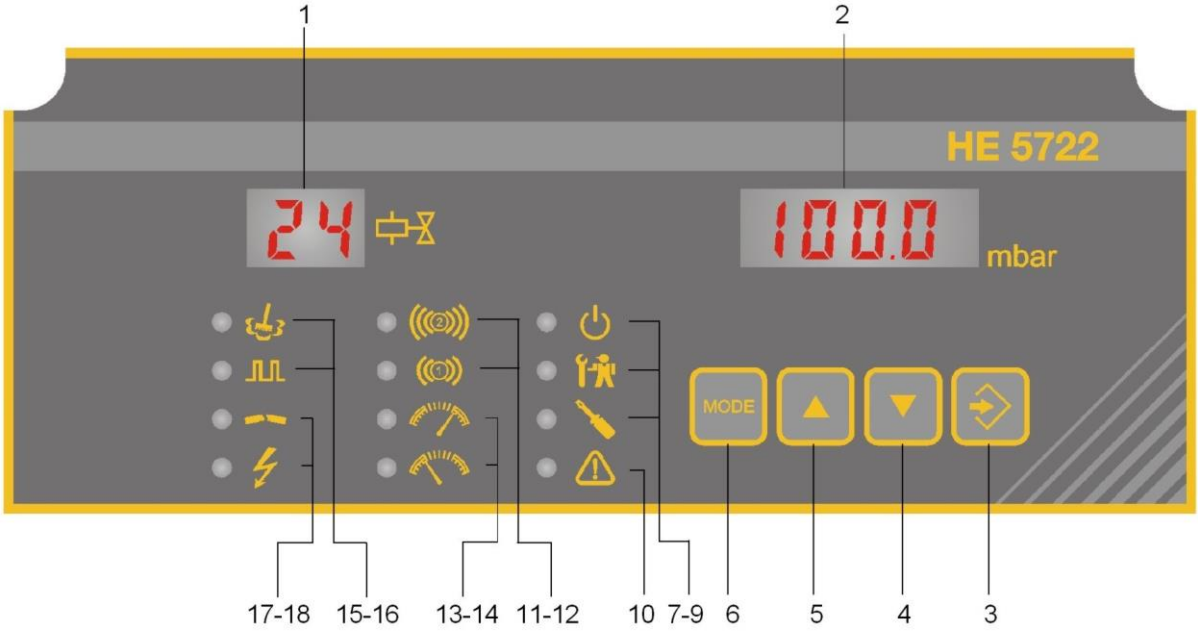
Shock
To EN 60068-2-27
Load: 25 g for 11 ms, half sine wave

Creepages and clearances

Working voltage:	300 V AC
Fouling:	2
Overvoltage category:	II

Resistance to interference (immission)
- EN 61000-6-2 Immunity for industrial environments
- EN 61000-6-4 Emission standard for industrial environments
- EN 61326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements

3 Operation



3.1 Control and display elements

1 Valve display: This 2-digit, 7-segment display indicates the current valve or the faulty valve. The name of the submenu is shown in the parameter settings mode.

2 Δp display: This 4-digit, 7-segment display indicates the current actual value. You can also display the parameter names and their corresponding values simply by pressing a key. Variable parameters flash. The word 'OPTION' appears next to optional parameters.

3 ' ' key: By pressing the key, you select the displayed function or confirm an input.

4 ▼ key: Press the ▼ key to scroll down in a menu. You can also use this key to change a number, in which case the current value is decremented by one.

5 ▲ key: Press the ▲ key to scroll up in a menu. You can also use this key to change a number, in which case the current value is incremented by one.

6 'MODE' key: Press the 'MODE' key to exit the selected function without changing any values.

7-9 Status LEDs: Normal operation ( ), test function ( ), parameter settings ( )

10 General fault: The LED lights up to indicate an internal fault, e.g. if the unit parameters are incorrect.

11-12 Δp alarms: The and LEDs light up if the differential pressure limits are exceeded.

13-14 Δp thresholds: The LED lights up if the upper threshold is exceeded.

The LED lights up if the low threshold is under-run.

15 Cleaning: The LED lights up while the filter is being cleaned.

16 Pulse LED: The LED lights up when a valve is actuated.

17-18 Valve error:
- The LED flashes if the valve current is interrupted (< 15 mA).
- The LED flashes to indicate valve overcurrent (> 1.2 A).

LEDs 11, 12 and 17 to 18 light up continuously if the controller detects that the cause of a fault has been cleared but the fault signalling relay is programmed with a HOLD function.

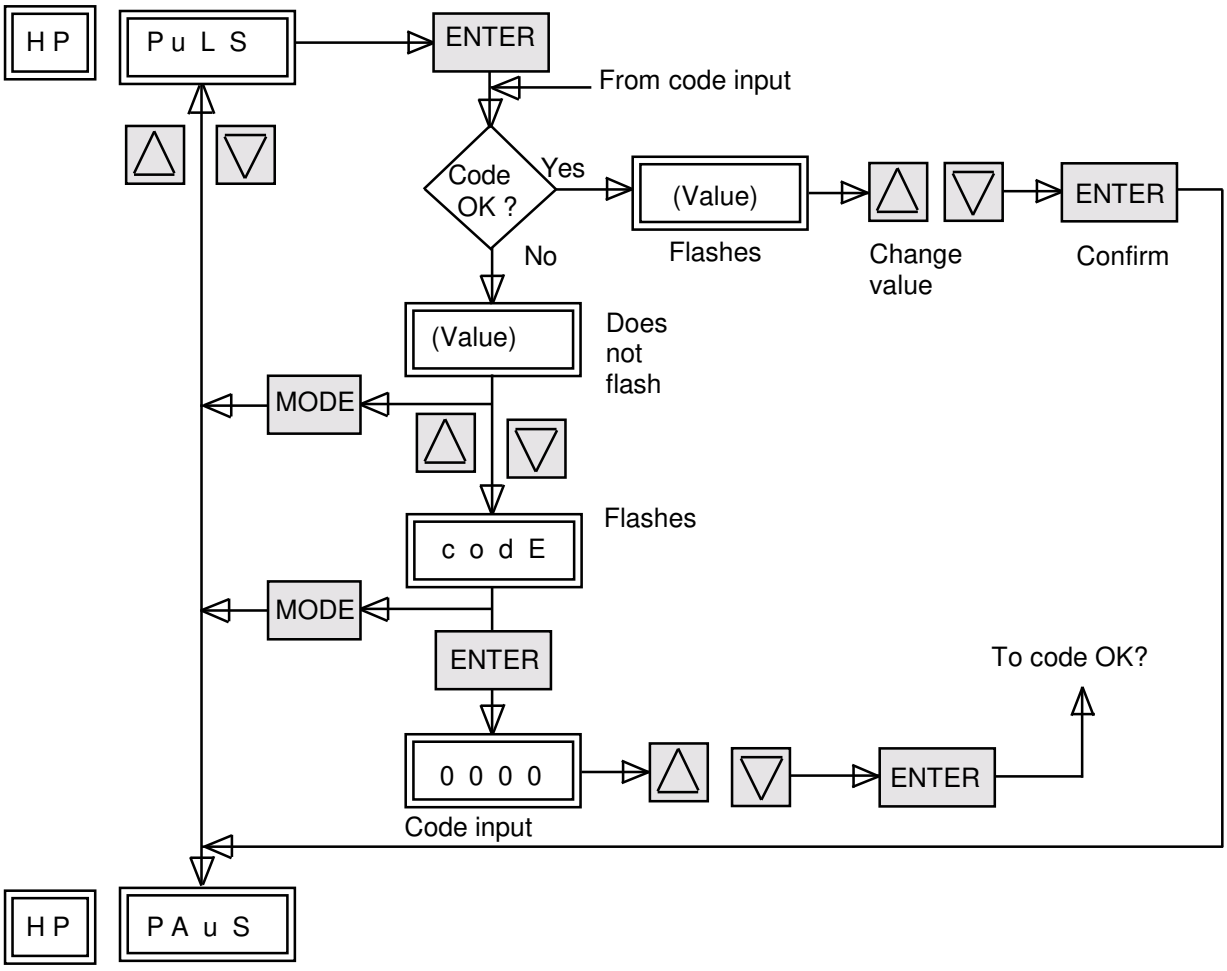
3.2 Settings

You can set the parameters in various parameter menus. The currently open menu is indicated on the valve display by two letters. You open the parameter menus by pressing the ▼ key.

3.2.1 Code setting

All the unit parameters can be protected with a code. The system prompts you to enter this code whenever you attempt to change a parameter.

Example: How to change the pulse time if a user code is active



3.2.2 Settings in the Main Parameters menu (HP)

Parameter	Meaning	Setting range	Default setting
AnZ	No. of valves	01 - 24	
PuLS	Pulse time	00.01 - 99.99 s	
PAuS	Interval time	000.1 - 999.9 s	
u.Sch	Low threshold	-10.0 - 500.0 mbar	
o.Sch	High threshold	-10.0 - 500.0 mbar	
AL. 1	Alarm threshold 1	-10.0 - 500.0 mbar	
AL. 2	Alarm threshold 2	-10.0 - 500.0 mbar	

3.2.3 Settings in the Valve Parameters menu (Ut)

Parameter	Meaning	Setting range	Default setting
P.PAu	Proportional interval time	000.0 - 999.9 s	
Pu 2	Pulse time, 2nd control time	00.01 - 99.99 s	
PA 2	Interval time, 2nd control time	000.1 - 999.9 s	
FoLG	Pulse actuation sequence	01 - 23	
r.Art	Cleaning mode, partial / full cycle	tEIL - ALLE	
Anz.P	Multiple pulse actuation, no. of	1 - 99	
M.E.Pu	Multiple pulse, first pulse	00.00 - 99.99 s	
M.PAu	Multiple pulse actuation, interval between pulses	00.00 - 99.99 s	
nAc.r	Post-cleaning cycles	01 - 99	
ZG.Zt	Forced cleaning time	0:00 - 99:59 hh:mm	
ZG.An	Forced cleaning, no. of valves	0 - 999	
nA.LF	Lag time for discharge devices	0:00 - 99:59 hh:mm	

3.2.4 Settings in the Delta P Parameters menu (dP)

Parameter	Meaning	Setting range	Default setting
S.AL1	Switching mode, alarm 1	HI - Lo Maximum / minimum	
H.AL1	Hysteresis, alarm 1	0.1 - 500.0 mbar	
d.AL1	Delay, alarm 1	0:00 - 99:59 hh:mm	
S.AL2	Switching mode, alarm 2	HI - Lo Maximum / minimum	
H.AL2	Hysteresis, alarm 2	000.1 - 500.0 mbar	
d.AL2	Delay, alarm 2	00:00 - 99:59 hh:mm	
InP	Delta P input	Dp / aIN	
oFFS	Delta P offset	-90.0 - 90.0 mbar	
FILt	Delta P filter stage	1 - 5	
A.In	Analogue input	0 - 20 mA / 4 - 20 mA	
A.out	Analogue output	0 - 20 mA / 4 - 20 mA	
SEnS**	Pressure sensor measuring range	100 mbar (optional: 500 mbar)	-
rAnG**	Customer's measuring range	10 - 100 mbar	70 mbar

** Default parameters

3.2.5 Settings in the Relay Parameters menu (rE)

Parameter	Meaning	Setting range	Default setting
Fun1	Relay 1 function		
	Status message	bEtr	
	Group fault	SA.St	
	Valve fault	Ut.St	
	Differential pressure alarm 1	dP.A1	
	Differential pressure alarm 2	dP.A2	
	Differential pressure alarms	dP.AL	
	All cleaning modes	rEIn	
	Forced cleaning	ZG.rE	
	Post-cleaning	NA.rE	
	Differential pressure cleaning	dP.rE	
	Lag time	nL.Zt	
	Cycle counter	ZY.ZA	
r1FH	Relay 1 switching mode		
	Normal function	nEIn	
	Failsafe	FAIL	
	Hold	HoLd	
	Failsafe + hold	FA.Ho	
Fun2	Relay 2 function	Like relay 1	
r2FH	Relay 2 switching mode	Like relay 1	
Fun3	Relay 3 function	Like relay 1	
r3FH	Relay 3 switching mode	Like relay 1	

3.2.6 Settings in the Special Parameters menu (So)

Parameter	Meaning	Setting range	Default setting
codE	Parameter protection password	0 - 9999 [1)]	

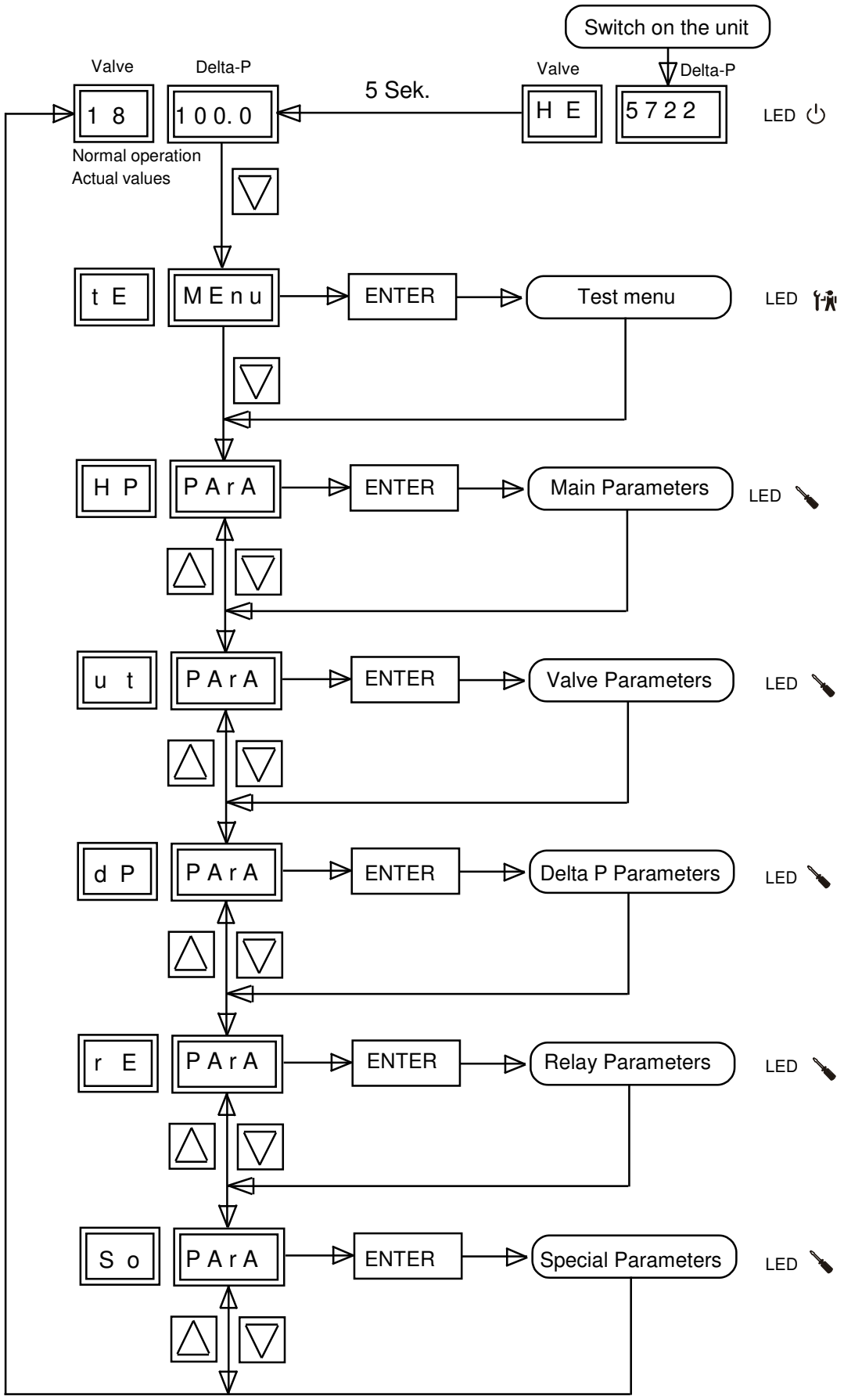
[1)] If codE is set to 0, the password protection is deactivated.

3.3 Structure of the menus

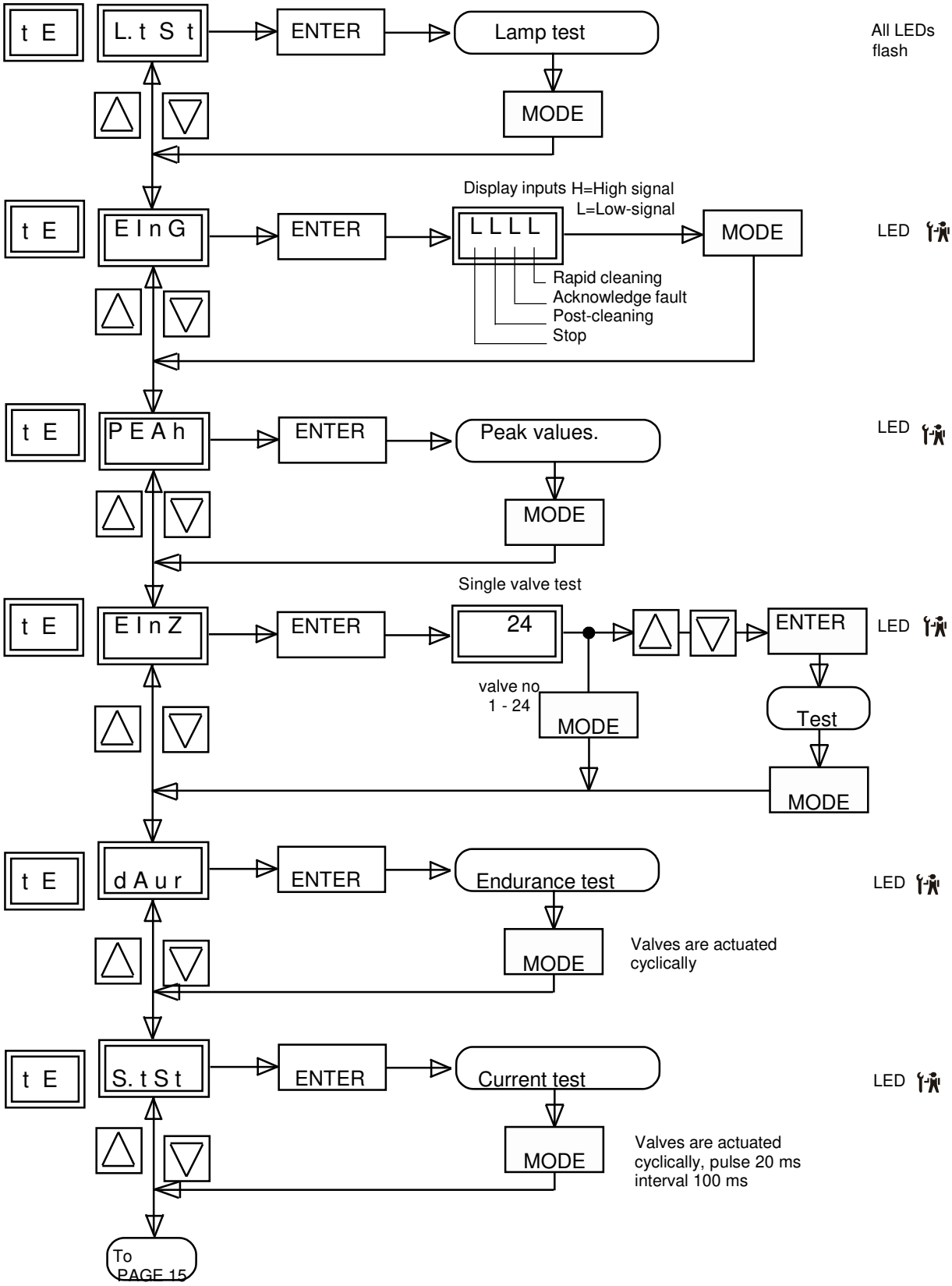
General hints for setting parameters:

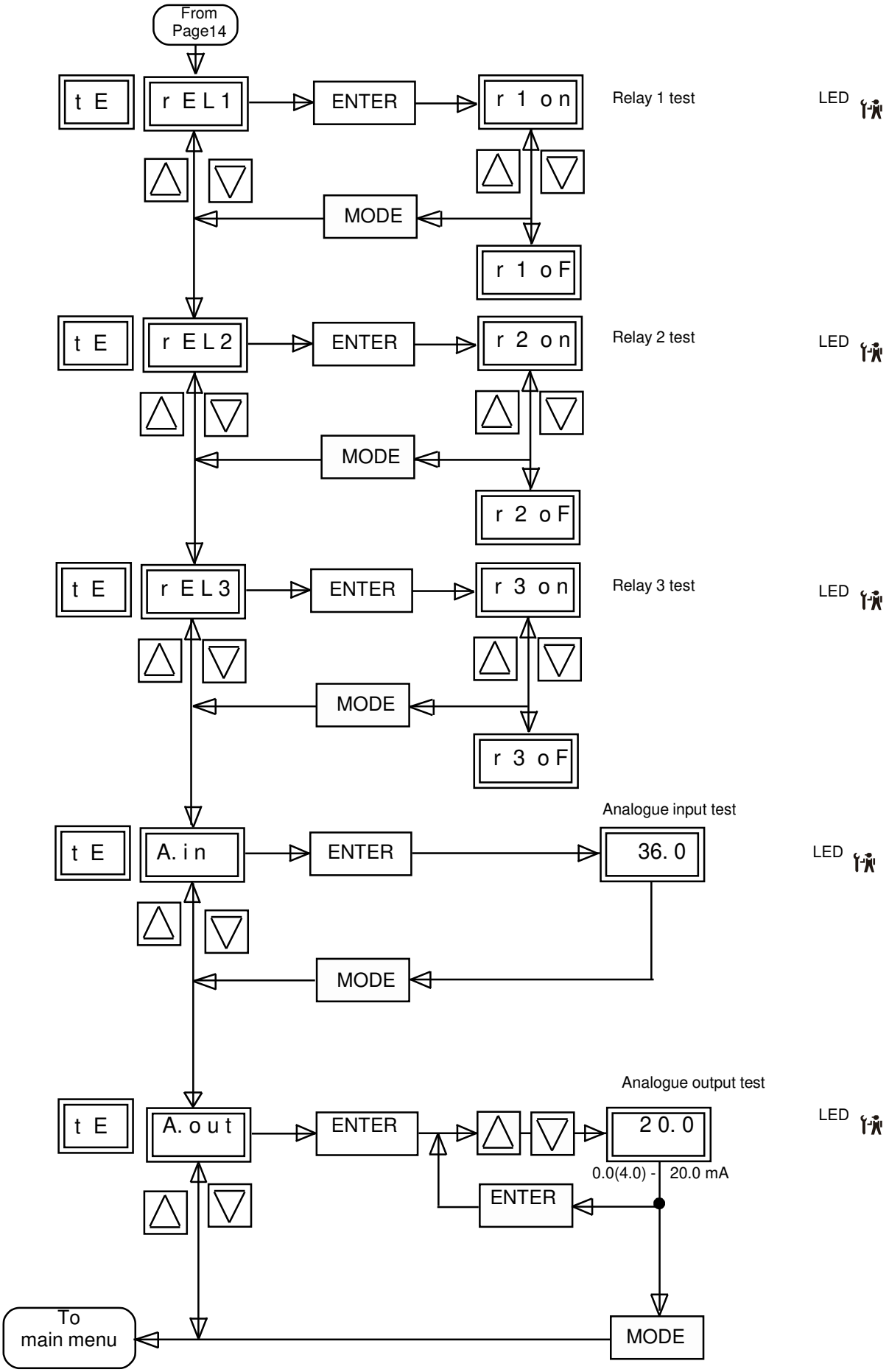
Keys	Function(s)
 or	• Set a flashing decimal place
 **ENTER**	• Jump to the next decimal place • When you reach the last decimal place, jump to the next parameter
 **MODE**	• Cancel the input and jump to the next parameter • If you press this key three times, the display shows 'Operation' (bE trIE). Press 'ENTER' to return to normal operation.

3.3.1 Structure of the main menu

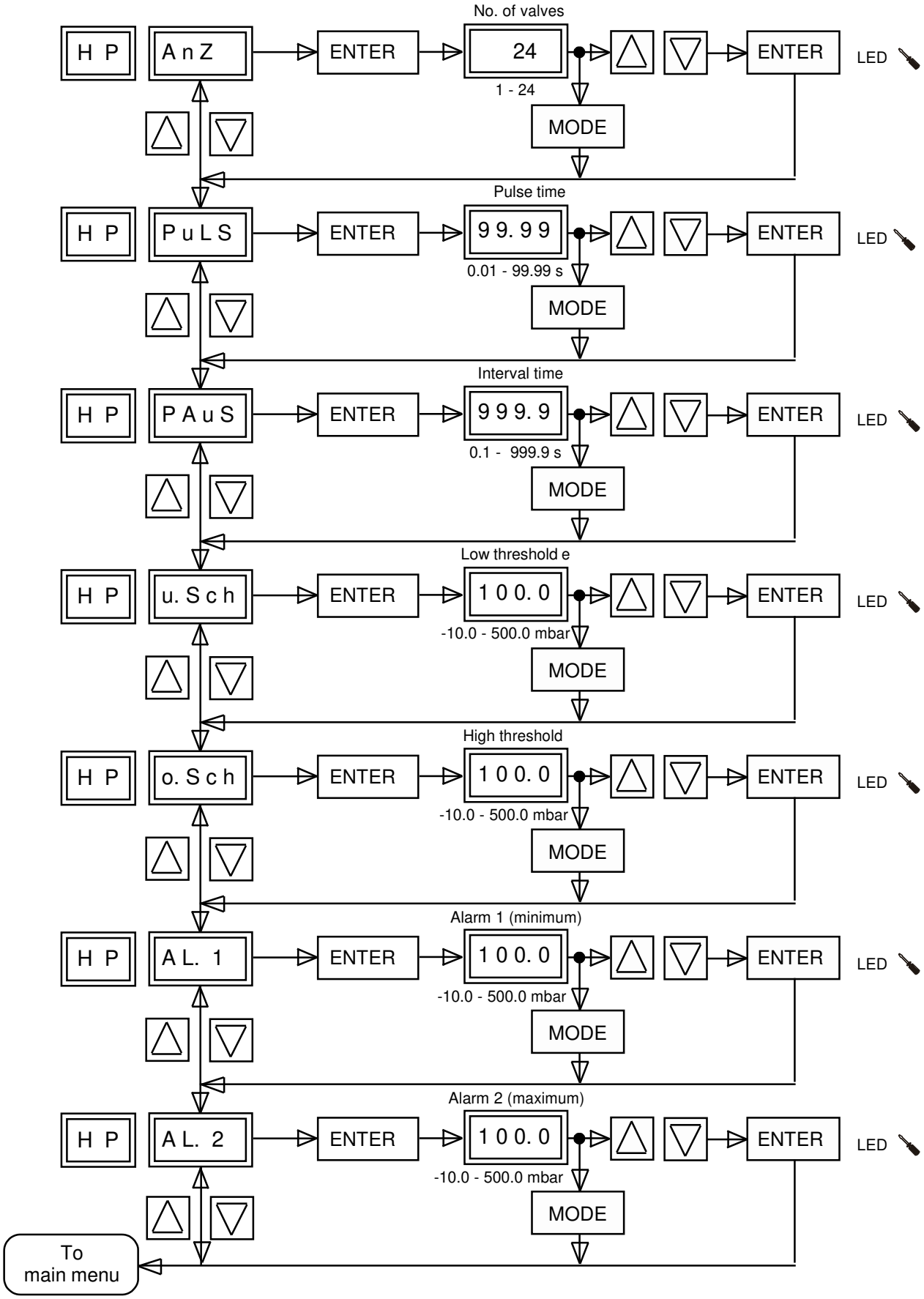


3.3.2 Structure of the Test menu

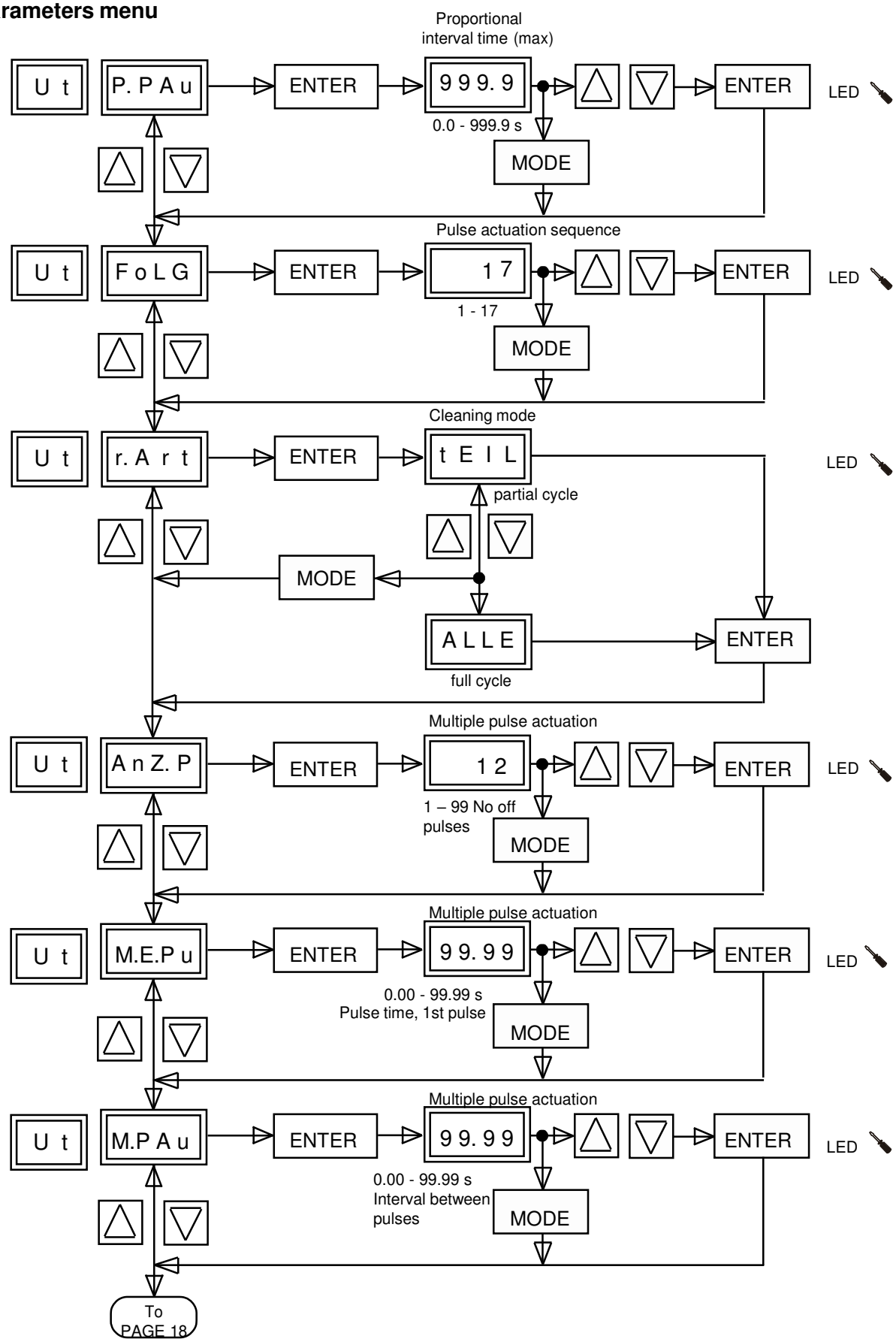


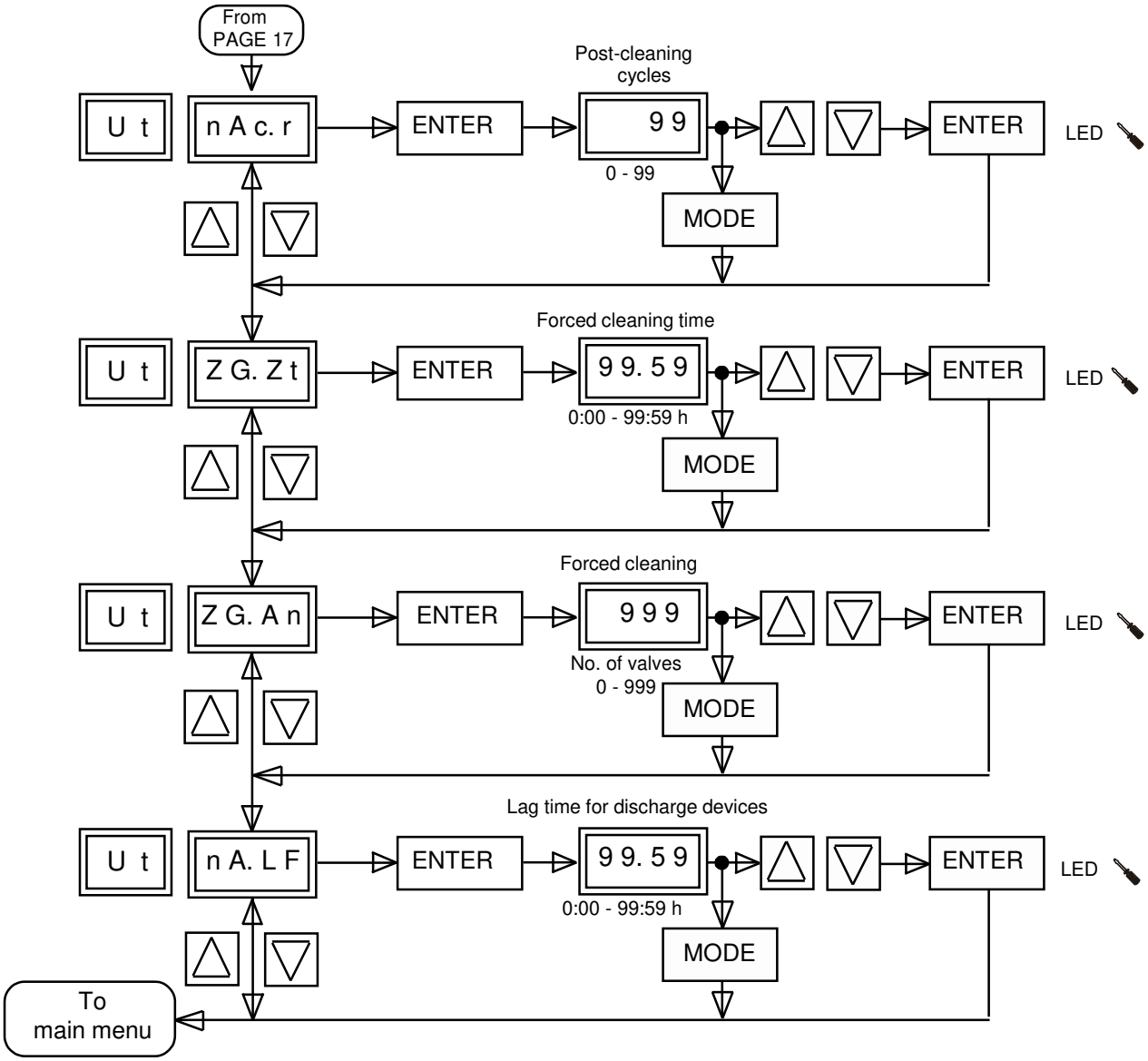

From Page14
t E
r E L 1
ENTER
r 1 o n
Relay 1 test
LED
MODE
r 1 o F
t E
r E L 2
ENTER
r 2 o n
Relay 2 test
LED
MODE
r 2 o F
t E
r E L 3
ENTER
r 3 o n
Relay 3 test
LED
MODE
r 3 o F
Analogue input test
t E
A. i n
ENTER
36. 0
LED
MODE
Analogue output test
t E
A. o u t
ENTER
2 0. 0
LED
0.0(4.0) - 20.0 mA
ENTER
To main menu
MODE

3.3.3 Structure of the Main Parameters menu

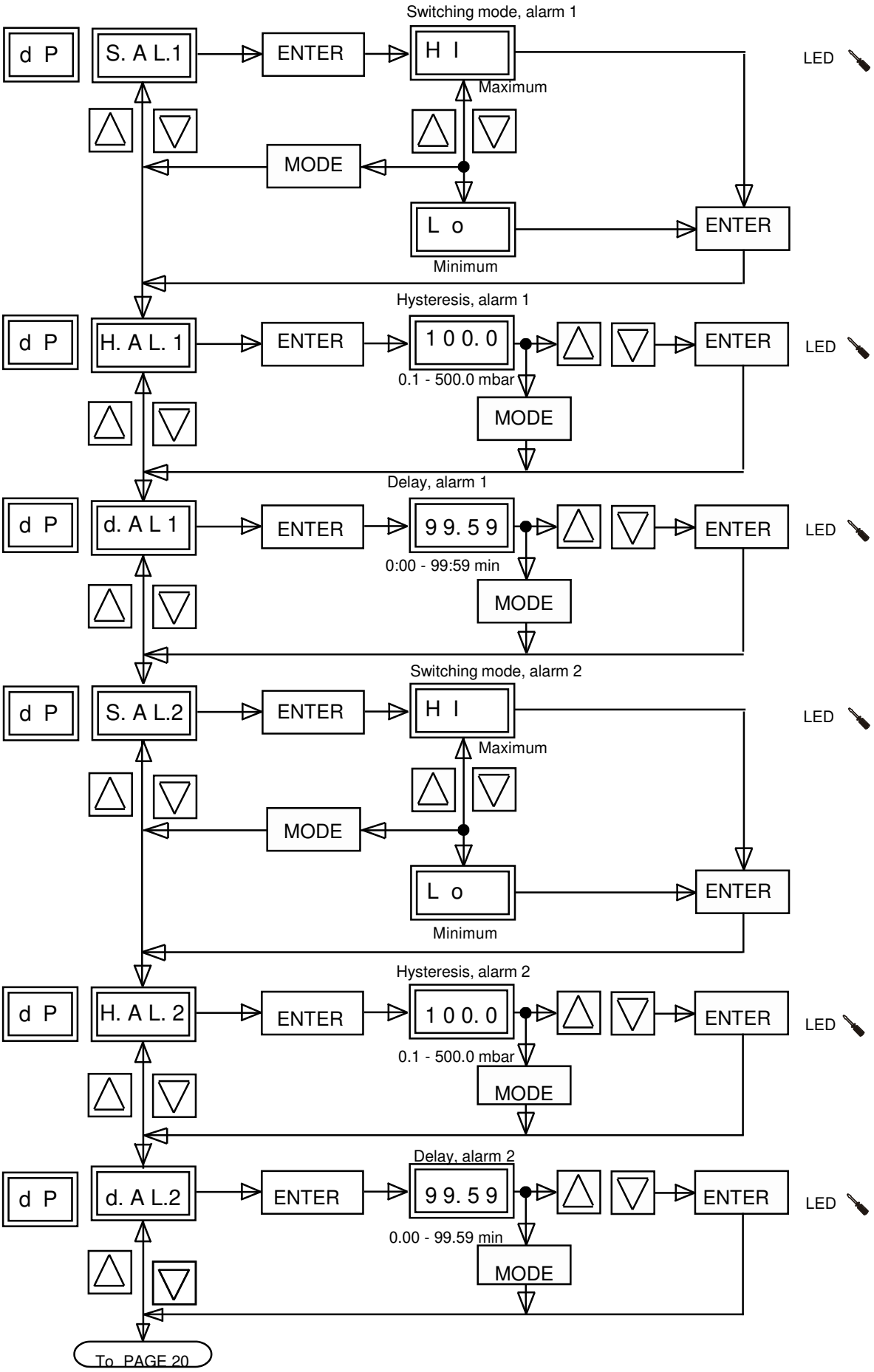


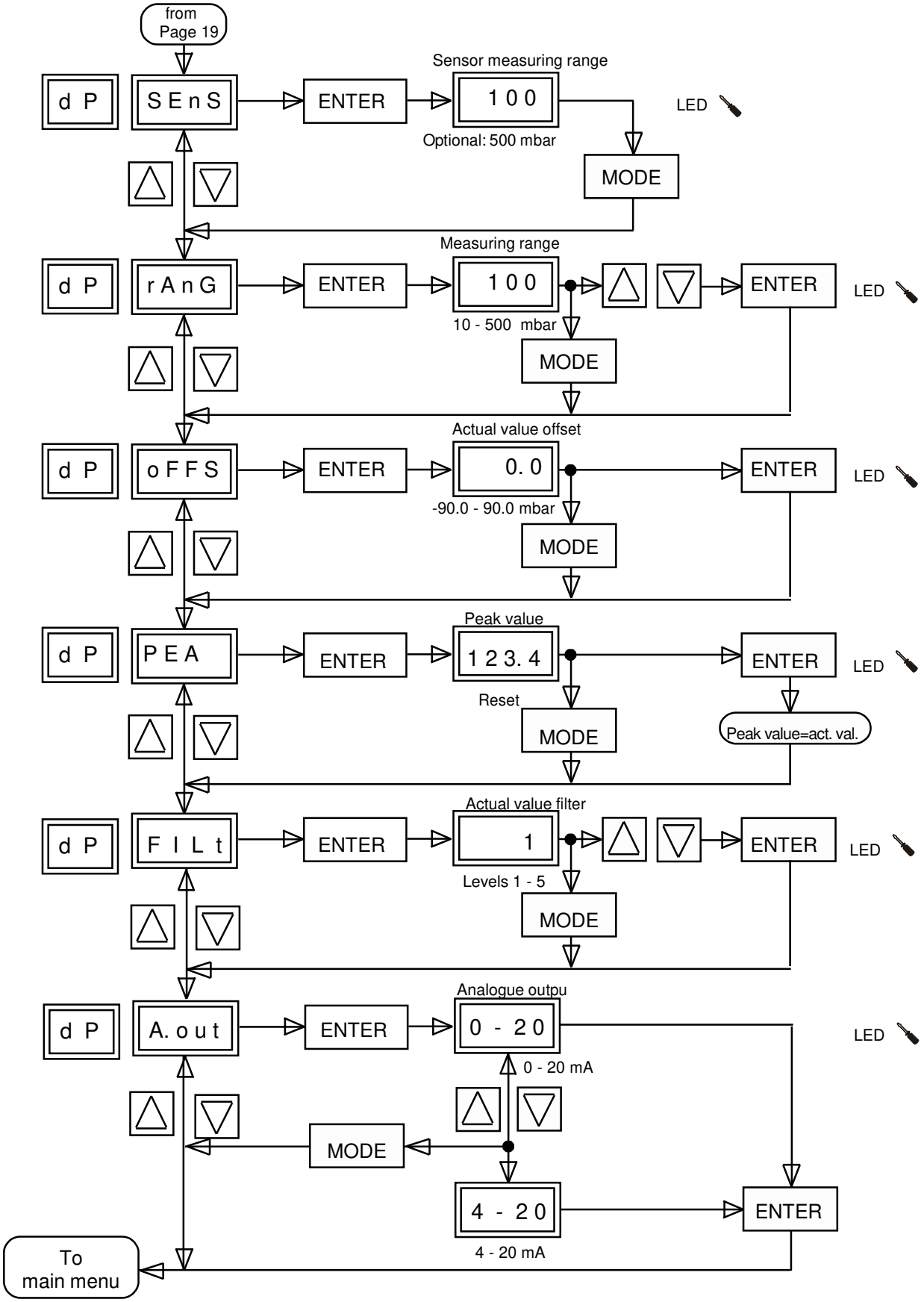
3.3.4 Structure of the Valve Parameters menu



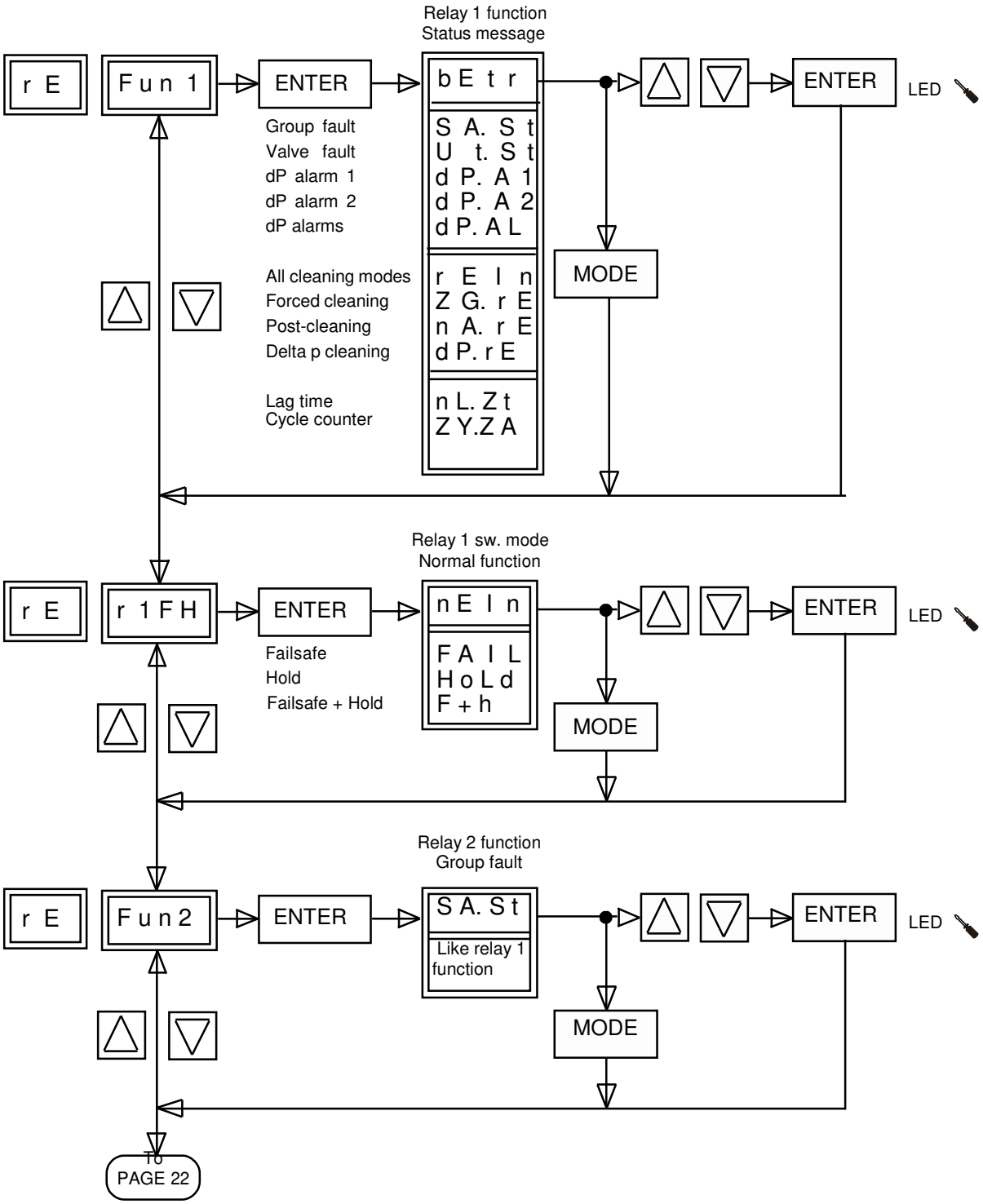

From PAGE 17
U t
n A c. r
ENTER
Post-cleaning cycles
9 9
0 - 99
MODE
ENTER
LED
U t
Z G. Z t
ENTER
Forced cleaning time
9 9. 5 9
0:00 - 99:59 h
MODE
ENTER
LED
U t
Z G. A n
ENTER
Forced cleaning
9 9 9
No. of valves
0 - 999
MODE
ENTER
LED
U t
n A. L F
ENTER
Lag time for discharge devices
9 9. 5 9
0:00 - 99:59 h
MODE
ENTER
LED
To main menu

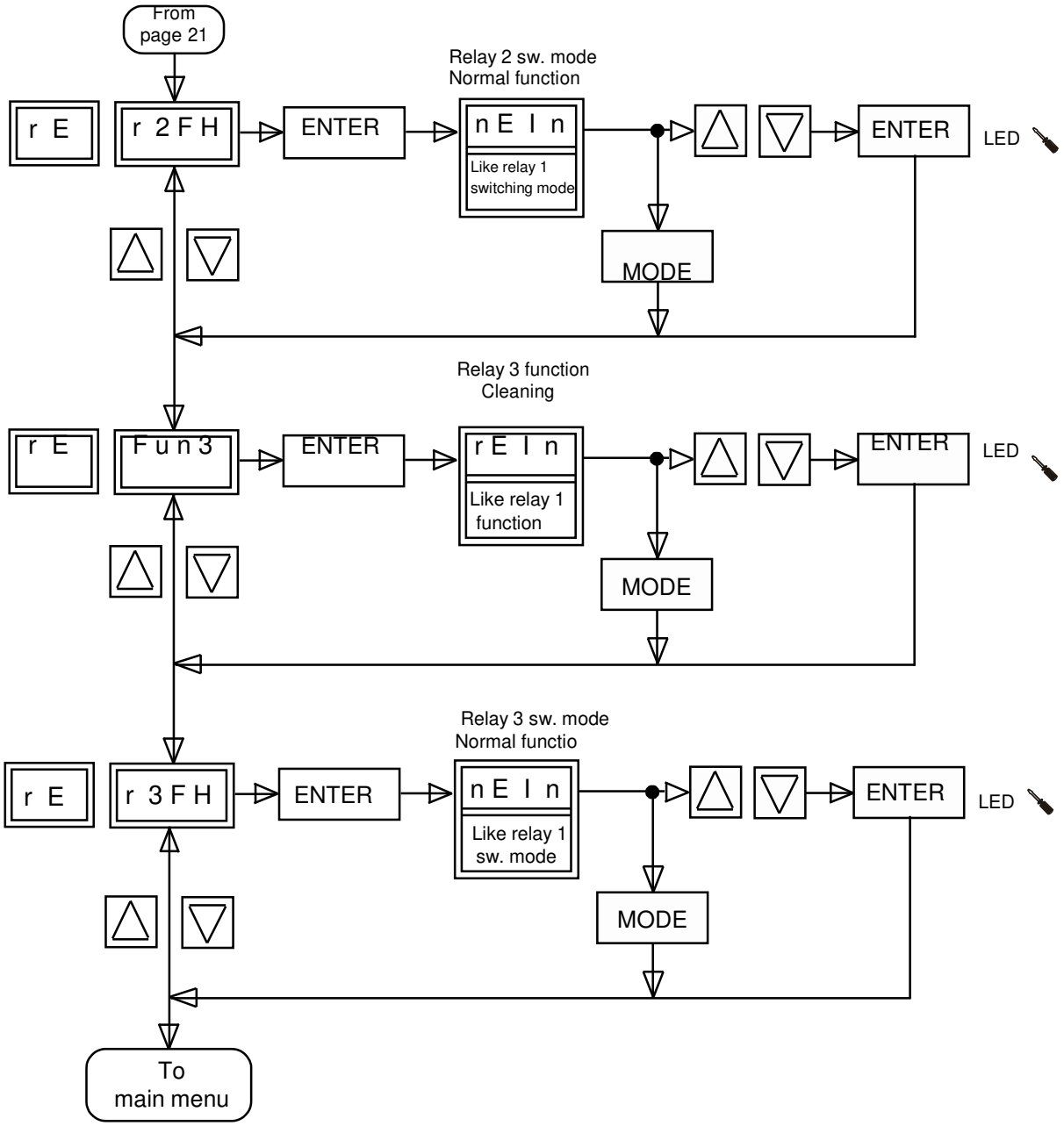
3.3.5 Structure of the Delta P Parameters menu



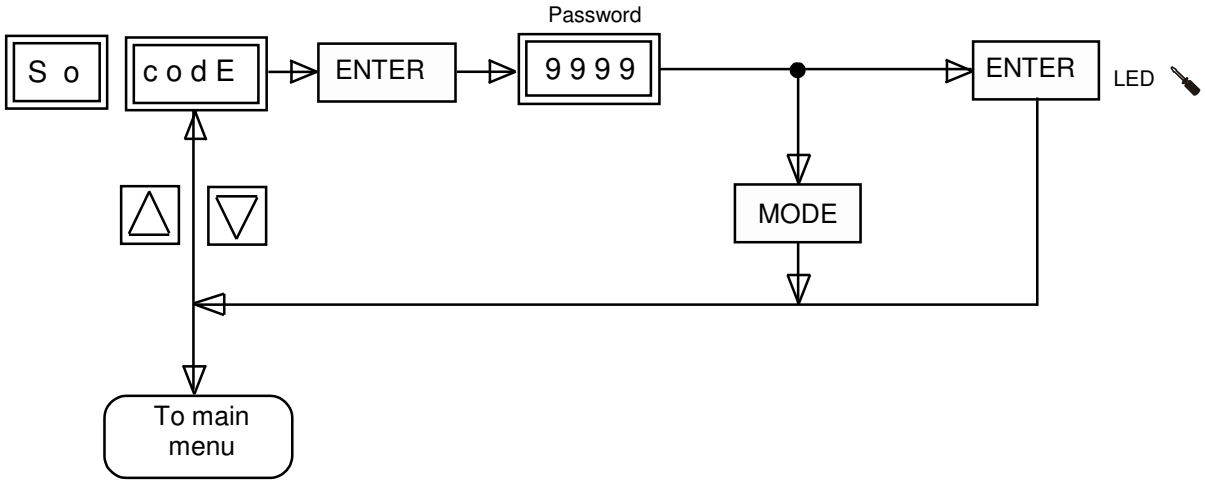

from Page 19
d P
SEnS
ENTER
Sensor measuring range
100
Optional: 500 mbar
LED
MODE
Measuring range
rAnG
ENTER
100
10 - 500 mbar
MODE
ENTER
LED
Actual value offset
oFFS
0.0
-90.0 - 90.0 mbar
Peak value
PEA
123.4
Reset
Peak value=act. val.
Actual value filter
FILt
1
Levels 1 - 5
Analogue outpu
A.out
0 - 20
0 - 20 mA
4 - 20
4 - 20 mA
To main menu

3.3.6 Structure of the Relay Parameters menu




From page 21
r E
r 2 F H
ENTER
Relay 2 sw. mode
Normal function
n E I n
Like relay 1 switching mode
ENTER
LED
MODE
Relay 3 function
Cleaning
r E
F u n 3
ENTER
r E I n
Like relay 1 function
ENTER
LED
MODE
Relay 3 sw. mode
Normal functio
r E
r 3 F H
ENTER
n E I n
Like relay 1 sw. mode
ENTER
LED
MODE
To main menu

3.3.7 Structure of the Special Parameters menu



4 Differential pressure measurement

The differential pressure between the air inlet and air outlet connections is measured in the range from -2.0 to 100 mbar (optional: up to 500 mbar). It is assumed that the higher pressure is present at the air inlet connection (+).

4.1 Zero offset

The zero for differential pressure measurements can be corrected or adapted to each specific application with the **'oFFS'** parameter in the Delta P menu.

The setting range is -90.0 to +90.0 mbar.

The value of the **'oFFS'** parameter is subtracted from the measured differential pressure. The computed value is then displayed and signalled via the analogue output.

4.2 Actual value filter

An actual value filter can be activated in the software in order to suppress unwanted signals. To do this, select the **'FILt'** parameter in the Delta P menu.

You can set a filter level from 1 to 5. The higher the filter level, the slower both the actual value display and the analogue output will respond.

4.3 Peak value memory

The maximum differential pressure values measured during operation are stored in the peak value memory.

You can display the peak value with the 'PEA' parameter in the Delta P menu and reset it to the actual differential pressure by pressing the ENTER key. The peak value memory is cleared if the mains power is disconnected.

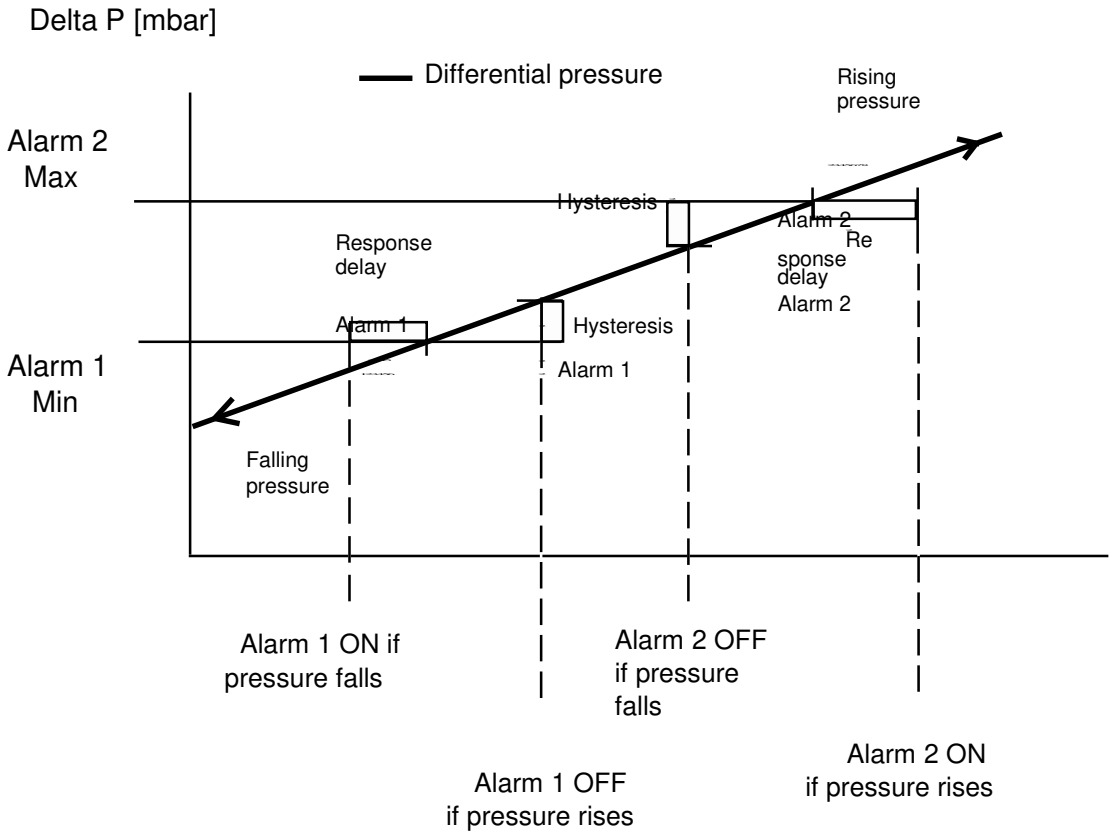
4.4 Delta P alarms 1 and 2

The limit values for alarms 1 and 2 can be set in the Main Parameters menu, anywhere within the measuring range from -10.0 to 500.0 mbar.

You can toggle the switching mode (**'S.AL1'** or **'S.AL2'**) between the MIN and MAX alarms (**'Lo'** and **'HI'**) in the Delta P menu.

The **'H.AL1'** and **'H.AL2'** parameters set a hysteresis. The alarms work with a minimum hysteresis of 0.1 mbar.

You can set an alarm response delay with the **'d.AL1'** and **'d.AL2'** parameters. The alarms must be programmed as relay functions for external signalling (group fault or delta P alarm).



5 Analogue output

You can change the current output from 0-20 mA to 4-20 mA with the **'A.out'** parameter in the Delta P menu.

The analogue output always signals the actual differential pressure that is shown on the display. 20 mA is indicated if the full-scale value is reached.

6 Valve parameters

6.1 Number of valves

Menu name: **(Anz)**

'No. of valves' refers to the total number of valves in the filter. You can set up to 24 valves. If the set number of valves is higher than the number of valves actually connected, an 'Interruption' error message appears as soon as you attempt to actuate the first valve that is not connected.

6.2 Control times

6.2.1 Control time (pulse / interval)

Menu name: **(PuLS/PAuS)**

The control time determines the time for which the valve is actuated as well as the interval between two valves. (PuLS) = pulse time Valve open

(PAuS) = interval time Valve closed

6.2.2 Second control time

Menu name: **(Pu 2/PA 2)**

The second control time facilitates rapid pulse actuation. Note that the pressure system needs the interval time between two pulses in order to provide the pressure that is required to actuate the next valve in the air tank. The second control time is used for post and forced cleaning. It can also be activated via a digital input with an external switching contact.

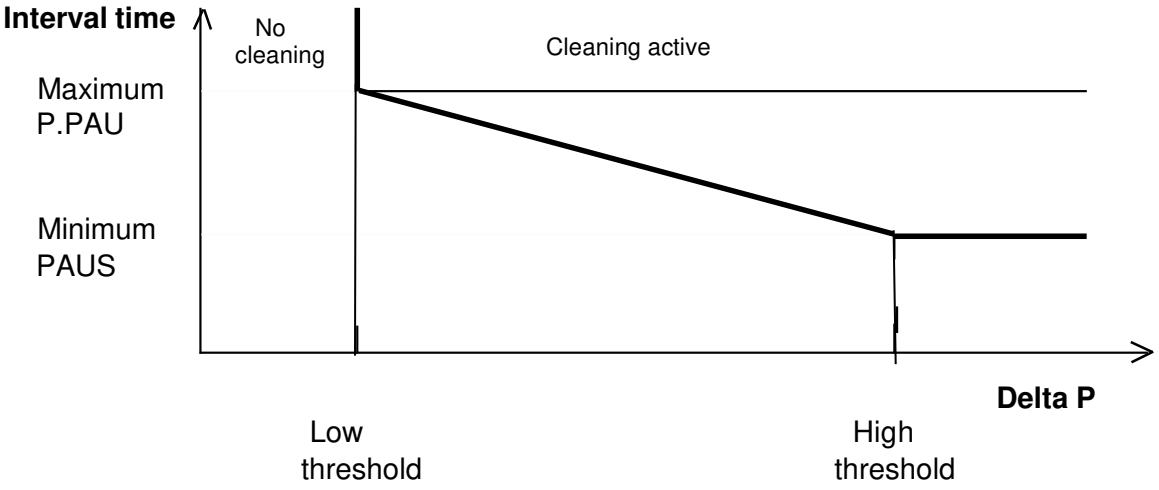
The times you set here take the place of the first control times. If you set the times to 0, the system reverts to the first control time.
(Pu 2) = pulse time, 2nd control time
(PA 2) = interval time, 2nd control time

6.2.3 Proportional interval time

You can set an interval time that is proportional to the differential pressure with the **'P.PAu'** parameter in the Valve Parameters menu. The **'PAuS'** parameter corresponds to the minimum interval time and the **'P.PAu'** parameter to the maximum interval time.

The minimum interval time triggers pulse actuation at a differential pressure $\geq$ high threshold. The maximum interval time triggers pulse actuation at a differential pressure = low threshold.

Between the two thresholds, the interval time is reduced proportionally to the pressure rise.



6.3 Pulse actuation sequence

Menu name: **(FoIG)**

The pulse actuation sequence determines the order in which the valves are actuated. In a filter with several chambers, it is thus possible to actuate one valve cyclically in each chamber. You can choose which of the following cleaning modes is best suited for your particular application:

1. Clean all valves in one chamber consecutively, or
2. Clean one valve at a time in each chamber.

In the first instance, a cleaning cycle cleans most of the raw gas in a chamber, because the resistance after cleaning is relatively low.

The advantage of the second method is that approximately the same amount of raw gas is cleaned in each chamber, so that the filter dust is uniformly distributed.

New valve number = old valve number + pulse actuation sequence

Example: 3 chambers, each with 4 valves

Valve connections: Valves 1 to 4 in the first chamber
5 to 8 in the second chamber
9 to 12 in the third chamber

Pulse actuation sequence = 4 (corresponds to the number of valves / chamber)

Order of actuation:

1st valve in 1st chamber	Valve no. 1
1st valve in 2nd chamber	Valve no. 5
1st valve in 3rd chamber	Valve no. 9
2nd valve in 1st chamber	Valve no. 2
2nd valve in 2nd chamber	Valve no. 6
2nd valve in 3rd chamber	Valve no. 10
3rd valve in 1st chamber	Valve no. 3
3rd valve in 2nd chamber	Valve no. 7
3rd valve in 3rd chamber	Valve no. 11
4th valve in 1st chamber	Valve no. 4
4th valve in 2nd chamber	Valve no. 8
4th valve in 3rd chamber	Valve no. 12

6.4 Cleaning mode

Menu name: **(r.Art)**

There are two possible cleaning modes – partial cycles or full cycles. If you clean in partial cycles, the valves are only pulsed if the differential pressure exceeds the high threshold. The valves continue to be pulsed until the low threshold is exceeded.

If you clean in full cycles, the cleaning process continues until all the valves in the filter have been actuated, even if the differential pressure falls below the low threshold during a cycle.

(TEIL) = partial cycle

(ALLE) = full cycle

6.5 Multiple pulse actuation

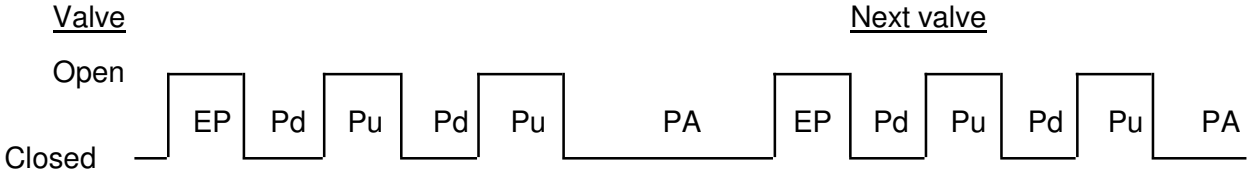
Menu name: **(Anz.P)**

'Multiple pulse actuation' means the same valve is actuated several times consecutively. The number of pulses can be selected in the menu (**AnZ.P**). If you set this number to 1, multiple pulse actuation is deactivated.

The control times are set in the same way as with single pulse actuation. The length of the interval between two pulses must also be specified. You can set a different control time for the first pulse.

Example: (AnZ.P) = 3

PuLS	= pulse	= Pu
PAuS	= interval	= PA
M.E.Pu	= first pulse	= EP
M.PAu	= interval between two pulses	= Pd



6.5.1 First pulse of a multiple pulse

Menu name: **(M.E.Pu)**

The first pulse of a multiple pulse can be set independently of the other pulses. It is used, amongst other things, to partially dissolve the filter cake, whereas the second pulse is needed for blowing out. The time that is set for the first pulse is only required for multiple pulse actuation, i.e. if the number of pulses (**AnZ.P**) is greater than 1.

6.5.2 Interval time for multiple pulse actuation

Menu name: **(M.PAu)**

The interval time for multiple pulse actuation is the time that elapses between two pulses. It is not necessarily the same as the interval time between two valves. You must specify an interval time for multiple pulse actuation if the number of pulses (**AnZ.P**) is greater than 1.

6.6 Post-cleaning

Menu name: **(nac.r)**

The post-cleaning function cleans all the valves in the filter. You can specify up to 99 repetitions of a full cycle. Post-cleaning is triggered by a momentary-contact signal at the post-cleaning input.

6.7 Forced cleaning

Menu name: **(ZG.Zt)**

The 'Forced cleaning' function monitors the valve pulse actuation time. If no valves are actuated within the specified forced cleaning time, the filter controller starts pulsing the number of valves set with (**ZG.An**).

7 Relay functions

The three relays integrated in the filter controller have freely selectable functions. The default settings are as follows:

Relay 1 - Operation
Relay 2 - Group fault
Relay 3 - All cleaning modes

The possible settings are shown in the table below:

Status message		Error messages		Cleaning messages	
Operation	bEtr	Group fault	SA.St	All cleaning modes	rEIn
		Valve fault	Ut.St	Forced cleaning	ZG.rE
		Diff. pressure alarm 1	dP.A1	Post-cleaning	NA.rE
		Diff. pressure alarm 2	dP.A2	Differential pressure-controlled cleaning	dP.rE
		Differential pressure alarms			

Special functions:

Lag time for discharge devices (nL.Zt)
When a discharge device (e.g. a rotary valve, screw conveyor, etc.) is actuated, the relay is energised at the start of each cleaning cycle and not de-energised again until after the lag time (**'nA.LF'** in the Valve Parameters menu). The lag time starts at the end of the cleaning cycle.

Cycle counter (ZY.ZA)
The number of cleaning cycles is counted by an external counter, in order to measure the load on the filter cartridges (service life) and allow maintenance intervals to be complied with where appropriate.
The selected relay is switched by the filter controller while the last valve in the filter is being cleaned.

7.1 Failsafe and hold functions

If the failsafe function is active, the relay indicates a fault when de-energised. This ensures that a power failure is also interpreted as a fault.

If you set the hold function, the relay concerned remains energised after the fault has been cleared. The fault LEDs stop flashing and light up continuously to indicate that the fault is no longer present.

You must acknowledge this fault either with the **ENTER** key or with the external 'Acknowledge fault' key.

To set the failsafe or hold function, select 'RxFH' (x=1-3) in the Relay Parameters menu:

'nein' = neither failsafe nor hold function active
'FAIL' = only failsafe function active
'HoLd' = only hold function active
'F+H' = both failsafe and hold functions active

8 Restoring the default settings

All user parameters are permanently stored in an EEPROM.

You can restore the default settings if necessary (e.g. if the data in the EEPROM is lost or the settings are programmed incorrectly).

To do this, press the **ENTER** and **MODE** keys simultaneously and hold them down while you switch on the filter controller. ‘EE’ ‘ProG’ then flashes on the display.
You can release the keys again as soon as the ‘Operation’ ⏻ LED lights up (ten seconds after powering up). The default settings are now permanently stored.

If the unit is protected by a code, ‘EE’ ‘codE’ appears instead and the parameters are not changed.

9 Normal operation

The HE 5722 differentiates between normal operation and parameter settings or test functions. The unit is set to the normal operating mode as soon as you connect it to the mains voltage. All the parameter settings are checked before you start work. During normal operation, the valves are cleaned and any faults analysed based on the parameter settings and external inputs. When the parameter settings mode is active, the controller automatically returns to normal operation if no keys are pressed for approximately ten minutes. This automatic mechanism is suppressed if the valve test function is active. The HE 5722 continues testing until you press the MODE key.

10 Test functions

10.1 Lamp test

Menu name: **(L.tSt)**

The 'Lamp test' function causes all LEDs and all segments on the 7-segment display to flash. You exit the function by pressing the **MODE** key.

10.2 Display inputs

Menu name: **(EInG)**

Each input is represented by a digit on the four-digit display as H = high signal (+24 V) or L = low signal (0 V). The inputs appear in the following order (from left to right):

Stop, Rapid cleaning, Post-cleaning, Acknowledge fault

You exit the function by pressing the **MODE** key.

10.3 Peak value memory

Menu name: **(PEAk)**

The maximum differential pressure values measured during operation are stored in the peak value memory. By pressing the ENTER key, you can reset the peak value to the actual differential pressure. The peak value memory is cleared if the mains power is disconnected.

10.4 Valve tests

When you activate a valve test, the unit shows the actual value on the differential pressure display and the current or faulty valve on the valve display. A fault is indicated by means of a flashing LED. You can acknowledge any faults that are detected during the test by pressing the ENTER key.

10.4.1 Single valve test

Menu name: **(EInZ)**

To test a single valve, select the valve number with the ▲ and ▼ keys and confirm it by pressing **ENTER**. This valve is then pulsed until you press the **MODE** key.

10.4.2 Endurance test

Menu name: **(dAur)**

The endurance test function actuates all valves cyclically until you press the **MODE** key.

10.4.3 Current test

Menu name: **(S.tSt)**

The current test actuates all valves cyclically with a high pulsing frequency (pulse = 20 ms, interval = 100 ms). It allows you to carry out a quick check of the valve connections for overcurrent (short-circuits) or interruptions. You exit the function by pressing the **MODE** key.

11 Error messages

11.1 Fault LEDs

If a fault occurs, it is indicated by a flashing LED. You acknowledge the fault either by pressing the **ENTER** key or with the **'Acknowledge fault'** input. The error message (relay) is simultaneously reset.

Test type	LED	Display
Self-test	Fault	EE cAL = calibration data error EE PArA = user parameter error
Parameter settings	Fault	Xy abcd = user parameter error
Valve fault	Interruption Overcurrent	nr – valve current < 15 mA nr – valve current > 1.2 A
Differential pressure	Alarm 1 Alarm 2	

xy abcd = Menu name (name of the menu step during which the fault was detected)

Nr. = Number of the faulty valve

The error message **'EE - PArA'** indicates a general error in the parameter settings that is not linked to a specific menu. Please check all your settings. This message disappears again when you correct the invalid parameter.

11.2 Acknowledging a fault

1. You acknowledge a fault and reset the error message (relay) by pressing the **ENTER** key in the normal operating mode or during a valve test.
2. The fault is also acknowledged and the error message (relay) reset by a momentary-contact signal at the **'Acknowledge fault'** input. The input is evaluated dynamically, i.e. the fault is only acknowledged by a momentary-contact signal and **not** if the input is permanently closed.
3. The fault LED and the error message (relay) are automatically reset as soon as the fault is cleared. Exception: The fault is indicated by a relay with an active hold function. In this case, the fault must always be explicitly acknowledged.

11.3 Power-up test and error messages

The unit checks the stored parameters whenever you switch on the power supply or change a parameter. If an error is detected, a message appears on the display:

1. 'xy' 'abcd': An error was detected in a parameter. xy = name of the parameter menu: 'HP', 'Ut', 'Delta P', 'rE', 'So'
   abcd = parameter setting in the menu
2. 'EE' 'PArA': An error was detected in the user parameters.
   Either check all parameters or restore the default settings.

A. Inputs

The filter controller has four optocoupler inputs:

Terminal 28 = Stop
Terminal 29 = Rapid cleaning
Terminal 39 = Post-cleaning
Terminal 40 = Acknowledge fault

Stop: Prevents the valves from being actuated and overrides the post-cleaning function. Rapid cleaning: Cleans the complete filter with only a short interval time. Post-cleaning: Cleans the complete filter one or more times (selectable). Acknowledge fault: Resets an error message.

Supply: The inputs are rated for +24 V DC / 5 mA.

1.) **Internal supply**

The unit makes a signal voltage available at terminals 26 (+) and 37 (-). Terminal 37 must be connected to terminal 48 if the internal supply is used. The inputs are active if the connection (external switch) from terminal 26 (+24 V DC internal) to the input is closed.
Terminal 26 is only allowed to be used for the signal current of the inputs (max. load: 20 mA).

2.) **External supply** (electrically isolated)

The earth connection for the external signal voltage must be connected to terminal 48. The inputs are active if the connection (external switch) from the external supply (+24 V DC external) to the input is closed.

B Outputs

B.1 Valves

The filter controller has 24 outputs for connecting magnetic valves. The number of valves used must be set (default = 24).

The valve outputs are rated for 24 V DC and 1 A. The maximum actuation time (pulse) must not exceed one second and the minimum recovery time (interval) must be greater than or equal to the pulse time. If the pulse time is longer than one second, or if the interval times are shorter than the pulse time, the maximum current allowed is 0.5 A.

A current test function (overcurrent and interruptions) is implemented for the valve outputs.

B.2 Relays

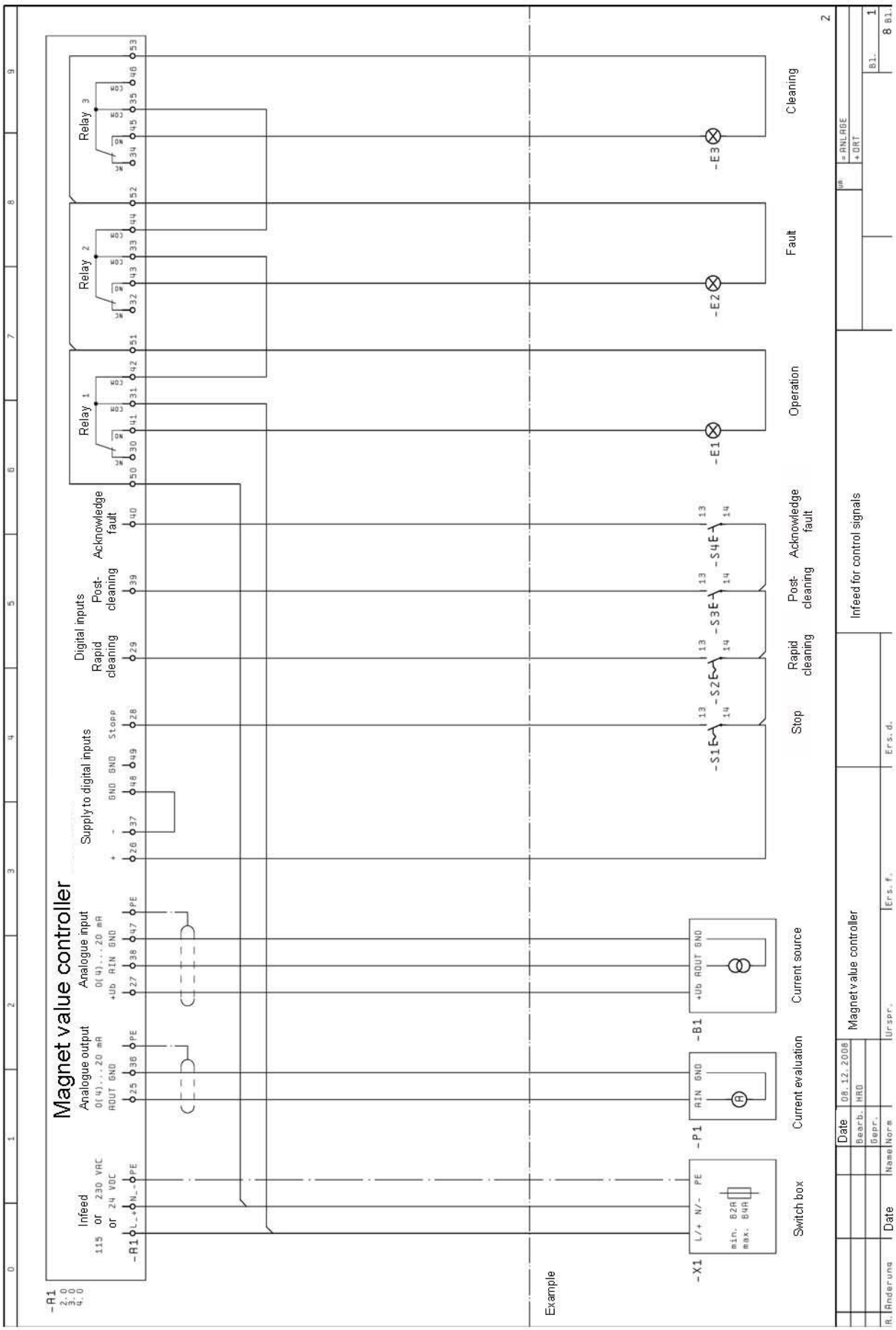
The unit is supplied with three relays. These relays can be used to signal states or errors (selectable). Error messages can be combined as a group fault.

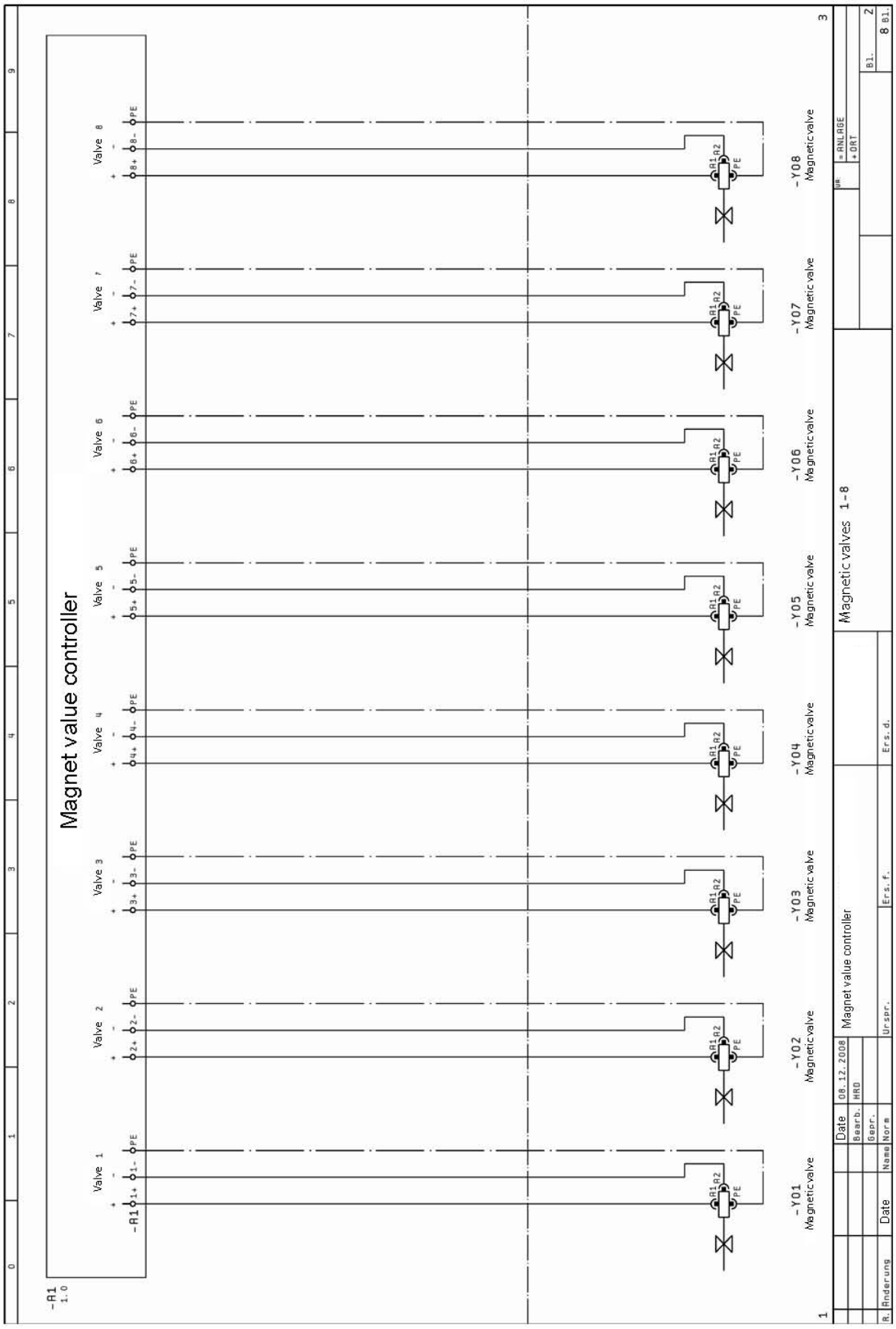
A failsafe function can be activated for error messages separately for each relay, i.e. a fault is indicated by the fact that the relay is de-energised.

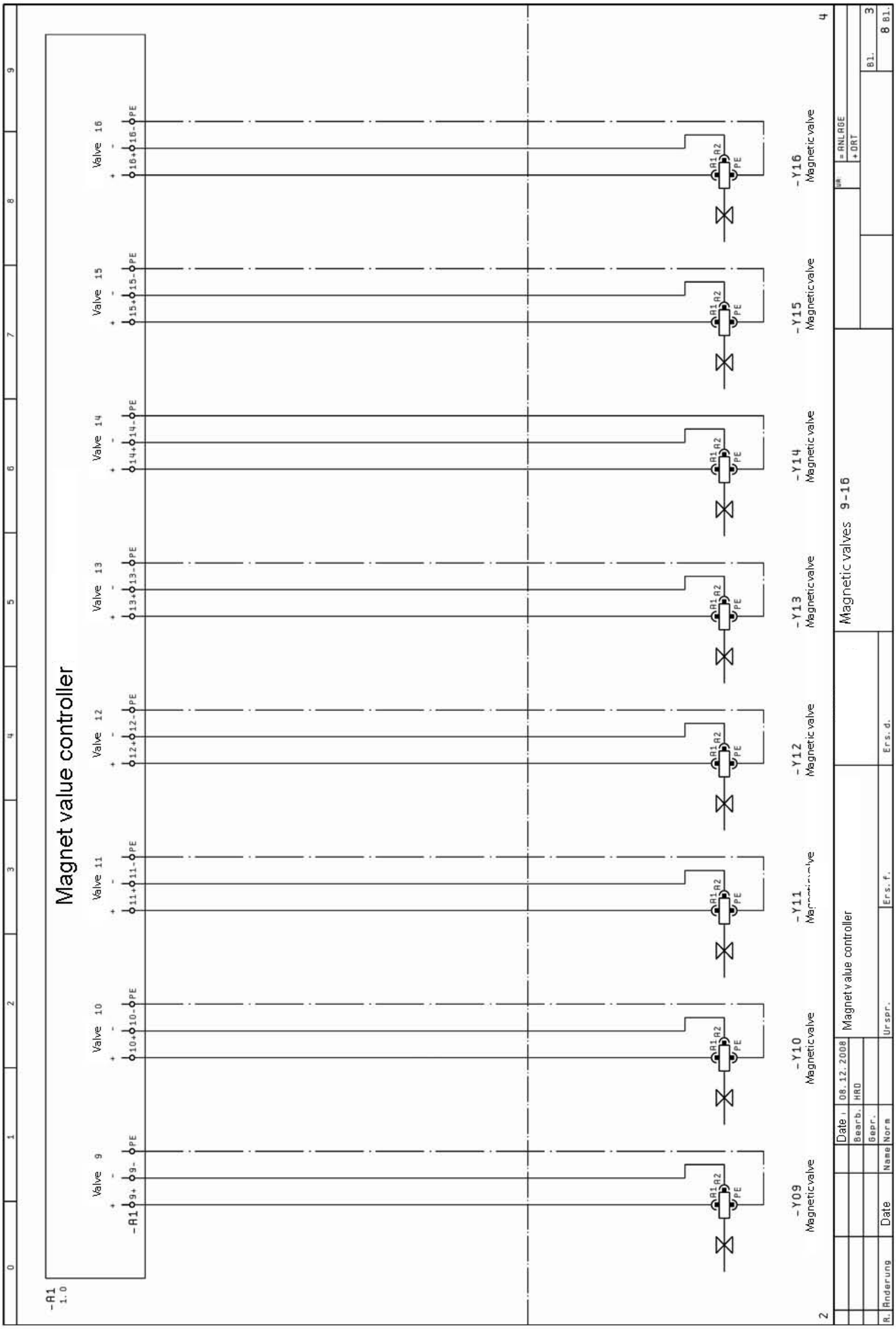
You can also set a HOLD function for the relays, i.e. they are not reset until the fault has been acknowledged.

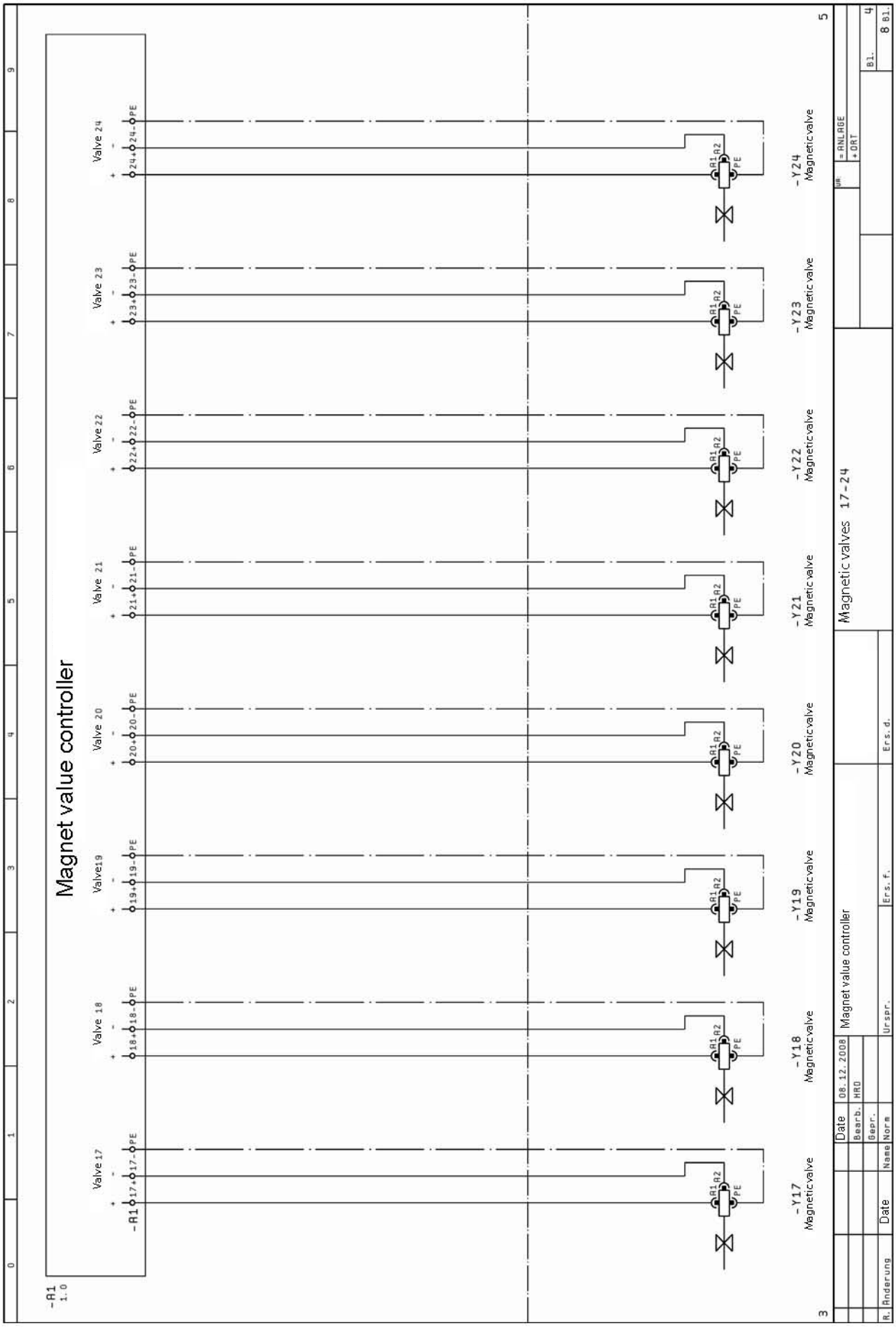
The relay outputs are rated for changeover contacts with a maximum of 250 V AC / 5 A.

You must provide a suitable protective circuit (quenched spark gap: RC element or VDR for AC applications, freewheeling diode for DC applications) if inductive loads are likely.


Magnet value controller
Infeed
115 or 230 VAC
or 24 VDC
Analogue output
0(4)...20 mA
Analogue input
0(4)...20 mA
Supply to digital inputs
Digital inputs
Rapid cleaning
Post-cleaning
Acknowledge fault
Relay 1
Relay 2
Relay 3
Operation
Fault
Cleaning
Stop
Rapid cleaning
Post-cleaning
Acknowledge fault
Infeed for control signals
Switch box
Current evaluation
Current source
Example
Magnet value controller
Date
Name
Norm
Bearb.
Gepr.
08.12.2006
HRO


Magnet value controller
-A1
1.0
Valve 1
Valve 2
Valve 3
Valve 4
Valve 5
Valve 6
Valve 7
Valve 8
-Y01 Magnetic valve
-Y02 Magnetic valve
-Y03 Magnetic valve
-Y04 Magnetic valve
-Y05 Magnetic valve
-Y06 Magnetic valve
-Y07 Magnetic valve
-Y08 Magnetic valve
Magnetic valves 1-8
Magnet value controller
08.12.2008
HRO
= ANLAGE
+ ORT


Magnet value controller
Magnetic valves 9-16
-A1
Valve 9
Valve 10
Valve 11
Valve 12
Valve 13
Valve 14
Valve 15
Valve 16
-Y09
-Y10
-Y11
-Y12
-Y13
-Y14
-Y15
-Y16
Magnetic valve
08.12.2008


Magnet value controller
-A1
1.0
Valve 17
Valve 18
Valve19
Valve 20
Valve 21
Valve 22
Valve 23
Valve 24
-Y17 Magnetic valve
-Y18 Magnetic valve
-Y19 Magnetic valve
-Y20 Magnetic valve
-Y21 Magnetic valve
-Y22 Magnetic valve
-Y23 Magnetic valve
-Y24 Magnetic valve
Magnetic valves 17-24
Magnet value controller
08.12.2008
HRO
= ANLAGE
+ ORT

Terminal diagram

Terminal strip name

=SYSTEM + LOCATION - A1

Function	Cable name: Type	Destination	Connection	Terminal no.	Jumpers	Unit connection	Destination	Connection	Side / path
Infeed		-X1	L/+	L_+ o					/1.0
Infeed		-X1	N/-	N_- o					/1.0
Infeed		-X1	PE	PE o		PE			/1.1
Valve 1		-Y01	A1	1+ o					/2.0
Valve 1		-Y01	A2	1- o					/2.1
Valve PE		-Y01	PE	PE o					/2.1
Valve 2		-Y02	A1	2+ o					/2.2
Valve 2		-Y02	A2	2- o					/2.2
Valve PE		-Y02	PE	PE o					/2.2
Valve 3		-Y03	A1	3+ o					/2.3
Valve 3		-Y03	A2	3- o					/2.3
Valve PE		-Y03	PE	PE o					/2.3
Valve 4		-Y04	A1	4+ o					/2.4
Valve 4		-Y04	A2	4- o					/2.4
Valve PE		-Y04	PE	PE o					/2.4
Valve 5		-Y05	A1	5+ o					/2.5
Valve 5		-Y05	A2	5- o					/2.5
Valve PE		-Y05	PE	PE o					/2.5
Valve 6		-Y06	A1	6+ o					/2.6
Valve 6		-Y06	A2	6- o					/2.6
Valve PE		-Y06	PE	PE o					/2.6
Valve 7		-Y07	A1	7+ o					/2.7
Valve 7		-Y07	A2	7- o					/2.7
Valve PE		-Y07	PE	PE o					/2.7
Valve 8		-Y08	A1	8+ o					/2.8
Valve 8		-Y08	A2	8- o					/2.8
Valve PE		-Y08	PE	PE o					/2.9
Valve 9		-Y09	A1	9+ o					/3.0
Valve 9		-Y09	A2	9- o					/3.1
Valve PE		-Y09	PE	PE o					/3.1
Valve 10		-Y10	A1	10+ o					/3.2
Valve 10		-Y10	A2	10- o					/3.2

Date

Bearb. PC2

Gepr.

R. Änderung | Date | Name | Norm | Urspr. | Ers.f. | Ers.d.

Magnet value controller

Terminal strip

= ANLAGE
+ DRT

Bl. 5
Bl. 8

0 1 2 3 4 5 6 7 8 9

Terminal diagram

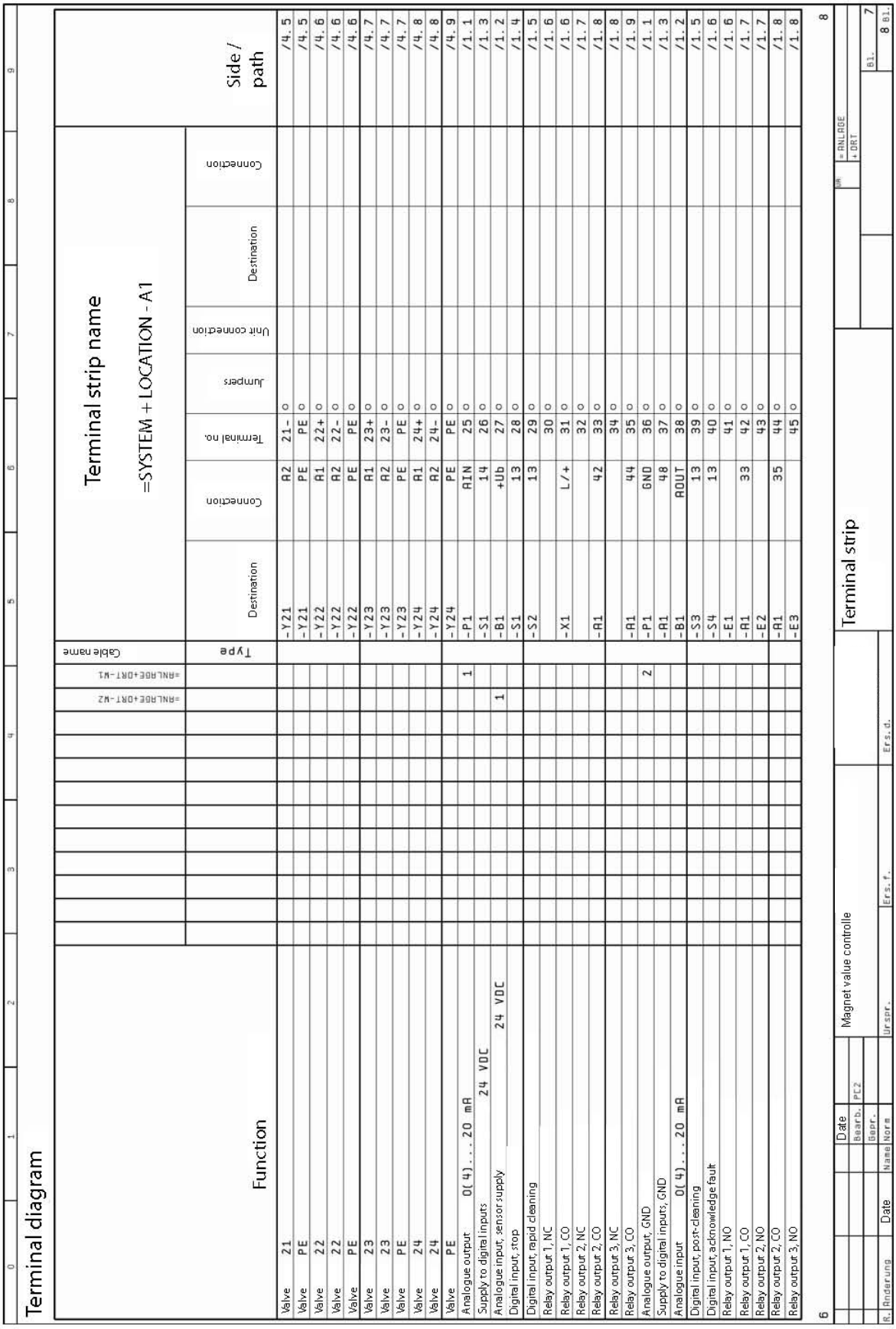
Terminal strip name

=SYSTEM + LOCATION - A1

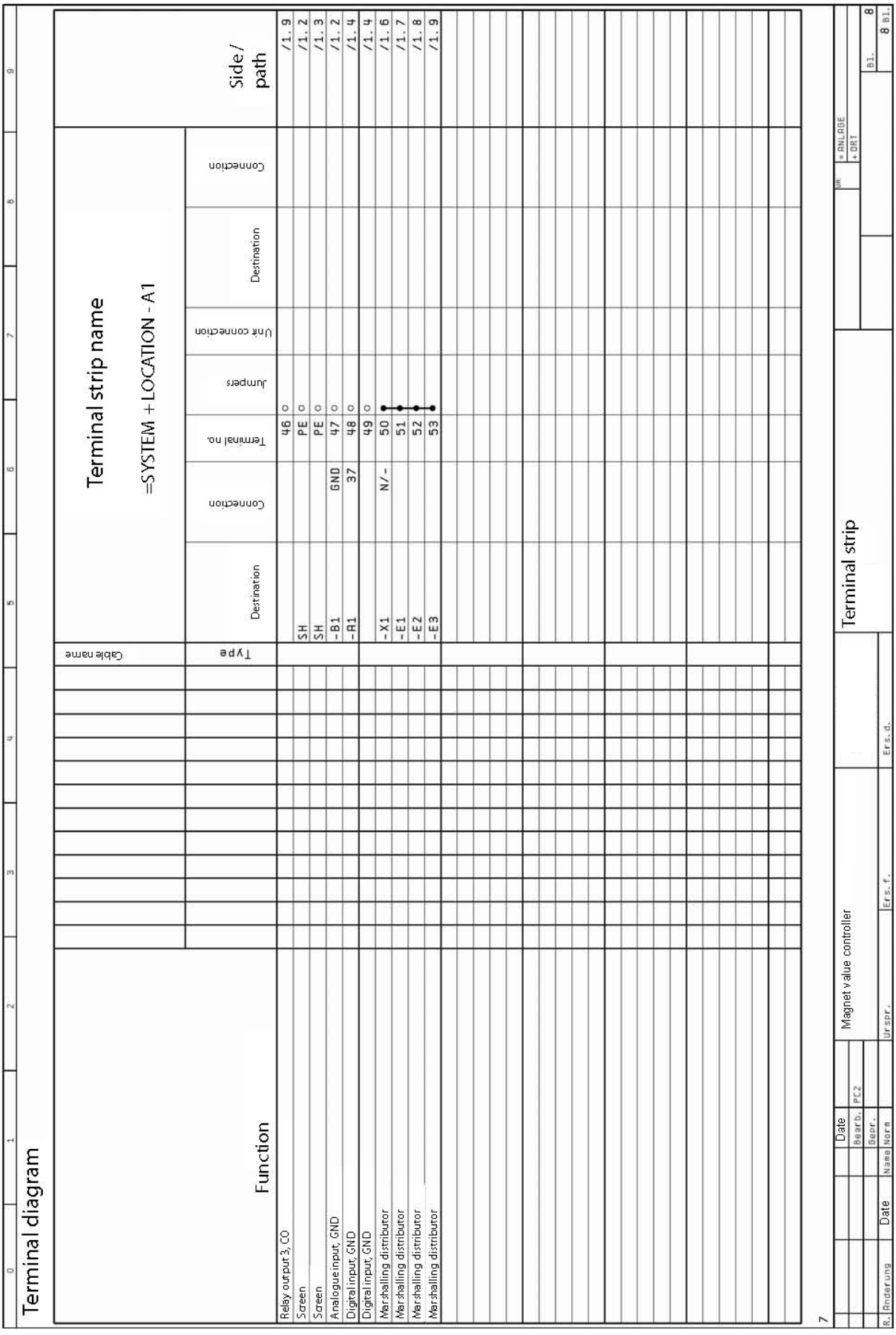
Function		Cable name / Type	Destination	Connection	Terminal no.	Jumpers	Unit connection	Destination	Connection	Side / path
Valve	PE		-Y10	PE	PE	o				/3. 2
Valve	11		-Y11	A1	11+	o				/3. 3
Valve	11		-Y11	A2	11-	o				/3. 3
Valve	PE		-Y11	PE	PE	o				/3. 3
Valve	12		-Y12	A1	12+	o				/3. 4
Valve	12		-Y12	A2	12-	o				/3. 4
Valve	PE		-Y12	PE	PE	o				/3. 4
Valve	13		-Y13	A1	13+	o				/3. 5
Valve	13		-Y13	A2	13-	o				/3. 5
Valve	PE		-Y13	PE	PE	o				/3. 5
Valve	14		-Y14	A1	14+	o				/3. 6
Valve	14		-Y14	A2	14-	o				/3. 6
Valve	PE		-Y14	PE	PE	o				/3. 6
Valve	15		-Y15	A1	15+	o				/3. 7
Valve	15		-Y15	A2	15-	o				/3. 7
Valve	PE		-Y15	PE	PE	o				/3. 7
Valve	16		-Y16	A1	16+	o				/3. 8
Valve	16		-Y16	A2	16-	o				/3. 8
Valve	PE		-Y16	PE	PE	o				/3. 9
Valve	17		-Y17	A1	17+	o				/4. 0
Valve	17		-Y17	A2	17-	o				/4. 1
Valve	PE		-Y17	PE	PE	o				/4. 1
Valve	18		-Y18	A1	18+	o				/4. 2
Valve	18		-Y18	A2	18-	o				/4. 2
Valve	PE		-Y18	PE	PE	o				/4. 2
Valve	19		-Y19	A1	19+	o				/4. 3
Valve	19		-Y19	A2	19-	o				/4. 3
Valve	PE		-Y19	PE	PE	o				/4. 3
Valve	20		-Y20	A1	20+	o				/4. 4
Valve	20		-Y20	A2	20-	o				/4. 4
Valve	PE		-Y20	PE	PE	o				/4. 4
Valve	21		-Y21	A1	21+	o				/4. 5

5 7

Date		Magnet value controller	Terminal strip	UR	= ANLAGE
Bearb.	PC2				+ ORT
Gepr.				Bl.	6
R. Anderung, Date, Name, Norm		Urspr. / Ers. f. / Ers. d.			8 Bl.



Please note: The destinations used in the example are marked on the terminals.



Please note: The destinations used in the example are marked on the terminals.

µP magnetic valve controller

Valve outputs: Max.24 valves, number settable

Valve voltage: 24 V DC / 1 A

Valve current: 1 A for pulse time ≤ 1 s and interval time ≥ pulse time, otherwise 0.5 A

Pulse time 0.01 s to 99.99 s; settable

Interval time: 0.1 s to 999.9 s; settable

Inputs: 4 electrically isolated inputs:
- Stop
- Rapid cleaning
- Post-cleaning
- Acknowledge fault (reset hold)

LEDs / display:
- 2-digit, 7-segment display (shows the actuated valve)
- 1 LED for pulses
- 1 LED for cleaning
- 4 LEDs for valve faults

µP differential pressure controller

Differential pressure range: 0 - 10 to 100 mbar (optional: up to 500 mbar)

Overpressure resistance: Max. static pressure 0.75 bar, max. pressure surge 1.0 bar

Basic accuracy: ±1%

Temperature drift / full-scale value: ± 0.05% / K

LEDs / display:
- 4-digit, 7-segment display (shows the differential pressure)
- 2 LEDs for high and low thresholds
- 2 LEDs for delta P alarms 1 and 2
- 1 LED for cleaning

General technical data

LEDs:
- 'Operation' LED
- 'Parameters' LED
- 'Test functions' LED
- 'Fault' LED

Control elements:
- 'MODE' key (Escape)
- '▼' key (decrement)
- 'ENTER' key (confirm)
- '▲' key (increment)

Relay outputs: 3 relay changeover contacts for indicating states / errors / cleaning, 250 V AC / 5 A, default settings:
- Relay 1 ⇒ Operation
- Relay 2 ⇒ Group fault
- Relay 3 ⇒ Cleaning

Analogue output: 0 (4) to 20 mA, settable

Analogue input: 0 (4) to 20 mA, settable, for external selection of pressure values

Ambient temperature: Operation: 0 to 50°C, storage: -25 to 70°C, transport: -25 to 70°C

Mains power supply:	115 / 230 V AC, 50-60 Hz	24 V AC
Tolerance:	± 10%	± 10%
Mains fuse:	0.315 A time-lag	3.15 A time-lag
Power input:	30 VA	30 VA

Housing: Macrolon with smoked glass cover (IP65)

Dimensions: 255 x 180 x 100 mm (W x H x D)

Pneumatic connections: Screw couplings: DN 4 (on sensor) and DN6 (on housing)

Electrical connections: Spring-loaded PCB terminals, max 15 A, max. 1.5 mm²
core cross-section, rigid / flexible

Cable entries: Glands: 3x M20, 4x M32 with multiple seal insert

Technical data is subject to change without notice !