

Measuring amplifier in
desktop housing

SCOUT55



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Safety instructions

To ensure safe operation, the device may only be operated in accordance with the information given in the Operating Manual. It is also essential to comply with the legal and safety requirements for the application concerned during use. The same applies to the use of accessories.

Before commissioning, find out whether the mains voltage and current type specified on the identification plate match the mains voltage and current type at the place of use, and whether the circuit being used is adequately protected.

Built-in devices must only ever be operated whilst they are within the housing provided for them.

The device complies with the safety requirements of DIN EN 61010-Part 1 (VDE 0411-Part 1); Protection Class I.

Use in accordance with the regulations

The SCOUT 55 with connected transducers is only to be used for measurement tasks and directly associated control functions. Use for any purpose other than the above shall be deemed to be not in accordance with the regulations.

General dangers of failing to follow the safety instructions

The SCOUT 55 is a state-of-the-art device and is fail-safe. The device may give rise to further dangers if it is inappropriately installed and operated by untrained personnel.

Any person instructed to carry out installation, commissioning, maintenance or repair of the device must have read and understood the Operating Manual and in particular the technical safety instructions.

Remaining dangers

The scope of supply and list of components provided with the SCOUT 55 cover only part of the scope of measurement technique. In addition, equipment planners, installers and operators should plan, implement and respond to the safety engineering considerations of measurement technique in such a way as to minimise remaining dangers. Prevailing regulations must be complied with at all times. There must be reference to the remaining dangers connected with measurement technique.

In this manual, the remaining dangers are indicated by the following symbols:



Symbol: **DANGER**

Meaning: **Maximum danger level**

Warns of an **imminently** dangerous situation in which failure to comply with safety requirements **will result in** death or serious physical injury.



Symbol: **WARNING**

Meaning: **Potentially dangerous situation**

Warns of a **potentially** dangerous situation in which failure to comply with safety requirements **can result in** death or serious physical injury.



Symbol: **CAUTION**

Meaning: **Potentially dangerous situation**

Warns of a **potentially** dangerous situation in which failure to comply with safety requirements **could result in** damage to property or some form of physical injury.



Symbol: **NOTE**

Means that important information about the product or its handling is being given.



Symbol:

Meaning: **CE mark**

The CE mark enables the manufacturer to guarantee that the product complies with the requirements of the relevant EC directives (the declaration of conformity is available at <http://www.hbm.com/support/dokumentation>).

Working safely

Error messages must only be acknowledged when the cause of the error has been removed and no further danger exists.

Conversions and modifications

The SCOUT 55 must not be modified from the design or safety engineering point of view except with our express agreement. Any modification shall exclude all liability on our part for any resulting damage.

In particular, any repair or soldering work on motherboards is prohibited (this includes changing components other than EPROMs). When exchanging complete modules, use only original parts from HBM.

Qualified personnel

This instrument must only to be installed and used by qualified personnel, strictly in accordance with the technical data and the safety requirements and regulations listed below. It is also essential to comply with the legal and safety requirements for the application concerned during use. The same applies to the use of accessories.

Qualified personnel means persons entrusted with the installation, assembly, commissioning and operation of the product who possess the appropriate qualifications for their function.

1 Introduction

1.1 Scope of supply

- Device with front frame
- 2 fastening straps
- 1 male cable connector DB-15P, order no.: 3.3312-0182
- 1 male terminal strip connector 3-pin (mains connection)
- 1 male terminal strip connector 3-pin (interface)
- 2 male terminal strip connectors 9-pin (control inputs/outputs)
- 1 Operating Manual Part1; 1 Operating Manual Part2
- 1 cable Kab3-3301.0104

1.2 General

The SCOUT 55 measuring amplifier is suitable for recording and processing measured values from passive transducers.

The essential features:

- Transducers that can be connected: S.G. full and half bridges, inductive full and half bridges, piezoresistive and potentiometric transducers, LVDT
- 10-digit alphanumeric display
- Using the touch-sensitive keypad
- 2 peak value stores for maximum and minimum values, as well as envelope and instantaneous value
- 4 limit switches
- RS232 serial interface for connecting a computer or a printer
- Parameter memory for saving up to 8 complete data sets
- Control inputs and outputs (potential-separated through optical couplers)
- Manageable housing with mounting frame / carrying handle

All the commands needed for device setup over the serial interface and for querying the measured values are listed and described in a separate Operating Manual document “**Operating the SCOUT 55 by Computer**”.

1.3 Block diagram

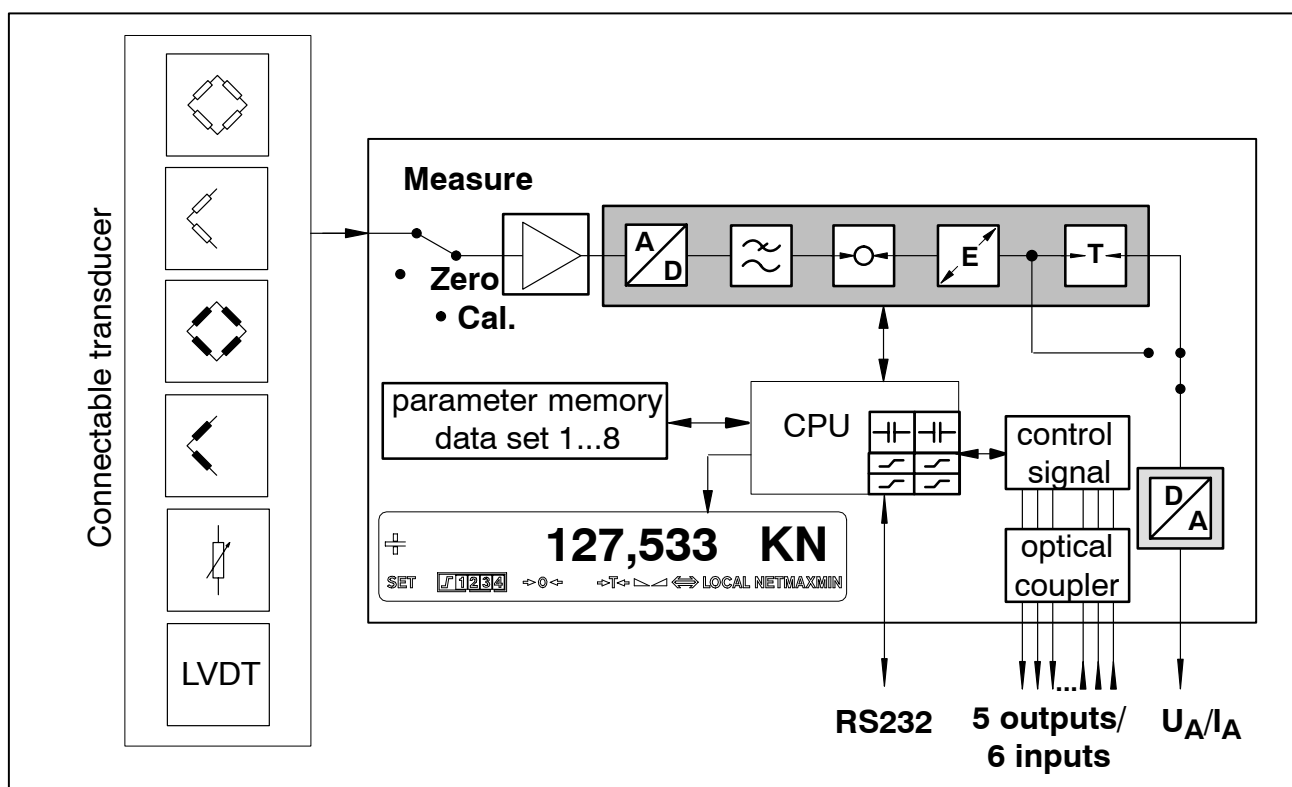


Fig. 1.1: SCOUT 55 block diagram

2 Connections

Observe the safety instructions before commissioning the device.

2.1 Factory settings

Before operating the device, check the parameters set at the factory and note that the elements for selecting the analogue output signal (current/voltage output) and for setting synchronisation, are located on the motherboard.

The factory settings are given below:

- Mains voltage: 230 V / 50...60 Hz or 115 V / 50..60 Hz, depending on order
- Analogue output: output voltage ± 10 V
- Synchronisation: master

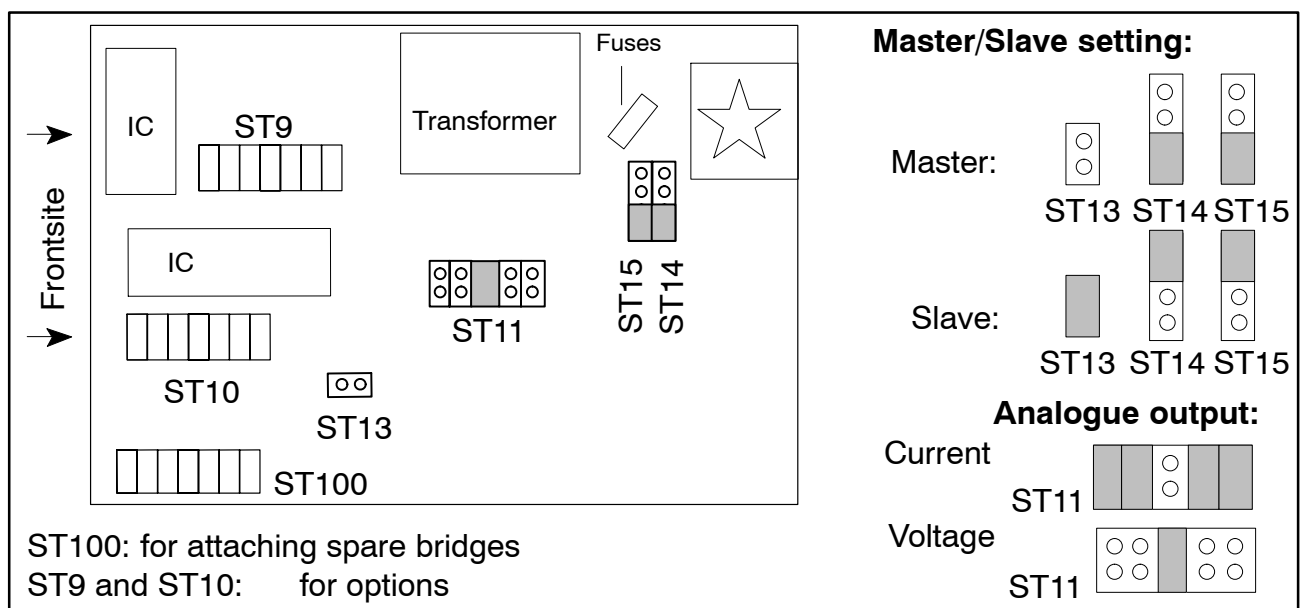


Fig. 2.1: Location of jumpers on motherboard

2.2 Changing the factory settings

To change the factory settings, proceed as follows:

- 1 Switch off the device and take out the mains cable. Remove all the plug connections on the back panel.
- 2 Loosen the four screws on the cover of the housing and remove the cover.
- 3 Change whichever setting is relevant to you with the aid of the jumpers, by following Fig. 2.1
- 4 Screw the cover of the housing back in position.

2.2.1 Setting the analogue output signal

Select the analogue output signal (voltage or current) by replugging jumpers ST11 (see Fig. 2.1). Choose between ± 20 mA or 4...20 mA in the control dialogue.

2.2.2 Choosing the operating mode for synchronisation

To synchronise several devices, set one device as the Master. All the other devices should then set to Slave. The “Master” and “Slave” selections are made with jumpers ST13, ST14 and ST15 (see Fig. 2.1).

2.3 Connecting the voltage supply

Check that the mains voltage of the device (details on the back of the device) matches the supply voltage. If this is not the case, change the device setup as described under 2.3.1 .

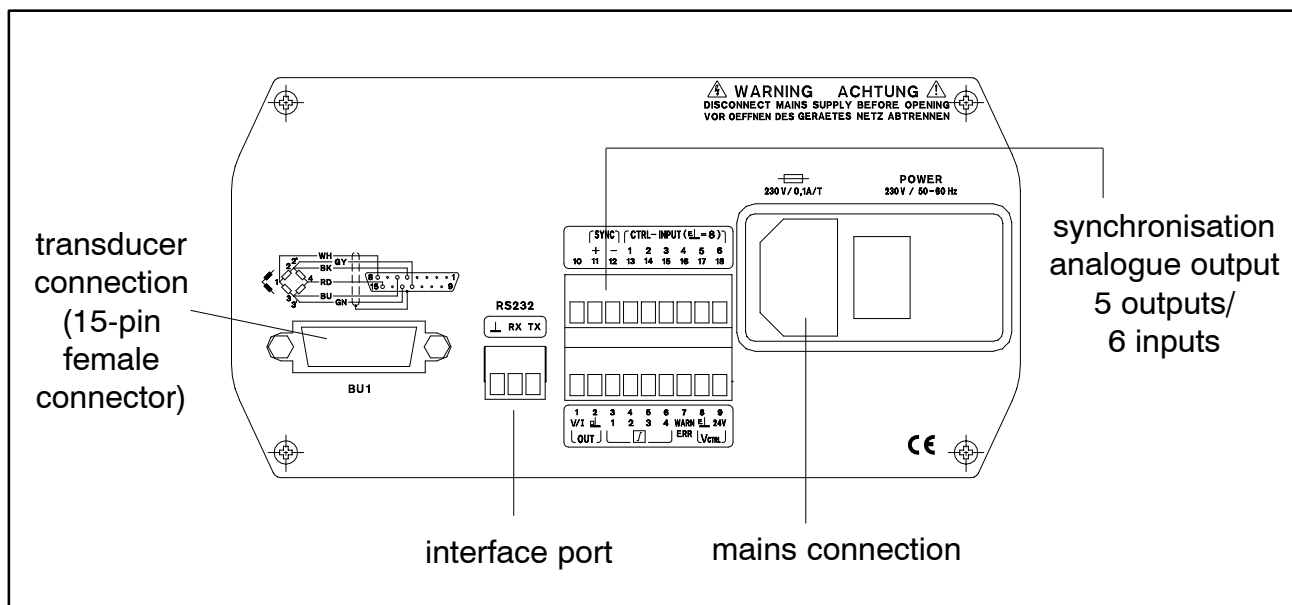


Fig. 2.2: Back of the device

An inlet connector for non-heating devices is provided for connecting the mains cable. The requisite mains power supply cable is included in the list of components supplied.

2.3.1 Changing the mains voltage selection/replacing the fuse

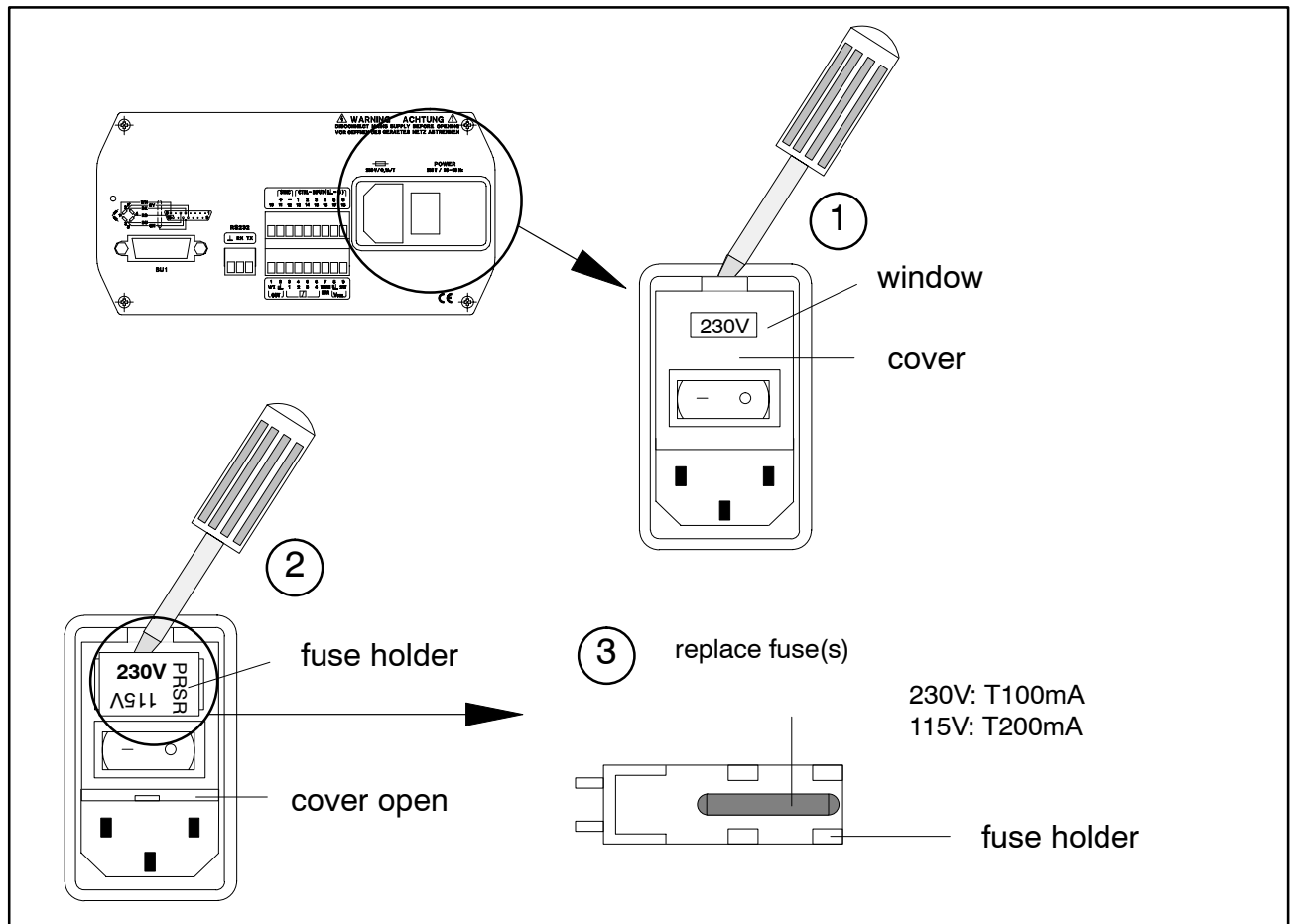


Fig. 2.3: Back of device: choosing mains voltage, replacing fuses

The mains voltage currently selected (e.g. 230 V) is shown in the “window”.

Adapting the mains voltage:

Switch off the device and take out the mains cable.

- 1 Lever the lid off and fold it aside
- 2 Remove the fuse holder
 - Fit the fuse holder to correspond to the required mains voltage (comply with the nominal current of the fine-wire fuse)
 - Close the cover

The chosen mains voltage can be seen in the “window” (selection here ② : 230 V).

Replacing the fuses:

Switch off the device and take out the mains cable.

- 1 Lever off the cover and fold it forward
- 2 Take out the fuse holder
- 3 Replace the fuses
 - Fit the fuse holder, paying attention to the correct mains voltage (the chosen value can be seen in the “window”).

2.3.2 Device mounting

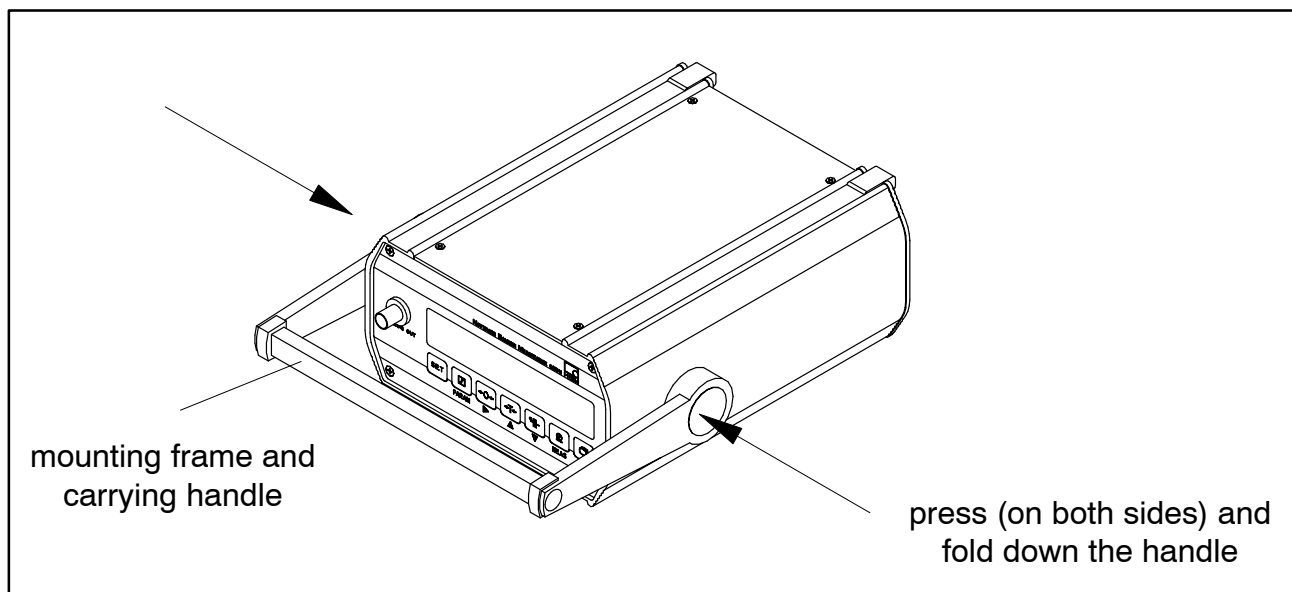


Fig. 2.4: SCOUT 55 mounting

2.4 Transducer connection

The following transducer types can be connected to the SCOUT 55:

- S.G. full and half bridge transducers
- Inductive half and full bridge transducers
- Potentiometric and piezoresistive transducers
- LVDT (Linear Variable Differential Transformer)

A 15-pin socket on the back panel of the housing, labelled BU1, is used for connection.

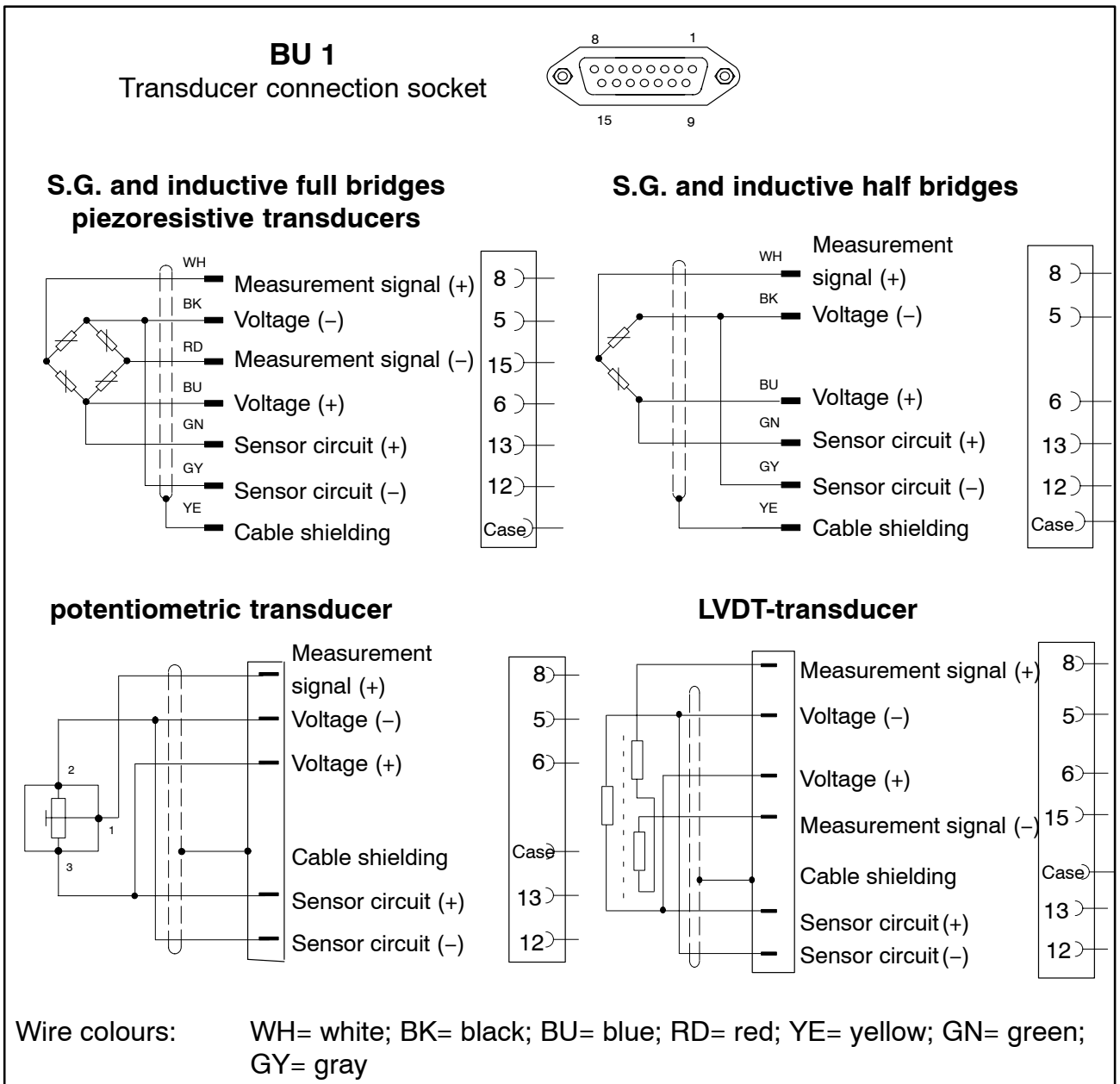


Fig. 2.5: Connecting various transducers

When connecting a transducer with a four-wire cable, you must connect the sensor circuits with the relevant bridge excitation circuit in the male cable connector (pin 5 with pin 12 and pin 6 with pin 13).

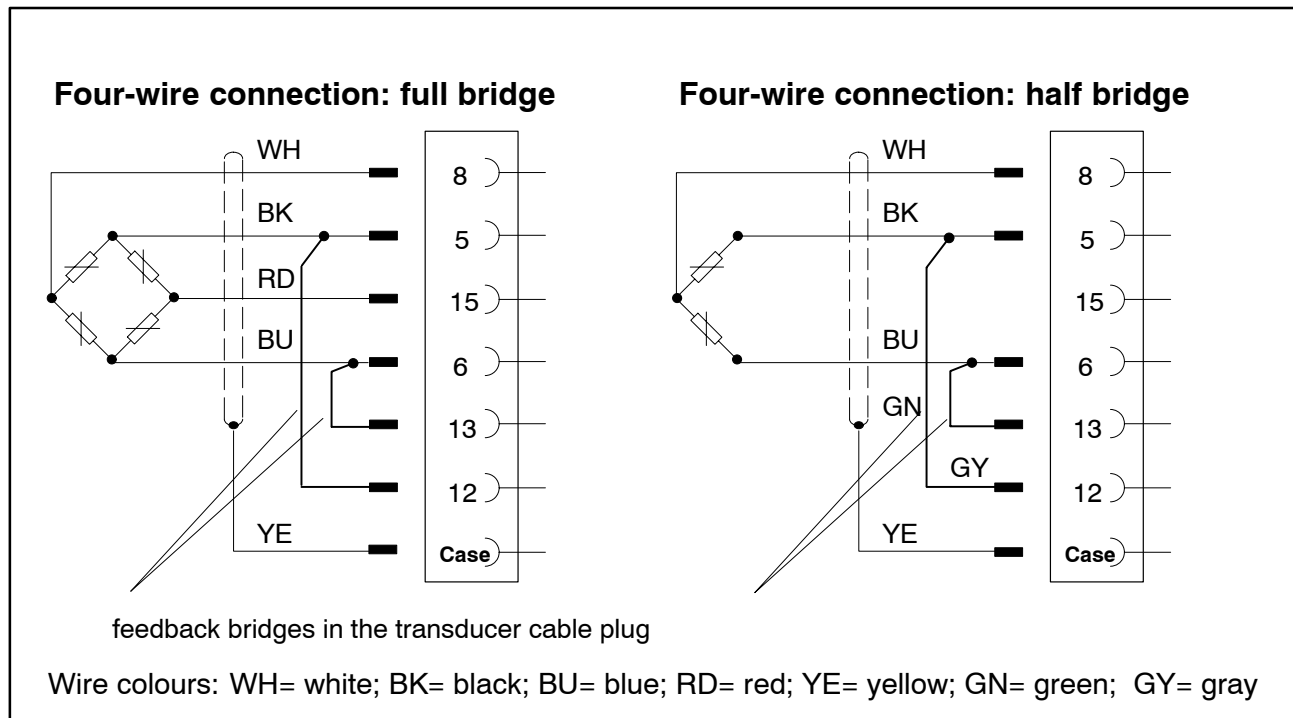


Fig. 2.6: Transducer connection in four-wire technique



NOTE

To connect the transducers, use HBM standard cable. If you use another shielded, low-capacitance measurement cables, connect the shielding of the transducer cable to the connector housing, in accordance with HBM Greenline information (document G36.35.0). This guarantees EMC protection.

2.5 Analogue output

The analogue output signal is available as voltage (± 10 V) or as current (± 20 mA or 4.. 20 mA) at terminals 1 and 2. The output voltage is also available at the BNC connector (female) on the front of the device (see Fig. 2.8.)

To choose current or voltage, use the jumpers on the amplifier motherboard, as described in Chapter 2.1.

Pin	Function	Pin	Function
1	Output signal (V/I)	10	no function
2	Output signal (ground)	11	Synchronisation (+)
3	LIMITVAL.1	12	Synchronisation (-)
4	LIMITVAL.2	13	Remote 1 (...)
5	LIMITVAL.3	14	Remote 2 (...)
6	LIMITVAL.4	15	Remote 3 (...)
7	Warning	16	Remote 4 (...)
8	Ground	17	Remote 5 (...)
9	External supply voltage 24V=	18	Remote 6 (...)

(SYNC) (CTRL- INPUT (E_L = 8))

+ - 1 2 3 4 5 6

10 11 12 13 14 15 16 17 18

1 2 3 4 5 6 7 8 9

V/I 1 2 3 4 WARN E_L 24V

(OUT) ERR (V_{CTRL})

Fig. 2.7: Output pin assignment

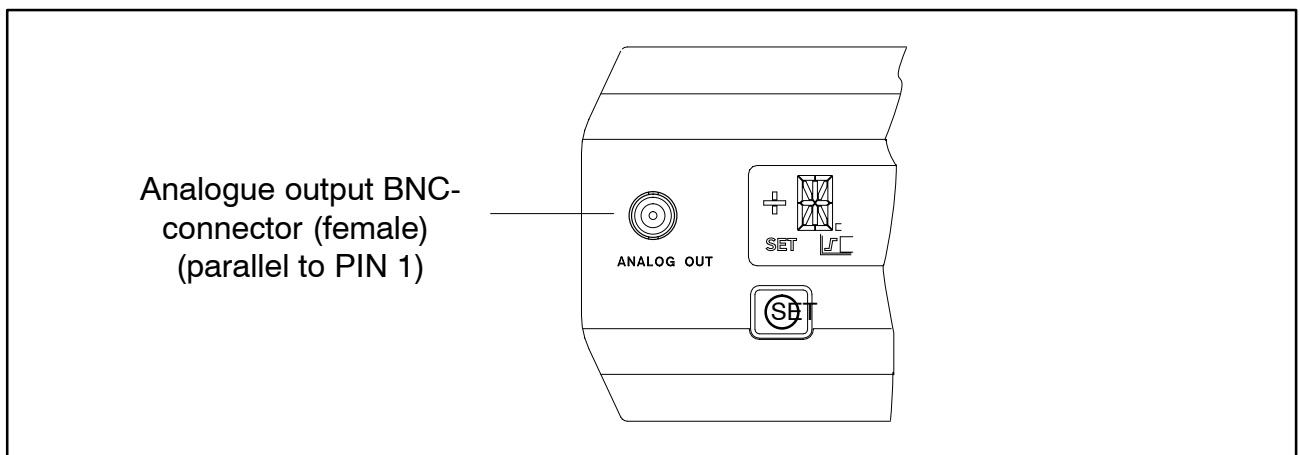


Fig. 2.8: BNC connector (female) on the front of the device

2.6 Control inputs / outputs

Input/Output	Terminal	Function	
←	3	Output LIMITVAL. 1	For positive logic in accordance with $V_{ext. 24 V}$
←	4	Output LIMITVAL. 2	
←	5	Output LIMITVAL. 3	
←	6	Output LIMITVAL. 4	
←	7	Output warning (overflow)	Warning active in the case of overflow, Autocal and MOTION OUT 24 V = OK 0V = Warning
→	13–17	Input remote 1–6 (function selectable)	see table on Page 42
→	8	Ground	$V_{ext. 0 V}$
→	9	External supply voltage	$V_{ext. 24 V}$

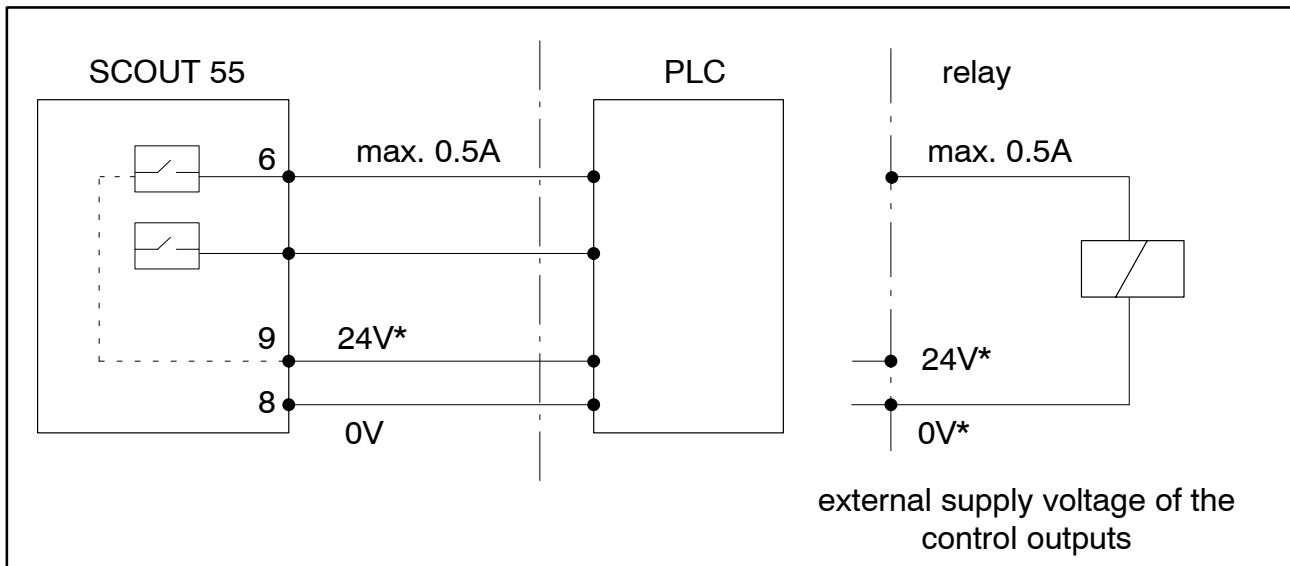


Fig. 2.9: Output assignments

* The control inputs and outputs are available at the terminal strip socket (9-pin) and are potential-separated by optical couplers. The control outputs must be supplied with an external voltage (ground and 24 V).



If the mains voltage is switched off, there is a power failure, or the mains fuse blows, all the control outputs are reset to 0V ($V_{ext.}$).

2.7 Synchronisation

If several devices are used right next to one another or if their cables run parallel, the devices should be synchronised. To achieve this, one device must be set to Master and all the others (max. seven) to Slave. The setup with jumpers on the amplifier motherboard is described in Chapter 2.2.2 . As well as these settings, the devices must be linked together for synchronisation.

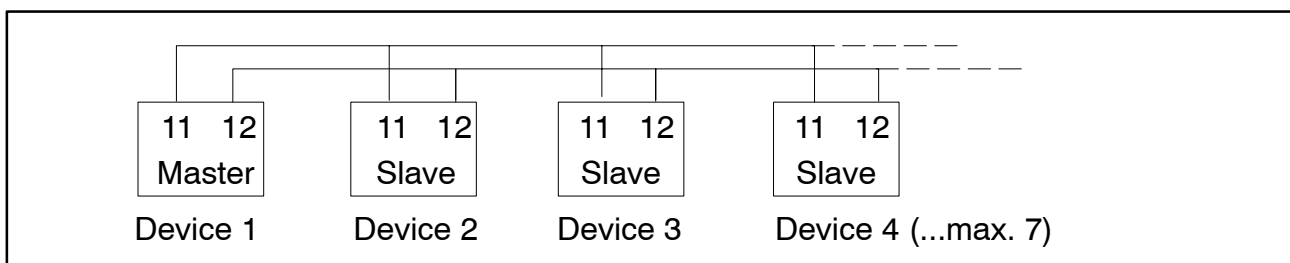
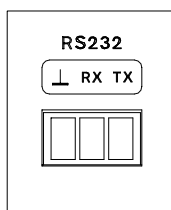


Fig. 2.10: Terminal connections for synchronisation

2.8 Connecting the serial interface

On the back of the device, there is an RS232 serial interface for connecting a computer or a terminal.



When connecting a printer, a simple line printer needing no more than 4 seconds to print a line is sufficient. The printout has 12 columns. This corresponds to a line length of 132 characters. Select the measured values to be printed as described in Chapter 3.5.9.

When connecting a computer, it is possible to enter into dialogue with the SCOUT 55.

You can use control commands to make all the device settings and query the measured values. An overview of the interface commands has been compiled in another part of the Operating Manual “**SCOUT 55, Part2: Operation by computer or terminal**”.

3 Setting up and operation


3.1 Commissioning and factory settings

Some of the steps you need to take to commission your measurement chain (amplifier and transducer) are listed below, so that you can carry out an initial function test of all components. The description basically covers adapting the SCOUT 55 to the transducer type used. We also warn about certain errors which can typically occur during commissioning.

- Follow the steps given in the previous Chapter to connect the mains cable and the transducer to the measuring amplifier.



Please observe the safety instructions

- Turn on the power switch.
- The device runs a function test and is then in measuring mode. The factory settings are active.
- Check the choice of output signal shown on the display. Use  to select the gross signal (no labelling in the display)




NOTE

If the error message **CALERR.** appears here, the following can be the causes:

- no six-wire feedback connected
- incorrect transducer/sensor connection
- no transducer/sensor connected

Remedy:

Switch off the device. Connect the transducer properly. Switch the device back on. If the error message **OVFL B**, **OVFL N** appears, you must adapt the measuring amplifier to your transducer type. The steps to take for each amplifier are described below.

- To get from measuring mode to device setup mode, press  for about 2s. "DIALOG" will appear in the display.
- Follow the examples given below to adjust the device according to the connected transducer type.

Transducer types:

S.G. force transducer:

Adaptation:

Transducer type:	Full bridge
Excitation:	2.5 V
Input:	4 mV/V

Calibration:

Unit, nominal value/ decimal point:	20,000 kN
Measuring range:	2 mV/V

Inductive displacement transducers:

Adaptation:

Transducer type:	Half bridge
Excitation:	1.0 V
Input:	10 mV/V

Calibration:

Unit, nominal value/ decimal point:	20,000 mm
Measuring range:	10 mV/V

Piezoresistive transducers:

Adaptation:

Transducer type:	Half bridge
Excitation:	2.5 V
Input:	400 mV/V

Calibration:

Unit, nominal value/ decimal point:	30,000 BAR
Measuring range:	200 mV/V

Potentiometric transducers:

Adaptation:

Transducer type:	Half bridge
Excitation:	1 V
Input:	1000 mV/V

Calibration:

Unit, nominal value/ decimal point	10,000 mm
Measuring range:	1000 mV/V

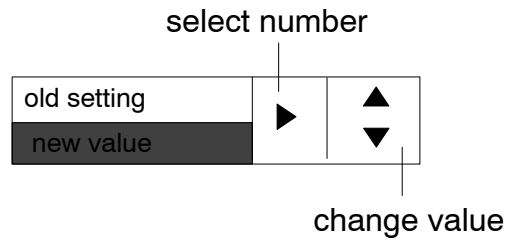
Key to symbols



Group



Parameter



MEAS. MODE

SET

press for 2 sec

DIALOG

PAR

LANGUAGE

Language



ENGLISH
DEUTSCH



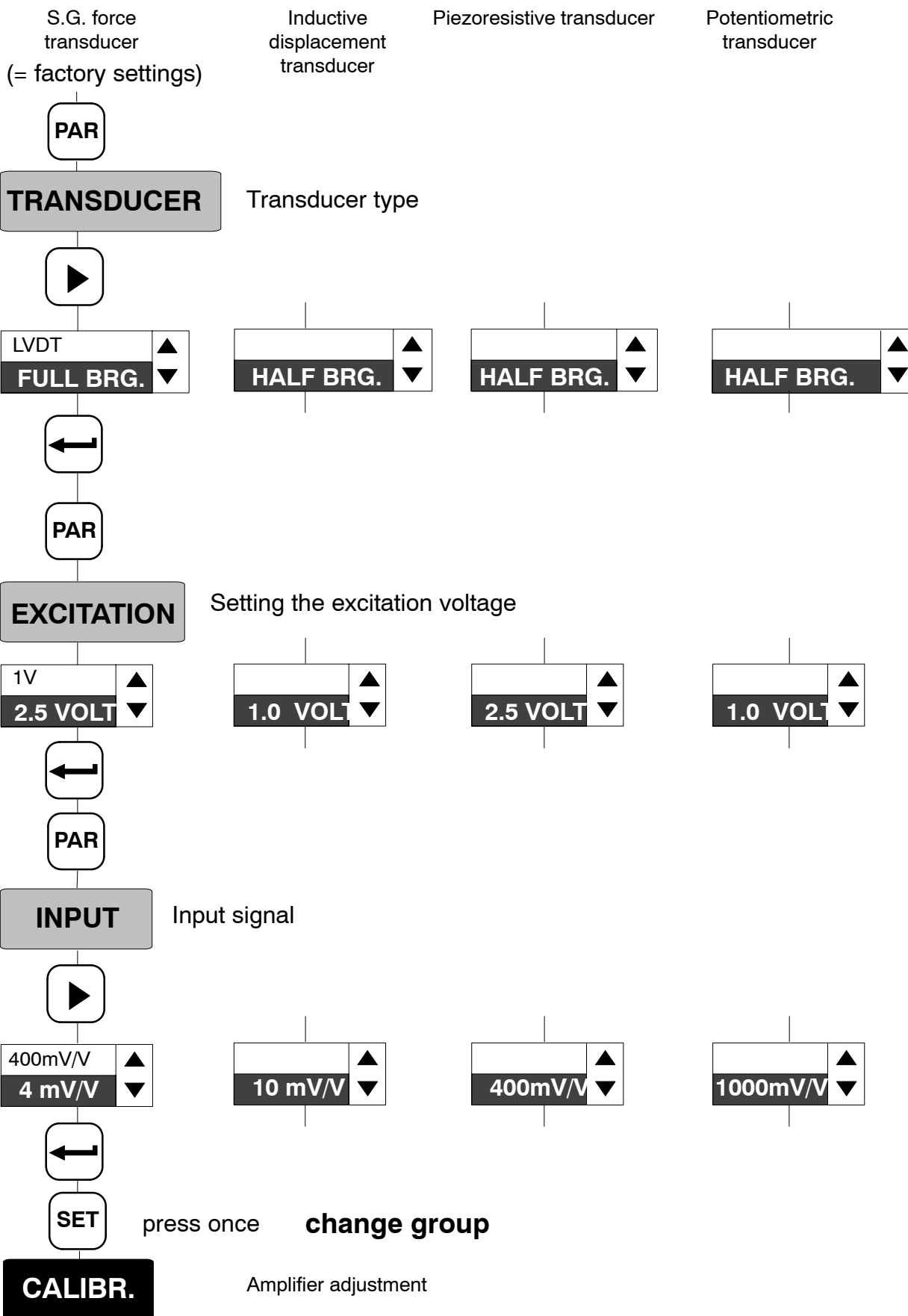
SET

press once

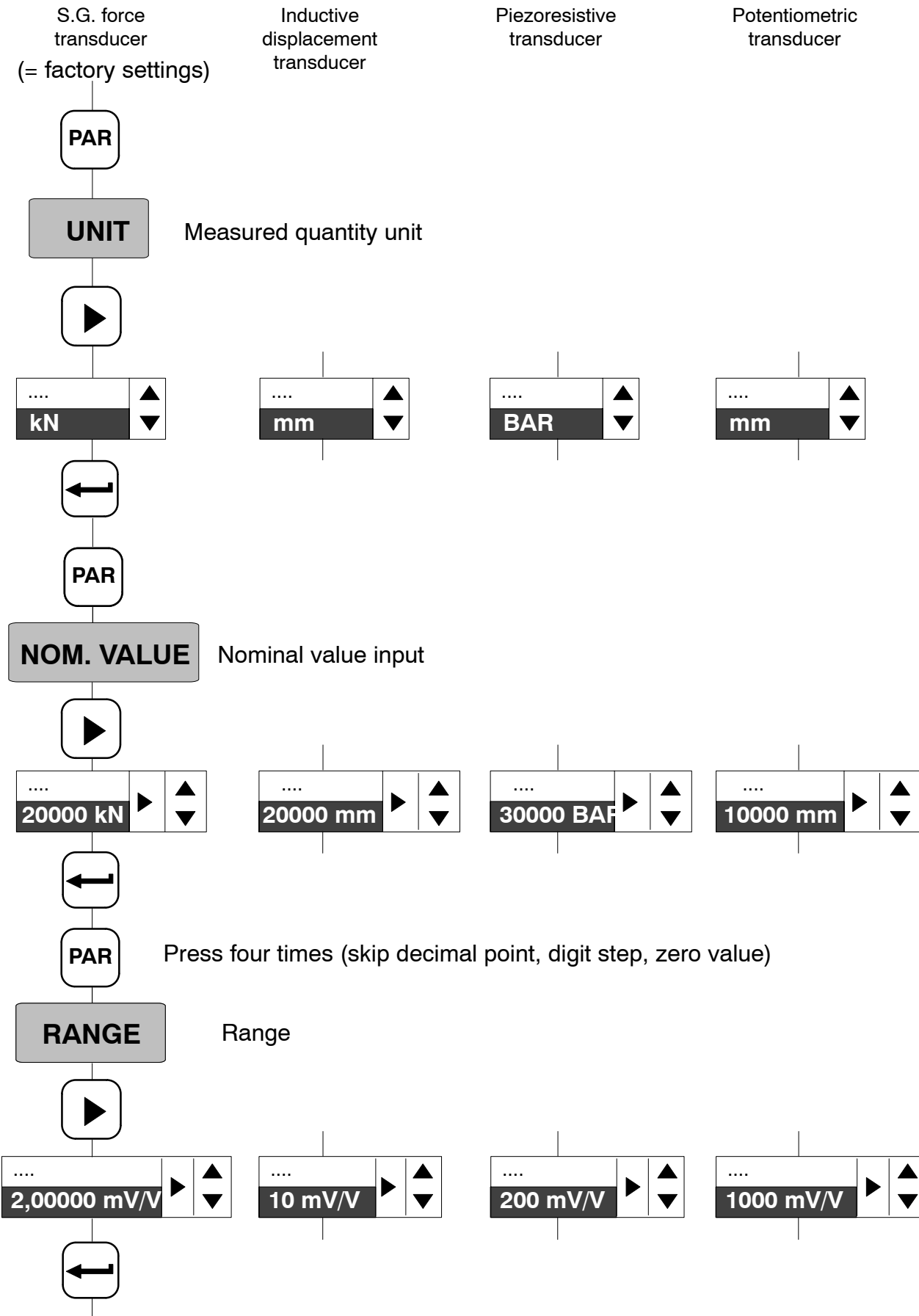
ADAPTATION

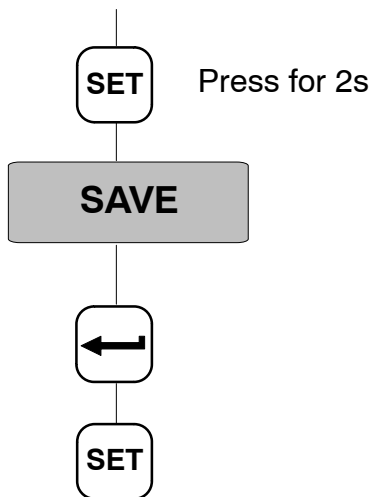
transducer adaptation

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Switch to measuring mode

The settings are saved in parameter set 1 and the device switches to measuring mode.

You can now run an initial function test.

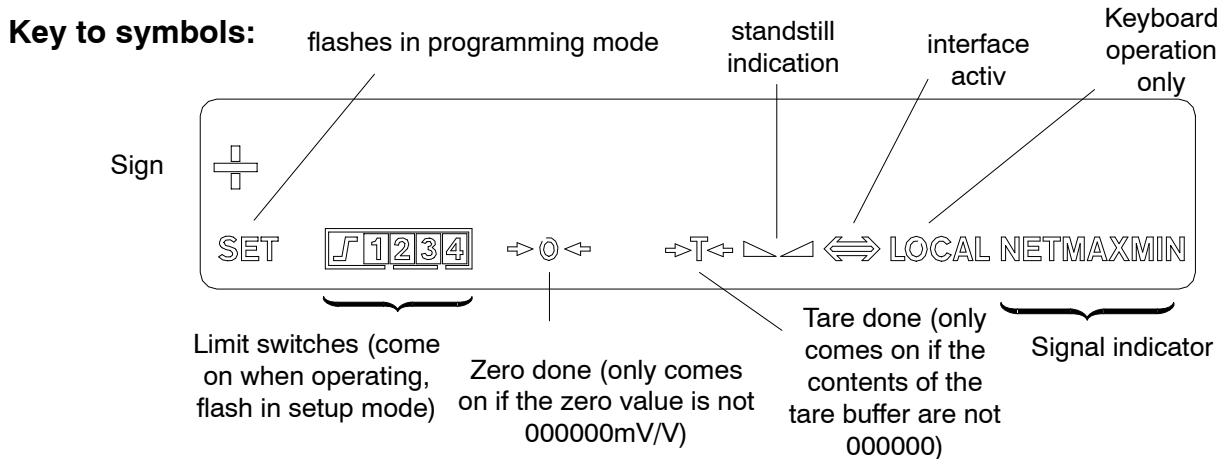
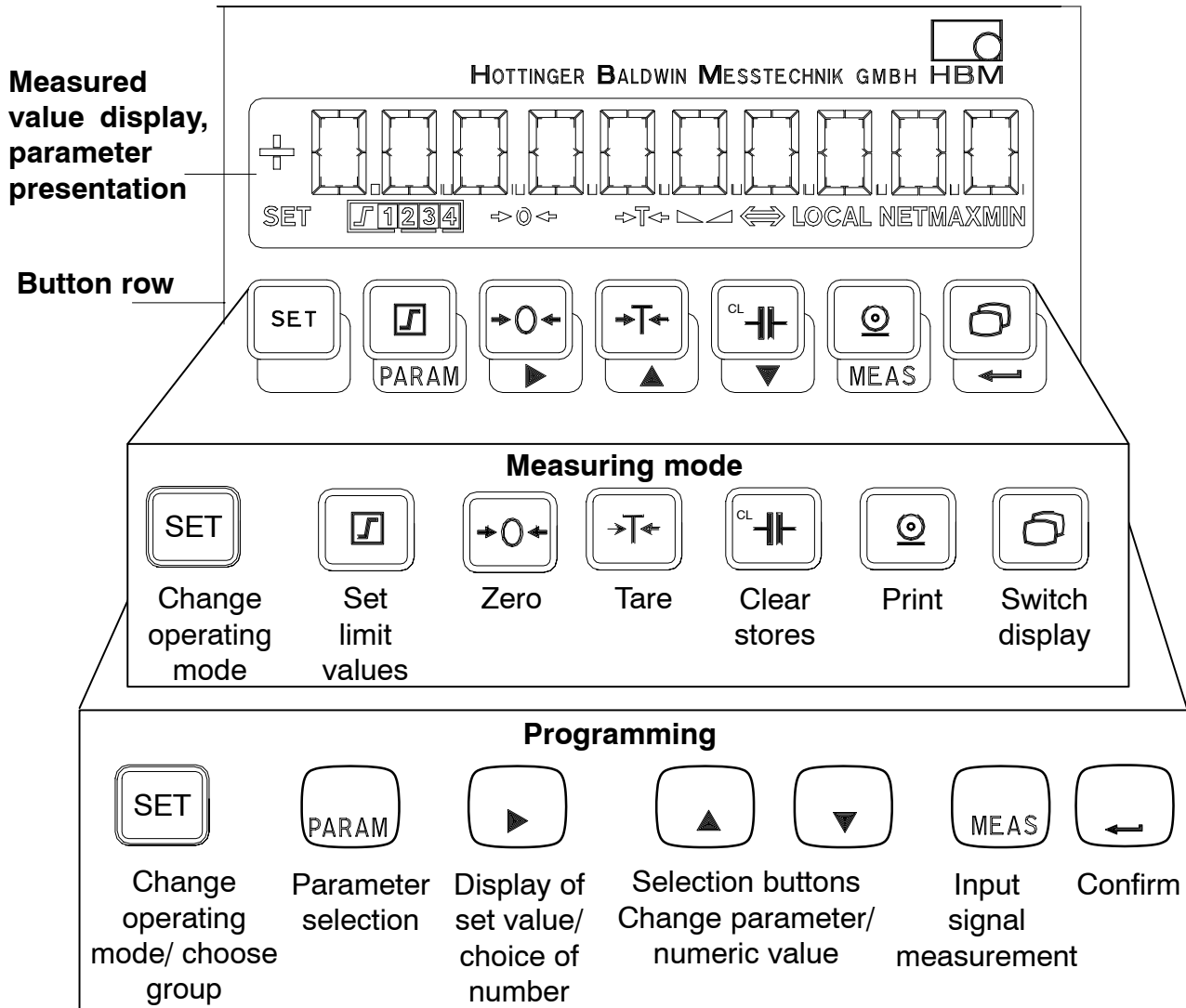
**NOTE**

The settings are only power fail safe once they have been saved under one of the parameter sets.



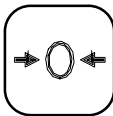
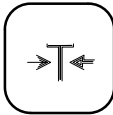


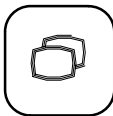
3.2 Control concept and functional overview

The control concept makes a distinction between two types of button functions:

- keys that are operative during measuring mode and
- keys effective in programming mode.



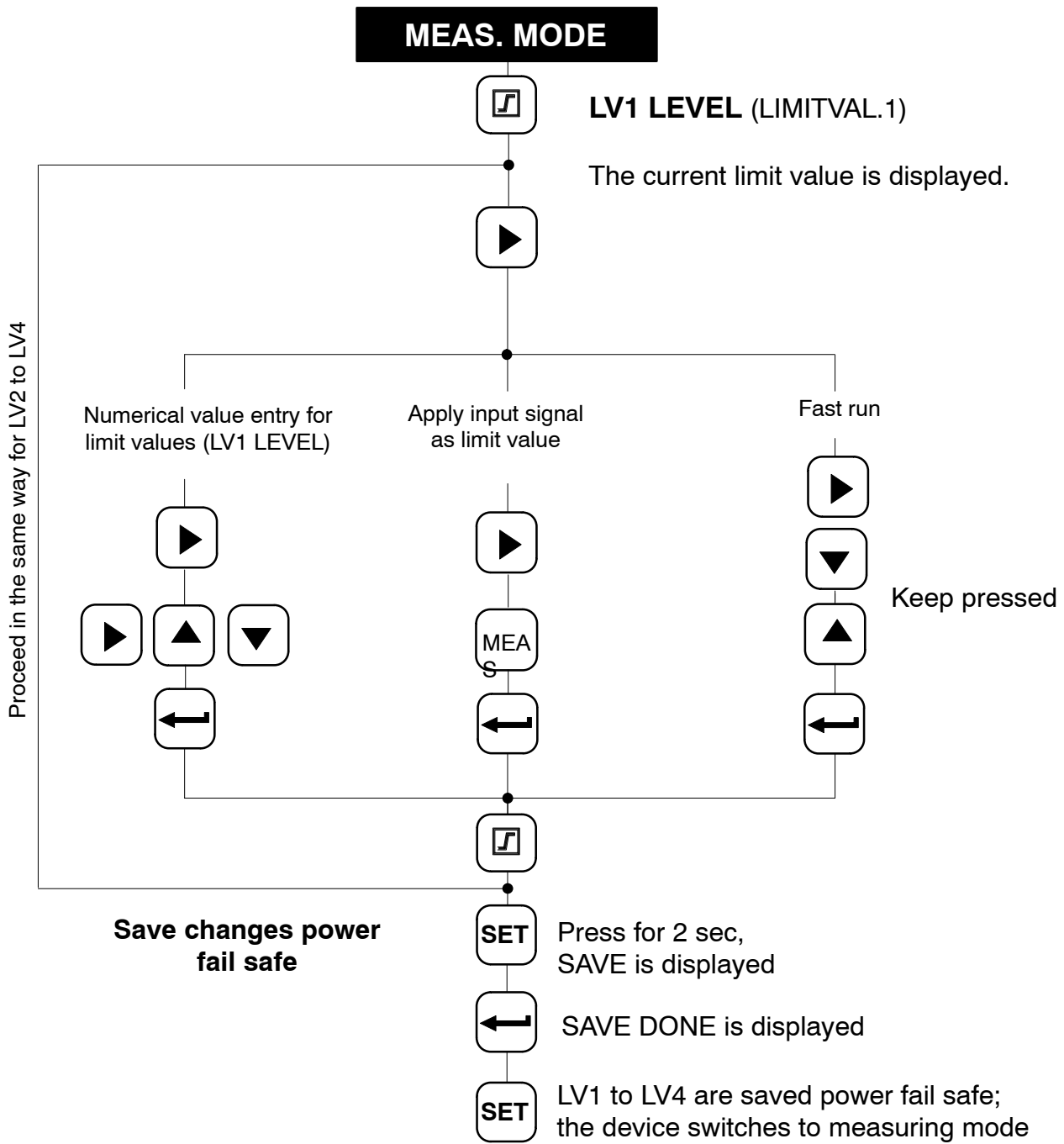
3.3 Button functions in measuring mode

Key	Meaning										
	Change from Measuring mode to Programming mode (and vice versa) by pressing for approx. 2s .										
	Set the limit values LV1...4 (see from Page 38) The additional parameters of the limit switches such as hysteresis, direction etc., are unchanged. The limit value function can be activated in the LIMITVAL.1...4 menu (see Page 38).										
	Zeroing the measurement chain (also possible by remote). The signal at the input is applied as the zero point.										
	Taring the measured value (also possible by remote). The current measured value is applied as the tare value.										
	Deletes the contents of the peak value store (also possible by remote). This function applies to all peak value stores (Min, Max, Peak-to-Peak).										
	Output of measured values and parameters over the RS-232 interface (also possible by remote). For possible print parameters, see "Additional function" starting on Page 44. Only those parameters (PRINT xxx) selected in additional functions will be printed.										
	Switches the measured value display between: <table border="0" data-bbox="453 1496 1401 1733"> <tr> <td>Gross value</td> <td>no marking in the display</td> </tr> <tr> <td>Net value (=gross minus tare)</td> <td>"NET" is displayed</td> </tr> <tr> <td>Minimum value</td> <td>"MIN" is displayed</td> </tr> <tr> <td>Maximum value</td> <td>"MAX" is displayed</td> </tr> <tr> <td>Peak-to-peak value</td> <td>"MAXMIN" is displayed</td> </tr> </table>	Gross value	no marking in the display	Net value (=gross minus tare)	"NET" is displayed	Minimum value	"MIN" is displayed	Maximum value	"MAX" is displayed	Peak-to-peak value	"MAXMIN" is displayed
Gross value	no marking in the display										
Net value (=gross minus tare)	"NET" is displayed										
Minimum value	"MIN" is displayed										
Maximum value	"MAX" is displayed										
Peak-to-peak value	"MAXMIN" is displayed										

3.3.1 Querying and setting limit values in measuring mode

You have several options available when choosing the limit values (in measuring mode):







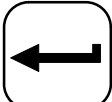
- a: Numerical value entry for limit values
- b: Apply input signal as limit value
- c: Fast search (keep arrow keys pressed for several seconds)



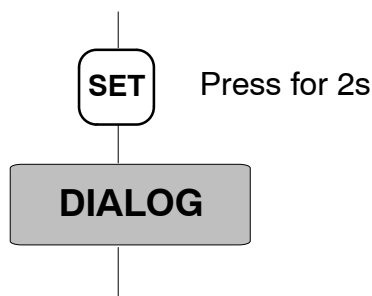
3.4 Button functions in programming mode

In this operating mode, you can make all the settings for using the amplifier in your application. The parameters are collected into groups.

Meaning of the keys:

	Change mode (press for 2 sec), select group (e.g. CALIBR.)
	Parameter selection (e.g. NOM. VALUE)
	Display last value set. Select desired number.
	Changes the number in ascending order.
	Changes the number in descending order.
	Apply measured value.
	Confirms input/modification

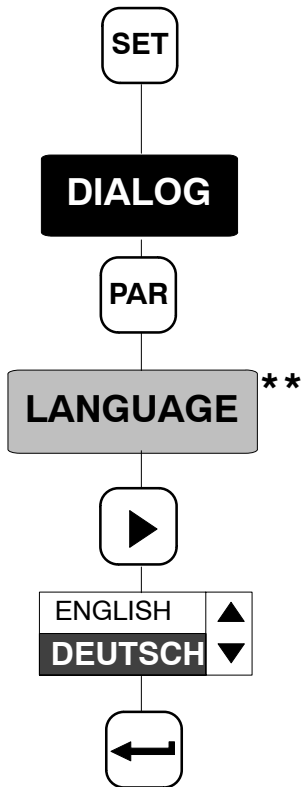
3.4.1 Changing from “Measuring” mode to “Programming” mode



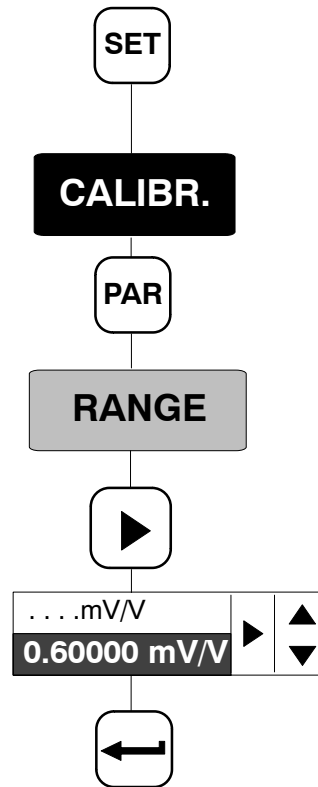
3.4.2 Programming

Typical programming mode operations

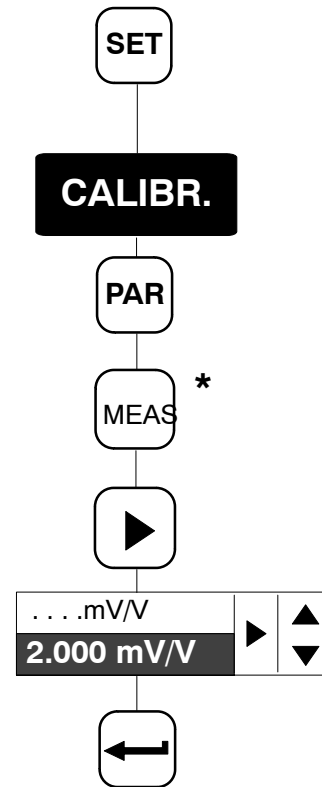
Selecting the value/parameter from a given table (example DIALOG-LANGUAGE)



Entering a numerical value as a parameter (example CAL-IBR./RANGE)



Apply a signal produced by the transducer when a defined loading occurs

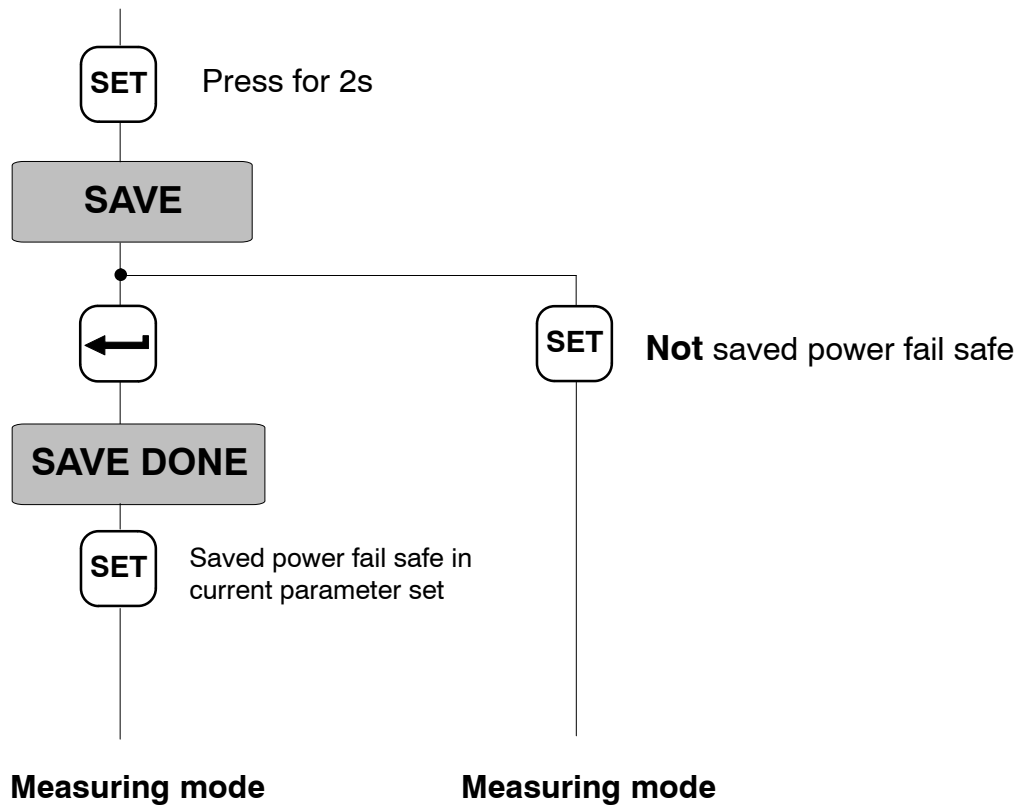


* Only possible when setting the zero value, the measuring range and the limit values

** see page 34

3.4.3 Switching from “Programming” operating mode to “Measuring” operating mode



When the parameters are changed, you will be asked whether the modified parameters are to be saved **power fail safe**.



NOTE

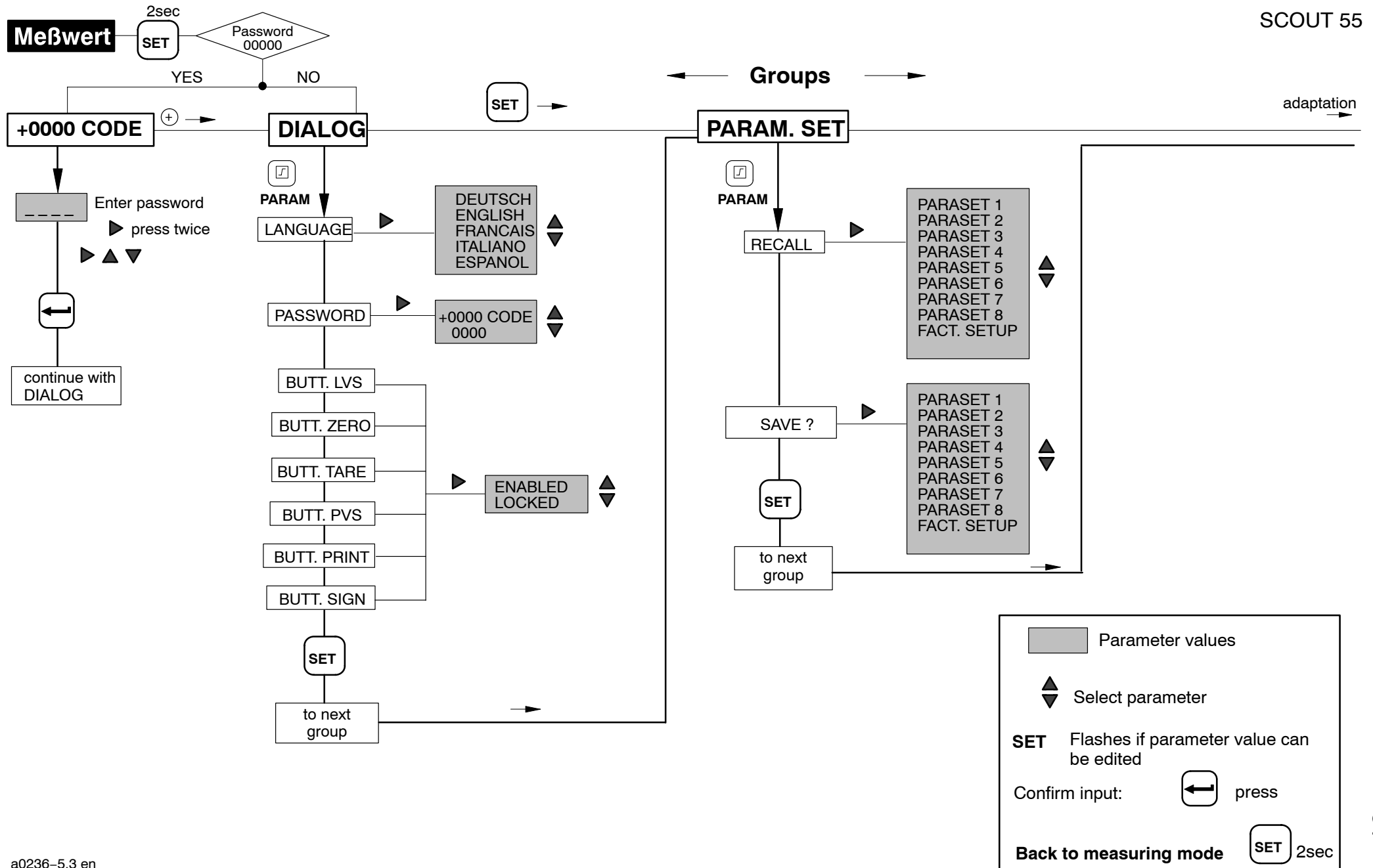
The settings are only power fail safe once they have been saved under one of the parameter sets.

3.5 Overview of all groups and parameters

		 → Groups							
		DIALOG	PARAM. SET	ADAPTATION	CALIBR.	LIMITVAL.1...4	PV STORE	IN/OUT	ADD. FUNCT.
 ↓ PARAM ↓ Parameters	LANGUAGE	RECALL	TRANSDUCER	UNIT	ENABLE	ENABLE	SOURCE UA	P34	
	PASSWORD	SAVE ?	EXCITATION	NOM. VALUE	SOURCE	PVS1	MODE UA	SERIAL No.	
	BUTT. LVS	SET	INPUT	DEC. POINT	SWITCH DIR.	PVS2	INPUT SIGN.	BAUDRATE	
	BUTT. ZERO		AUTOCAL	STEP	LEVEL	ENVELOPE	CONTACT 1	PARITY	
	BUTT. TARE		FILTER	ZERO VALUE	HYSTERESIS	SET	CONTACT 2	STOPBITS	
	BUTT. PVS		MOTION CNT	RANGE	LOGIC		CONTACT 3	COMM. ADDR	
	BUTT. PRINT		MOTION DIG	TARE VALUE	LV BUTT		CONTACT 4	PRINT.GROSS	
	BUTT. SIGN		MOTION OUT	SET	SET		CONTACT 5	PRINT NET	
	SET¹⁾		SET				CONTACT 6	PRINT MAX	
							REMOTE	PRINT MIN	
							SET	PRINT PP	
								PRINT LVS	
							PRINT OVERL		
						PRINT PAR.			
						ZERO/TARE			
						SET			

1) Use  to next group

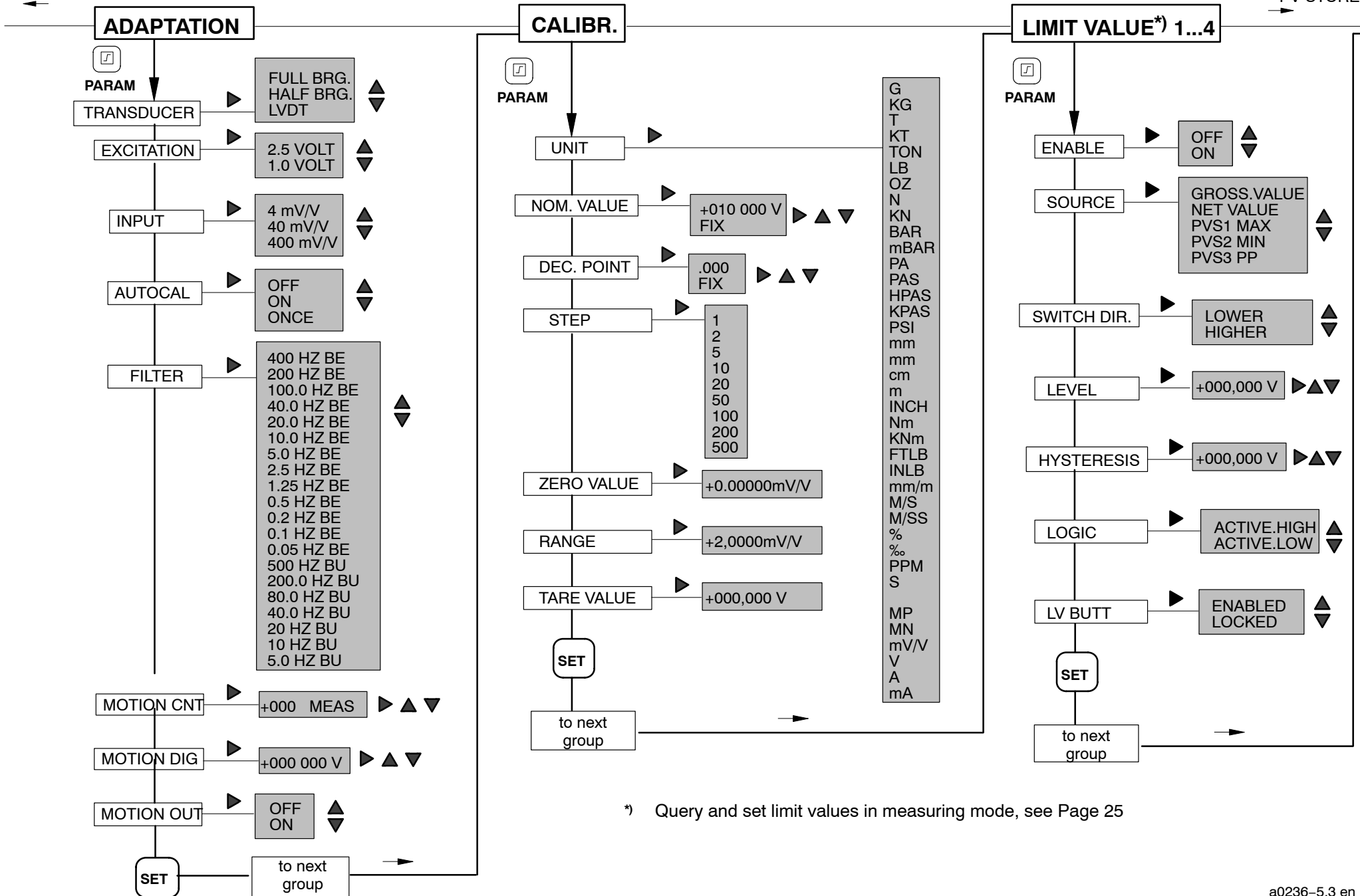
3.5.1 Setting all parameters



← groups →

parameter set

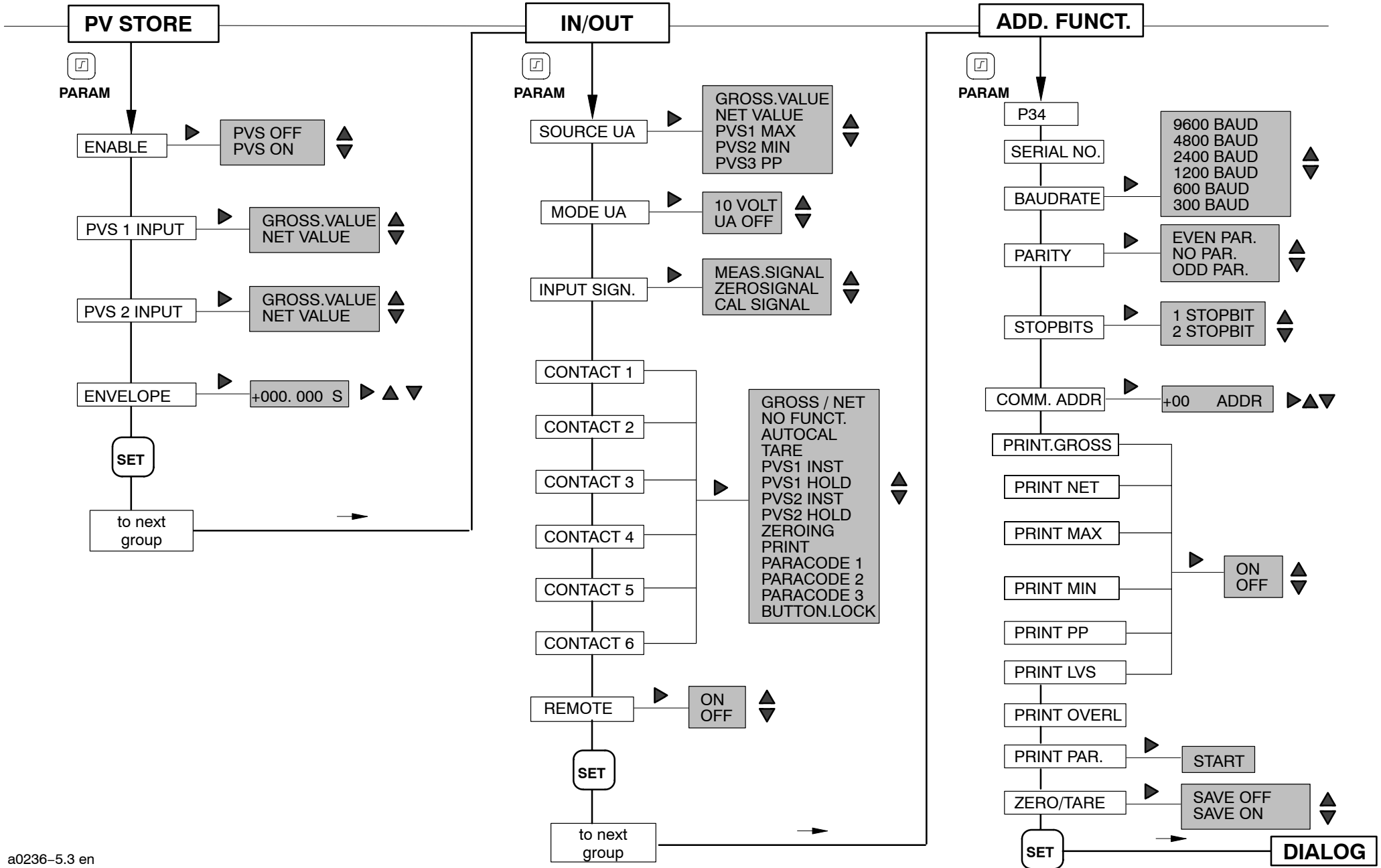
PV STORE



*) Query and set limit values in measuring mode, see Page 25

Groups

LIMITVAL.1...4



3.5.2 Dialogue

Select language (LANGUAGE)

Factory settings: DEUTSCH

You can choose the following languages:

German (DEUTSCH), English (ENGLISH), French (FRANCAIS),
Italian (ITALIANO), Spanish (ESPANOL)

3.5.3 Load/Save in parameter set (PARAM. SET)

The current device amplifier settings can be saved power fail safe in eight parameter sets and later queried.

When switching from the programming operating mode to measuring mode, you will be asked whether or not the change is to be saved. This is described in Chapter 3.4.3 .

Parameter sets can also be activated/recalled by remotes (PARACODE1...2, see Chapter 3.5.8).

RECALL: Parameter set 1 (parameter set 1...8) and factory setting (FACT. SETUP) are loaded

SAVE: Save as parameter set 1...8

3.5.4 Adaptation

TRANSDUCER:

Depending on the type of transducer, you can choose between the following bridge types:

Selectable bridge types	Full bridge *)	Half bridge *)	LVDT
--------------------------------	----------------	----------------	------

*) No distinction is made here between transducers with strain gauges and inductive transducers

EXCITATION:

The excitation voltage for the transducer is selected.

Selectable excitation voltages	1 V	2.5 V
--------------------------------	-----	-------

INPUT:


Depending on which excitation voltage is chosen, the input range (approximate measuring range) can be selected for the transducer type.

Input range	UB = 2.5 V	UB = 1 V
I	± 4 mV/V	± 10 mV/V
II	± 40 mV/V	± 100 mV/V
III	± 400 mV/V	± 1000 mV/V

AUTOCAL:

Depending on the application and on the stability requirement, you can start an autocalibration cycle. This lets you correct zero point and full scale value drift and the long-term constancy of the measuring amplifier.

Possible settings:

ON	Autocalibration switched on
OFF	Autocalibration switched off
ONCE	Autocalibration is run once, as soon as you confirm it with  . Autocalibration stays on/off, depending on the state previously selected.

**CAUTION**

If you need the analogue output signal for continuous monitoring, you must switch autocalibration off.

Reason: no measured values are recorded during the autocalibration cycle. This produces a “monitoring gap” (interval approx. 5 min., duration approx. 1s), which is undesirable if not dangerous during production processes.

FILTERS:

Different low-pass filters (characteristics and cut-off frequencies) can be selected:

Characteristics			
Bessel (BE) (Hz)	Sampling rate *) (measured values per sec)	Butterworth (BU) (Hz)	Sampling rate *) (measured values per sec)
0.05	18.75	5.0	1200
0.1	37.5	10	1200
0.2	75	20	1200
0.5	300	40	1200
1.25	600	80	1200
2.5	1200	200	1200
5.0	1200		
10	1200		
20	1200		
40	1200		
100	1200		
200	1200		

*) see motion count (MOTION CNT)

MOTION CNT (motion count)

To activate the motion count, you must set the number of measurements. During these measurements, the measured value must fall within the given tolerance for “standstill” to be reported. (for sampling rate, see table on Page 36).

Settings	+000 MEAS	Motion count switched off
	+255 MEAS	Maximum possible number of measurements

MOTION DIG

Input of tolerance field in digits in display units.

000110	kN
--------	----

MOTION OUT

Output of motion count status (control output terminal 7; warning).

Possible settings:	OFF	The motion count status is not output over WARNING
	ON	WARNING active, if no standstill or device error

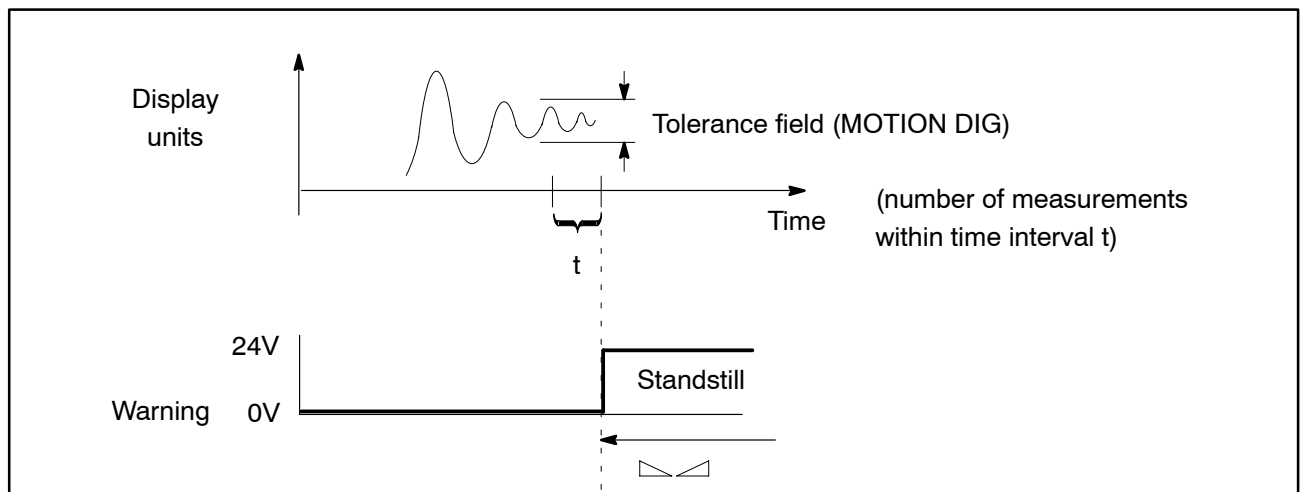


Fig. 3.1: Effect of the motion count

3.5.5 Calibration (CALIBR.)

UNIT

You can select the following units:

Selectable unit		
N	S	cm
OZ	PPM	mm
LB	‰	mm
TON	%	PSI
KT	M/SS	KPAS
T	M/S	HPAS
KG	mm/m	PAS
G	INLB	PA
V	FTLB	mBAR
mV/V	KNm	BAR
MN	Nm	KN
MP	INCH	A
----	m	mA

NOM. VALUE

You can adjust the nominal value. **Specify the nominal value including the desired decimal places.**

Examples:

- You want to measure in a pressure range between 0 and 1000.00 bar.
Enter nominal value: 100000
- With a 50 kg load cell you want to display the measured value with 3 decimal places.
Enter nominal value: 50000

DEC. POINT

Changes the position of the decimal point.

Selectable positions	.0000	0.000	00.00	000.0	0000
-----------------------------	-------	-------	-------	-------	------

For above example a: .00

for above example b: .000

STEP

You can choose the step or the digit step.

Selectable steps	1	2	5	10	20	50	100	200	500	1000
-------------------------	---	---	---	----	----	----	-----	-----	-----	------

ZERO VALUE

The maximum zero balance range matches the particular maximum measuring range in the following table.

RANGE:

Sets a full scale value (unit mV/V). If this value lies outside the input range, the minimum or maximum possible value is accepted.

Input range	Range at UB = 2.5V	Range at UB = 1V
I	± 0.2...4 mV/V	± 0.5...10 mV/V
II	± 2...40 mV/V	± 5...100 mV/V
III	± 20...400 mV/V	± 50...1000 mV/V

TARE VALUE:

You can specify a tare value (in display units) (net value = gross value minus tare value).

3.5.6 Limit values 1...4 (LIMITVAL.1...4)

The parameters for setting the limit values are combined in a group for each limit value. The status of the limit switches is shown on the display and carried out over the control outputs.

The function of the limit switches and their parameters are shown in the following diagram:

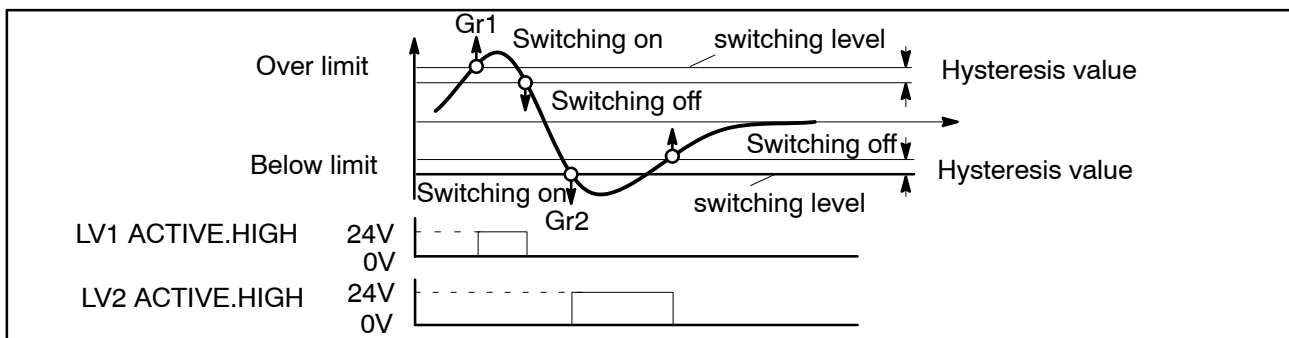


Fig. 3.2: Limit value functions and parameters

ENABLE

OFF	Disable individual limit switches
ON	Enable individual limit switches

SOURCE

Limit value evaluated.

GROSS.VALUE	Gross
NET VALUE	Net
PVS1 MAX	Store for maximum values
PVS2 MIN	Store for minimum values
PVS3 PP	Store for peak-to-peak value

SWITCH DIR.

Specify the switch direction or the working direction here (see Fig. 3.2).

HIGHER	Switch-on level greater than switch-off level for rising measured value
LOWER	Switch-off level greater than switch-on level for falling measured value

LEVEL

The level is set in display units (e.g. 2,000kg).

HYSTERESIS

The hysteresis value prevents “fluttering” of the limit switches upon reaching the switching threshold. Hysteresis is the difference between the activation and deactivation thresholds.

The value is set in display units, e.g. 0.200kg.

LOGIC

You can change the output logic of the remotes as required. The following allocation was made:

ACTIVE.HIGH	Switched on = High Switched off = Low
ACTIVE.LOW	Switched on = High Switched off = Low

3.5.7 Set peak value store (PV STORE)

Two peak value stores are available to you for monitoring processes. The following allocation has been made:

PVS1	Store for maximum values
PVS2	Store for minimum values

Use  to display Max/Min values in measure mode.

An additional value is determined arithmetically.

PVS3	Store for peak-to-peak value
-------------	------------------------------

Linking with PVS1 regarding control functions and envelope.

Both can be operated as peak value stores or as instantaneous value stores. The choice of operating mode is made with the remotes (see Page 42).

PVS1 INST	Instantaneous value or peak value for SP1
PVS1/Hold	Run / Hold mode for SP1
PVS2 INST	Instantaneous or peak value for PV2
PVS2/Hold	Run / Hold-Modus für SP2

The following diagram shows the function of the remotes:

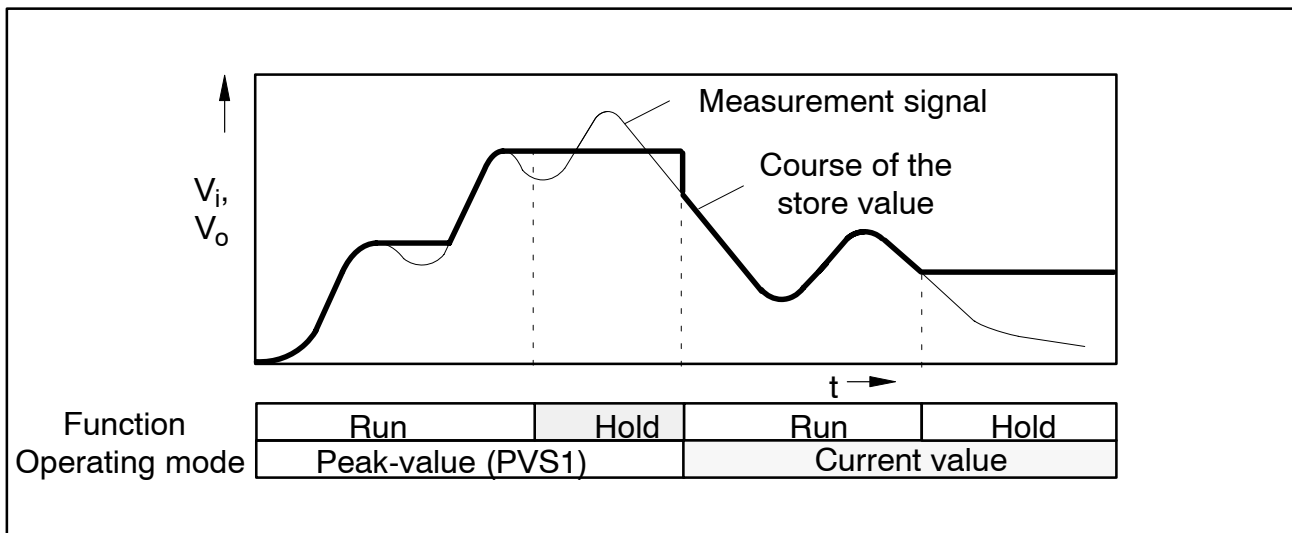


Fig. 3.3: Function of the remotes shown in the example of PVS1, peak value and instantaneous value storage (also applies to PVS2 and PVS3).

If the stores are operated as peak value stores, it is possible to display an envelope function by enabling and setting a discharge rate. This discharge rate affects all peak value stores.

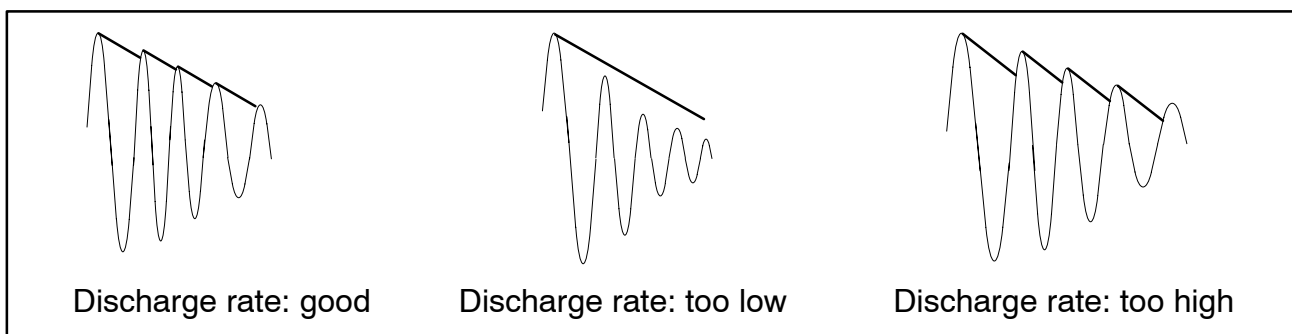


Fig. 3.4: Envelope function

You can set the following parameters:

ENABLE:

You can enable or lock the peak value stores.

PVS ON	Enable peak value store
PVS OFF	peak-value memory/buffer/store locked

PVS1 INPUT:

Choice of input signal for peak value store PVS1.

GROSS.VALUE	NET VALUE
--------------------	------------------

PVS2 INPUT:

Choice of input signal for peak value store PVS2.

GROSS.VALUE	NET VALUE
--------------------	------------------

ENVELOPE CURVE:

You can choose the discharge rate of the envelope function for both the peak value stores. The specification corresponds to a time in ms.

00000 s	envelope function off
000.100 to 060.000 s	envelope function on

3.5.8 Inputs and outputs (IN/OUT)

In this menu, you can make the required settings for the SCOUT 55 input signal, the analogue output and the remotes.

SOURCE UA:

The following signals can be specified as the source of the analogue signal:

GROSS.VALUE	Gross
NET VALUE	Net
PVS1 MAX	Store for maximum values
PVS2 MIN	Store for minimum values
PVS3 PP	Store for peak-to-peak value

MODE UA:

Depending on the analogue signal you select, the following options are possible:

Display	Meaning
UA OFF	-
0 TO 20mA	Output ± 20 mA
4 TO 20MA	Output +4.. 20 mA
UA OFF	-
10 VOLT	Output +/- 10 V

**NOTE**

The current output or voltage output selection is made using jumpers on the amplifier motherboard. The procedure is described on Page 42.

INPUT SIGN.:

For test purposes, a calibration signal and a zero signal can be displayed instead of the measurement signal. You can choose the following input signals:

MEAS.SIGNAL	Measuring mode
CAL SIGNAL *)	The display corresponds to 50 % of the current full scale value
ZEROSIGNAL *)	Internal zero point

*) To display the measurement signal, you must return to measuring mode.

CONTACT 1...6:

Remotes are available on the connector strip for controlling SCOUT 55 functions. The pin assignment or allocation of the remotes is freely configurable. No function is defined for the remotes at the factory.

Functions	Level 0V	Level 24V
NO FUNCT.	no function (factory setting)	
AUTOCAL	Autocalibration ON	Autocalibration OFF
TARE	For the transition 0V – 24 V, the tare value is adopted	
PVS1 INST	Peak value operating mode for PV1	Instantaneous value operating mode for PV1
PVS1/HOLD	Store contents PV1 and PV3 are updated	Store contents PV1 and PV3 are frozen
PVS2 INST	Peak value operating mode for PV2	Instantaneous value operating mode for PV2
PVS2/HOLD	Store contents PV2 are updated	Store contents PV2 are frozen
ZEROING	For the transition 0V – 24 V, the current instantaneous input signal is adopted as the zero value	
PRINT		A printout is triggered over the interface
GROSS/NET	Gross at analogue output	Net at analogue output
PARACODE 1	External selection of parameter sets and binary coded inputs (see following table)	
PARACODE 2		
PARACODE 3		
BUTTON.LOCK	ENABLED	LOCKED

PARAM. SET	PARACODE		
	3	2	1
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

REMOTE

Device control through remotes can be locked or enabled.

ON	no display	Operating using keyboard and remotes
OFF	LOCAL	Keyboard operation only

3.5.9 Additional functions (ADD. FUNCT)

P__:

In order to provide better support should you experience technical problems, the firmware status is indicated by this parameter. If you have any questions for our service department or HBM branch, giving the existing firmware version will enable us to provide effective support.

Example: P34 Software version P34

SERIAL NO:

Display the serial number of the device.

BAUDRATE:

You can choose between the following values as the baud rate for the serial interface.

Selectable baud rates	300	600	1200	2400	4800	9600
-----------------------	-----	-----	------	------	------	------

PARITY:

The following settings are possible:

Selectable parity	EVEN PAR.	ODD PAR.	NO PAR.
-------------------	-----------	----------	---------

STOPBITS:

The following settings are possible:

1 STOPBIT
2 STOPBIT

COMM. ADDR*:

Input the device address.

Selectable device addresses	00 to 31
-----------------------------	----------

*) Address selectable only for RS485 version; for RS232, set address to 1

PRINT.GROSS:

Output the gross value over the serial interface.

OFF/ON

PRINT NET:

Output the net value over the serial interface.

OFF/ON

PRINT MAX:

Output the maximum value over the serial interface.

OFF/ON

PRINT MIN:

Output the minimum value over the serial interface.

OFF/ON

PRINT PP:

Output the MIN/MAX value over the serial interface.

OFF/ON

PRINT LVS:

Output limit switch states over serial interface.

OFF/ON

PRINT OVERL

Adjust repetition rate. Heading comprising the source of the measured value and the unit.

- 0 = no heading (measured value only)
- 1 = Heading always
- 10 = Heading every 10 times etc.

PRINT PAR.:

Output all the parameters.

START

**NOTE**

The chosen print functions (apart from PRINT PAR) are run in measuring mode (by pressing  or by remote contact).

ZERO/TARE:

Any change to the tare value or the zero value made by keys (green) or remotes, is automatically stored in the current parameter set. This protection can be switched on or off:

SAVE OFF
SAVE ON

4 Example

The following example uses a measurement task to show you the functionality of the device and the required settings.

Problem definition:

The forming process in a press is to be monitored in order to obtain uniform product quality. The maximum force exerted by the press is to be recorded in each cycle. To guarantee the production process, this maximum force must fall between the lower (F1) and upper (F2) force limit.

Solution:

The force characteristic measured with an S.G. force transducer (e.g. C9B/10kN; 1 mV/V) is amplified and evaluated by the SCOUT 55. The peak value store (maximum) is used to record the maximum force and it is evaluated with two limit switches with regard to the lower and upper limits. An additional limit switch is provided for overload protection (emergency shut down) of the machine.

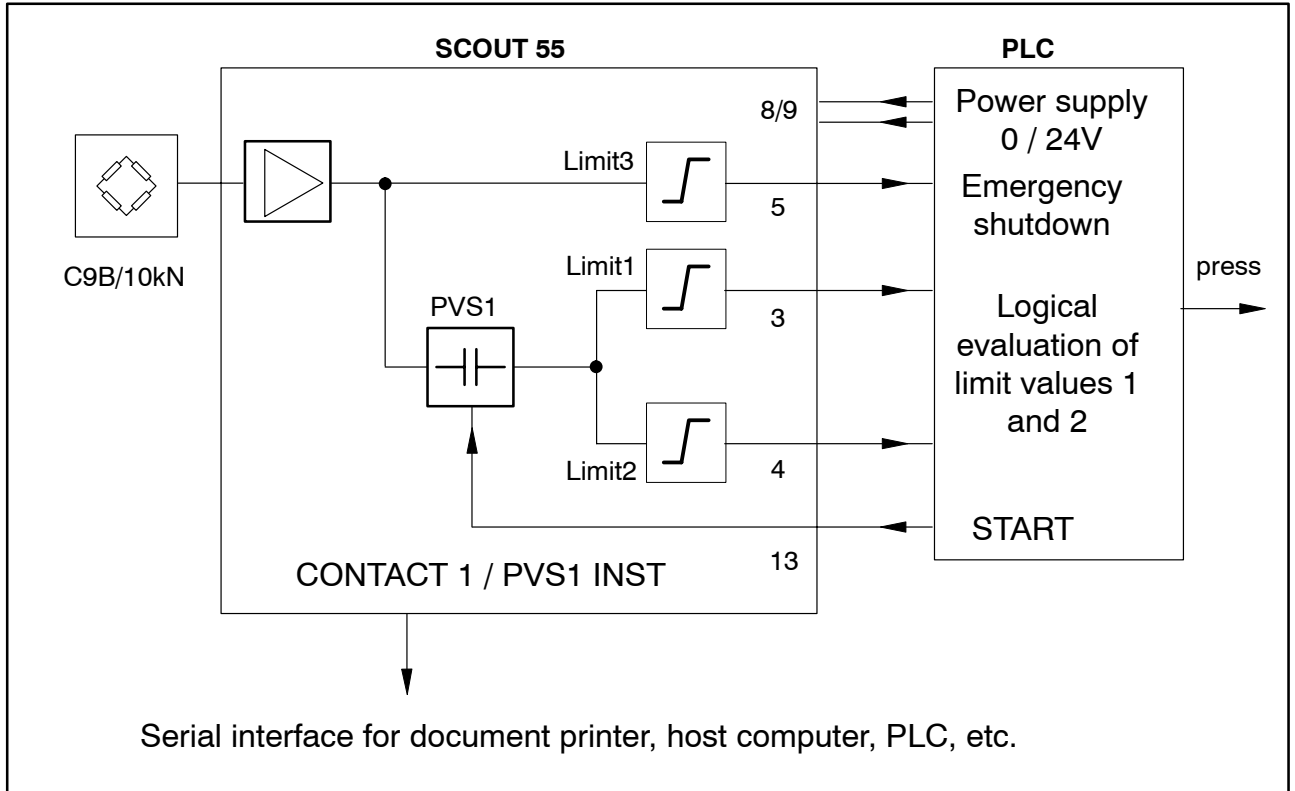
A PLC takes over the control of the process. As well as the control commands for the press, it gives the SCOUT 55 a start signal to begin the pressing cycle and once the process has finished, logically links the limit switch outputs to the "Good/Bad evaluation".

The start signal from the PLC clears the contents of the peak value store through the SCOUT 55 control input. To prevent unintentional modifications, during measurement, only the "Display signal selection" button is enabled for the machine operator on site.

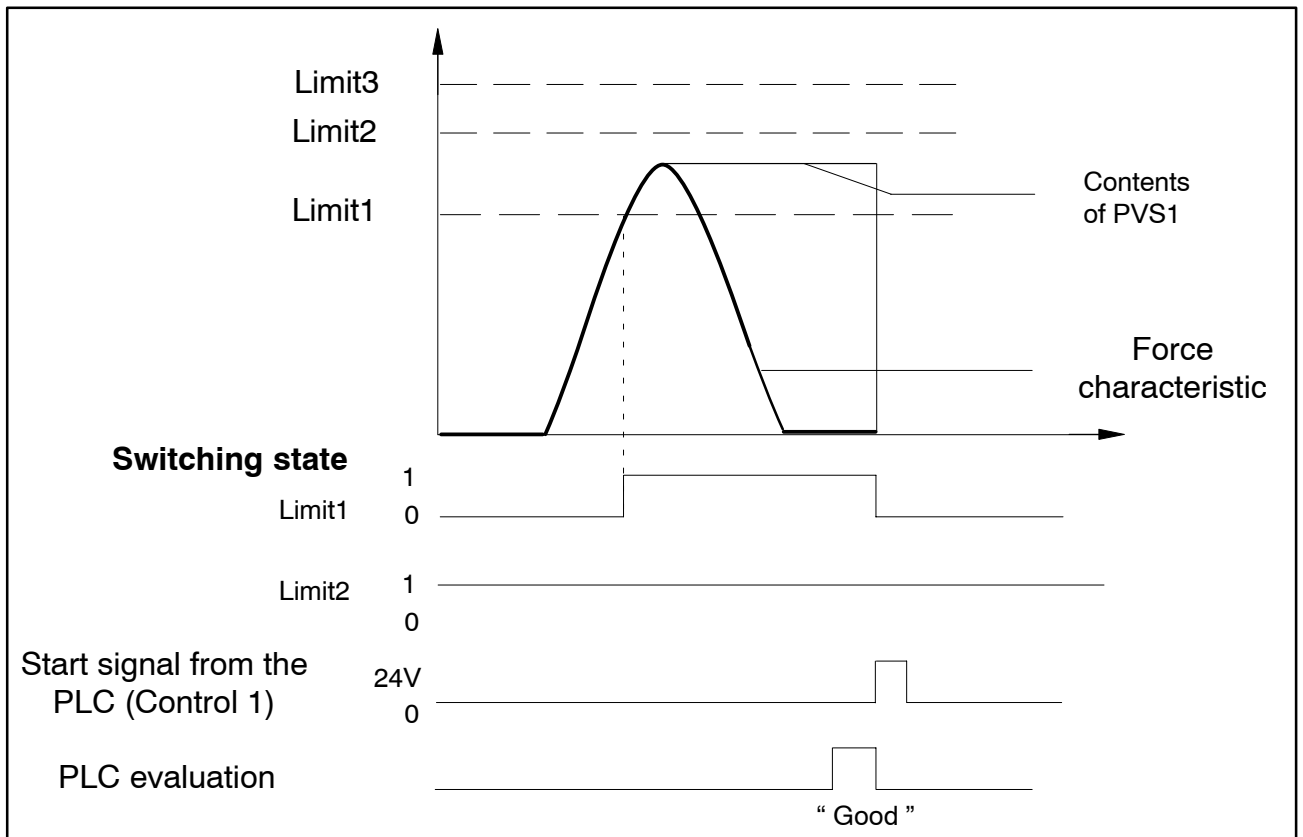
The parameter setups are protected against unauthorised modification by a password.

Device control through the remotes (remote control) must be activated.

Wiring diagram:



Timing diagram:



Using the PLC to evaluate the limit value message:

	Good	Reject	
Limit1	1	0	1
Limit2	1	1	0

Choose the following settings:

- Limit1** Checks whether the lower force limit has been reached. The input signal is the output of the peak value store (maximum value). If limit LV1 is exceeded, a High signal is generated. A positive switch direction must be set with positive output logic.
- Limit2** Checks whether the upper force limit has been reached. The input signal is the output of the peak value store (maximum value). If limit LV2 is exceeded, a Low signal is generated. A positive switch direction must be set with positive output logic.
- Limit3** Checks whether the maximum load limit of the machine is exceeded (emergency shutdown function). The input signal is the gross measured value. If limit LV3 is exceeded, a High signal is generated. A positive switch direction must be set with positive output logic.
- PVS1** Records the maximum peak value of the force characteristic. Must be enabled, the envelope function must be deactivated. The input signal is the gross measured value. PVS1 is cleared with remote 1 by switching to instantaneous value.
- Remote 1** Clears the contents of the peak value store. The function PVS1 INST must be selected. **The remote must be activated.**

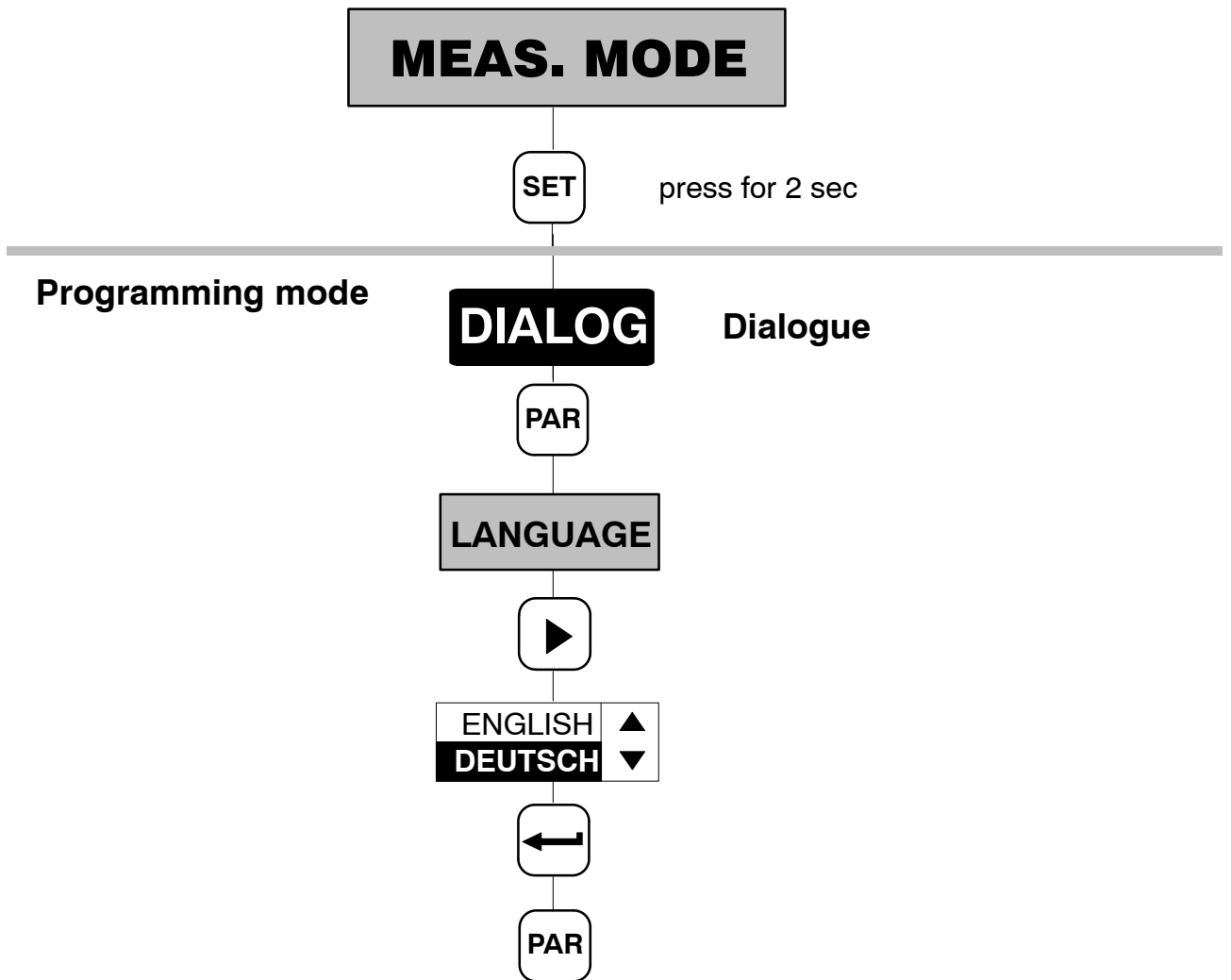
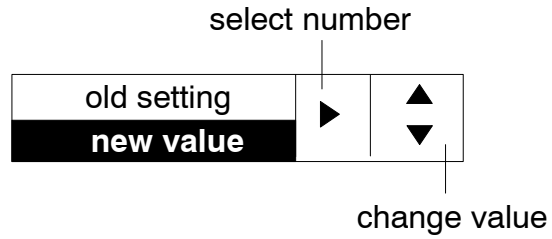
Key to symbols

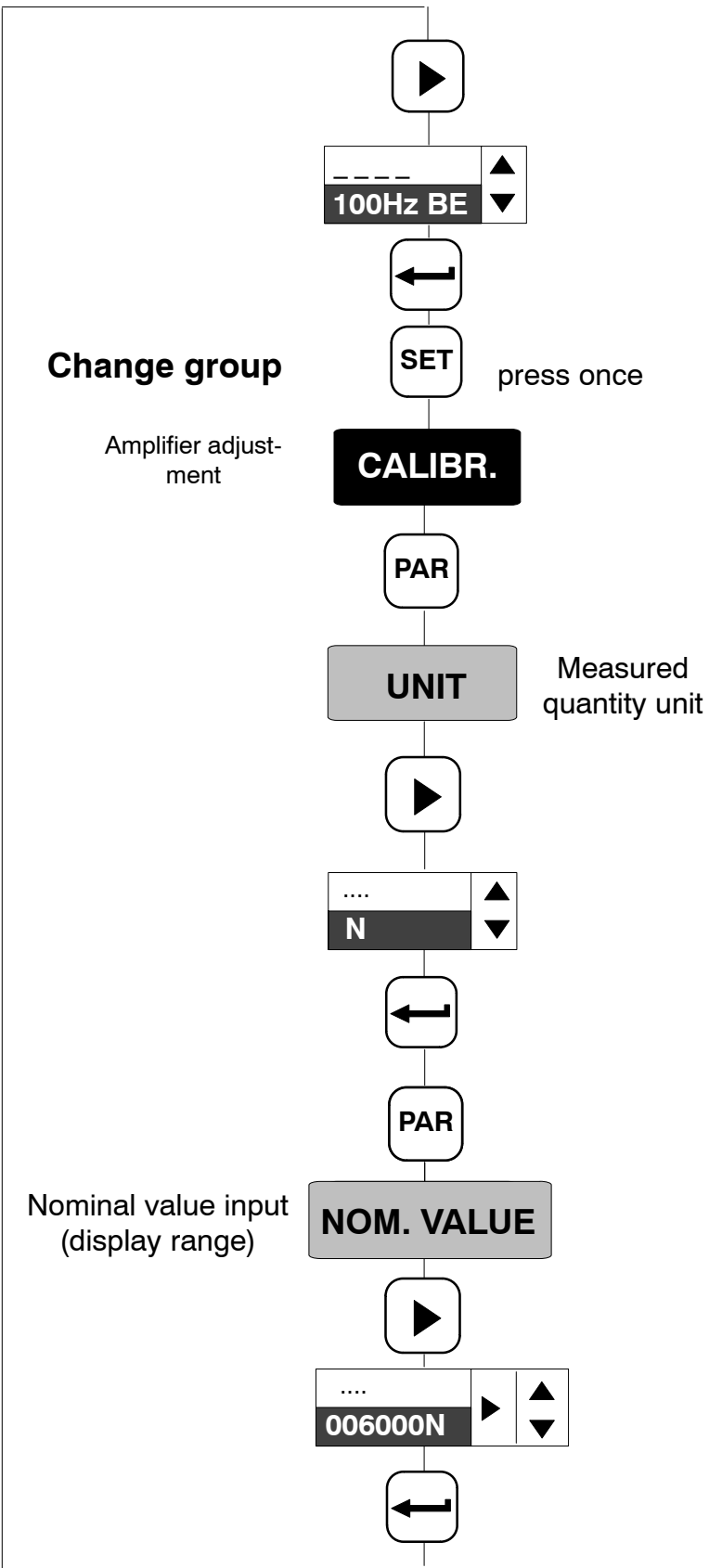
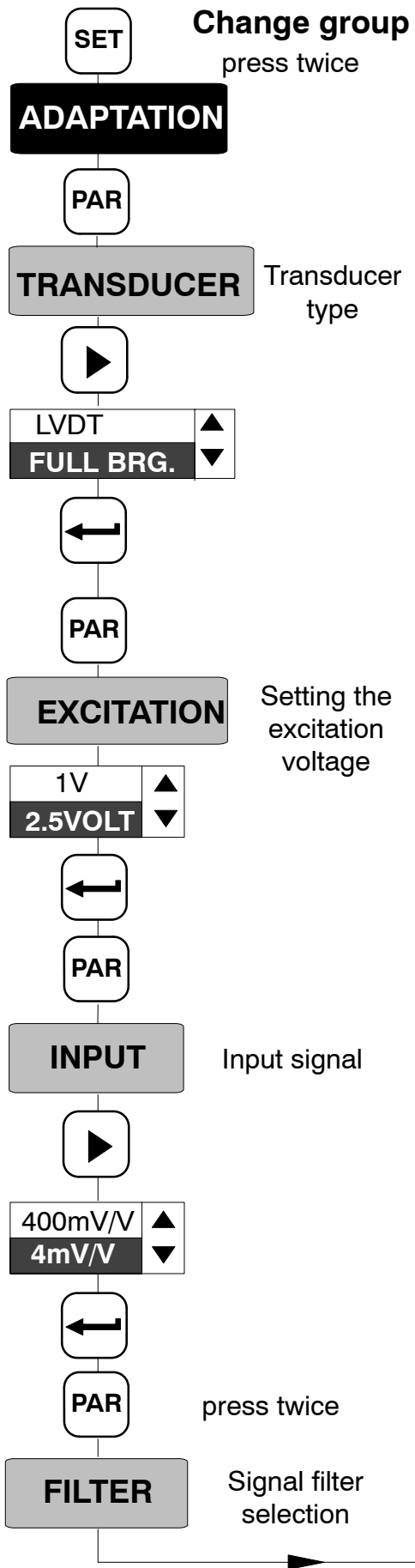


Group

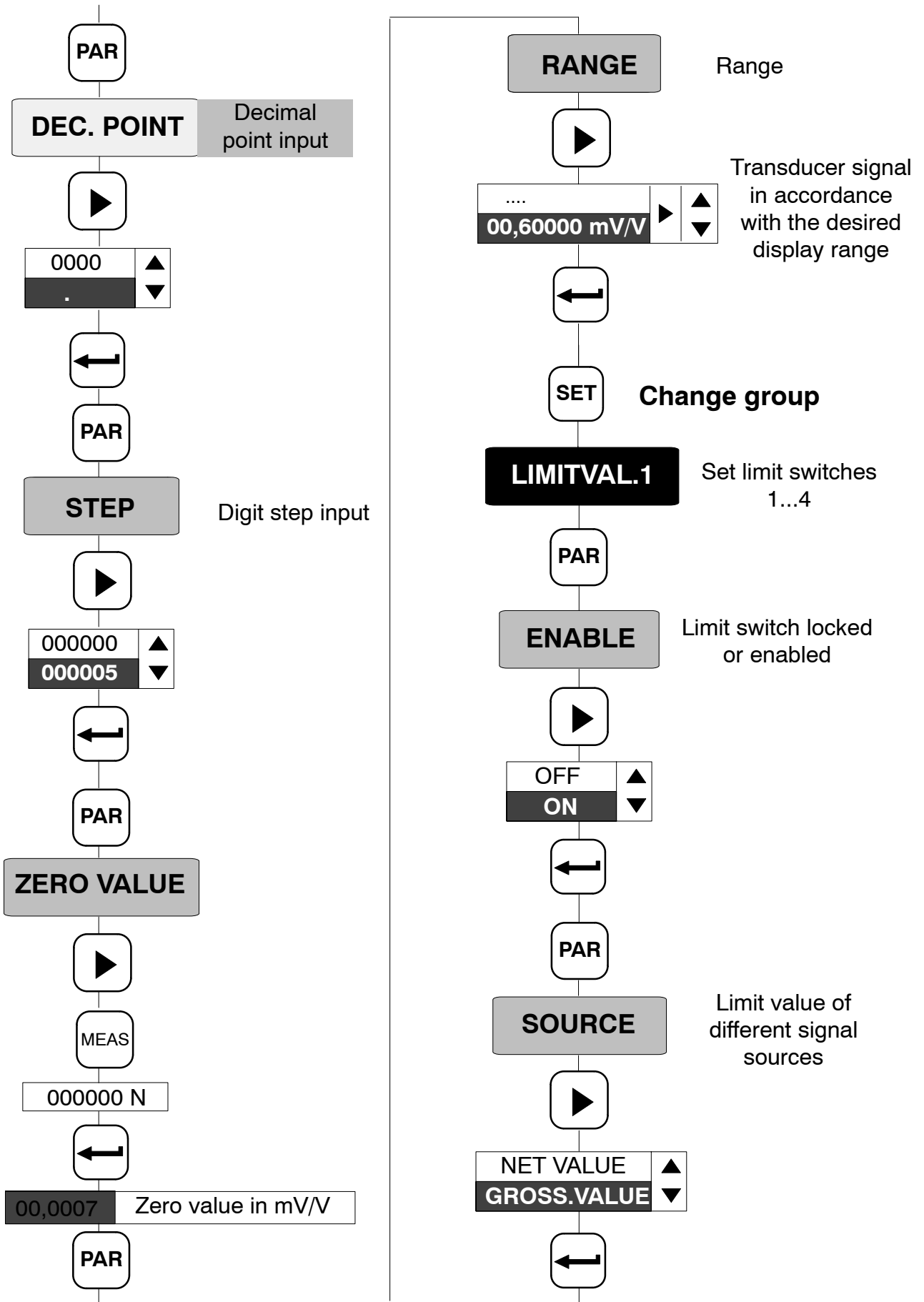


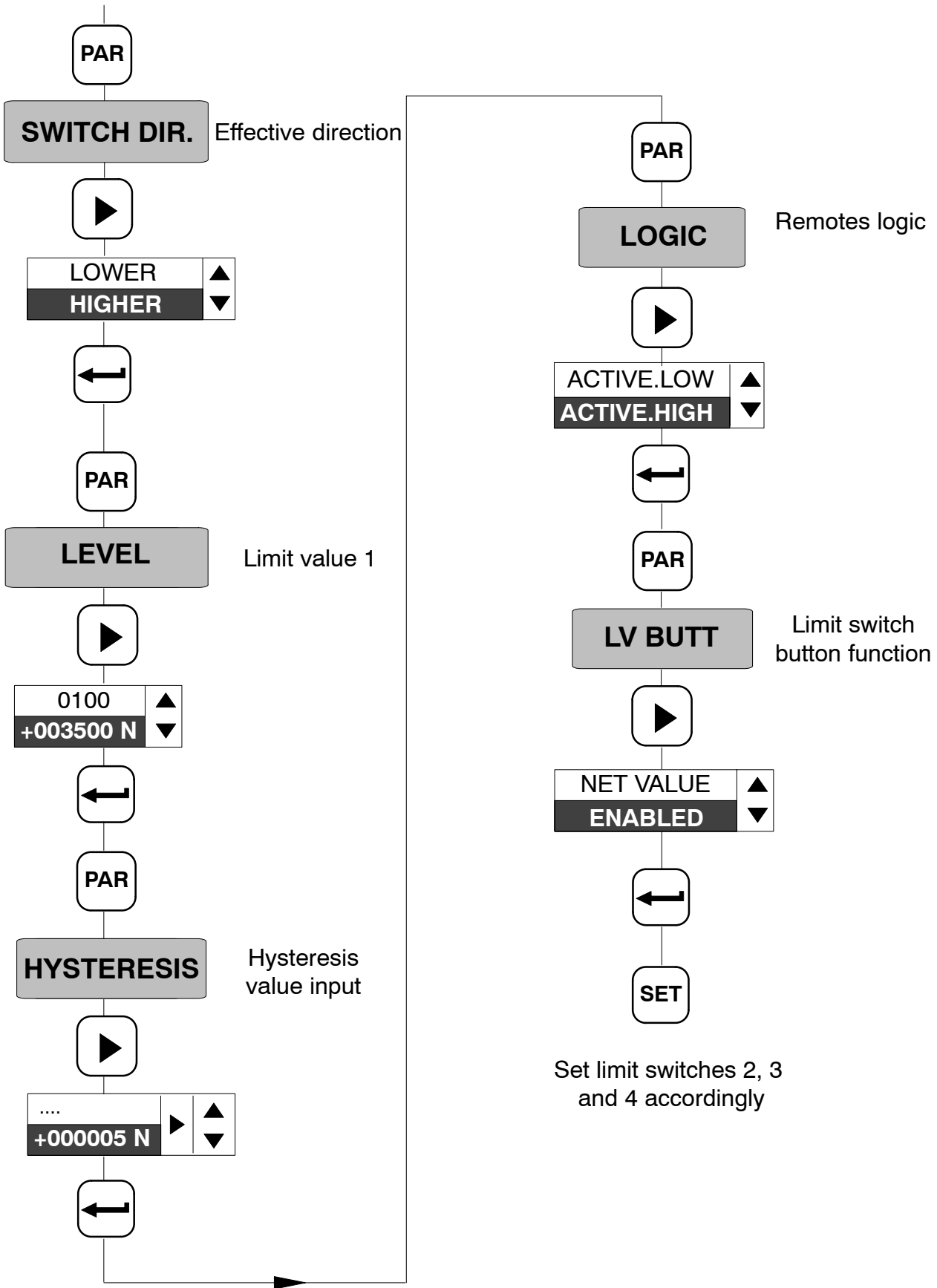
Parameter

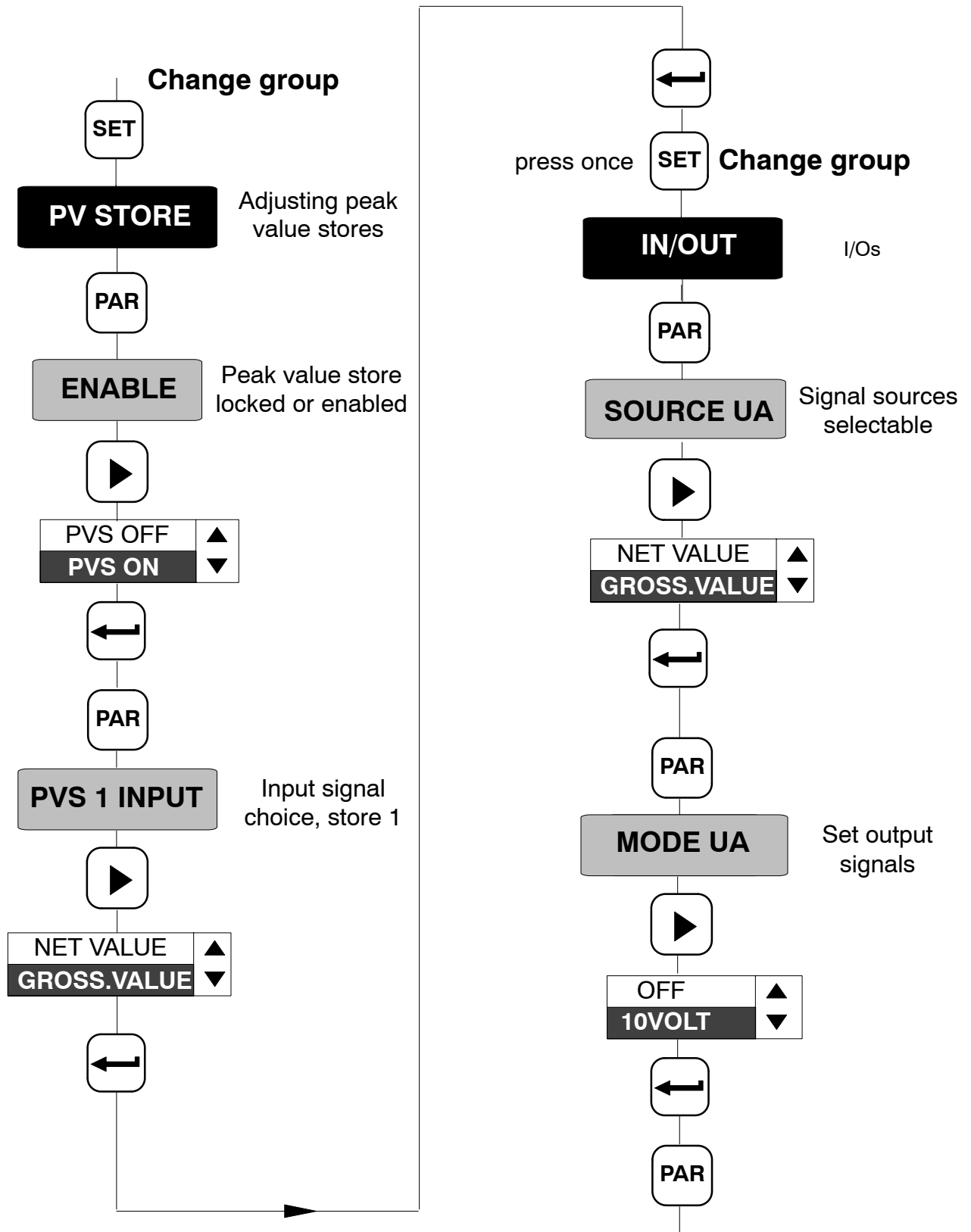


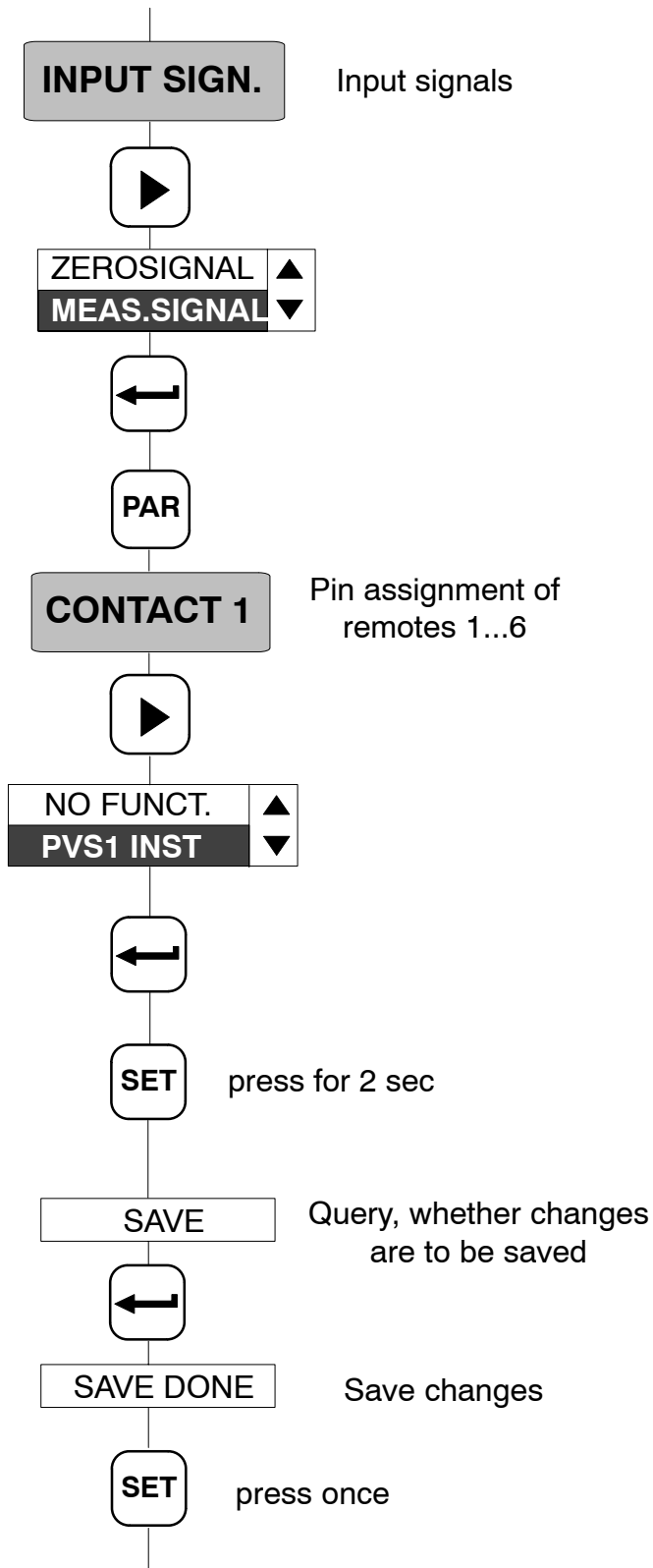


Continued on next page









Measuring mode

5 Error messages

Error message	Cause	Remedy
FIX	The given value cannot be altered. Example: For unit V and mV/V, the nominal value setting is fixed at 10,000	
OVFL B	Gross value overflow	
OVFL N	Net value overflow	
CAL.ERR	incorrect transducer/ sensor connection: No transducer/sensor connected No six-wire feedback connected Measuring bridge connected incorrectly (e.g. full bridge set, but half bridge connected)	Connect the transducer properly. Switch device off and then back on again.
OUTOFRANGE	The value chosen for measuring range, zero point value, nominal value or tare value cannot be set, as it exceeds the permissible limits.	The device sets the maximum or minimum value automatically, as soon as the error message has been acknowledged by "ENTER".
DATA ERROR	A transmission error occurred when saving the parameters	

6 Specifications

Type		SCOUT 55					
Accuracy class		0.1					
Mains connection/supply voltage	V	115/230, +6 %; -10 %;					
Power consumption, max.	Hz	48...60					
Safety fuse (slow-blowing)	VA	8					
		200 (115 V) / 100 (230 V)					
Amplifier							
Carrier frequency	Hz	4800 ± 0.32					
Excitation voltage U_B (± 5 %)	V_{rms}	1 or 2.5					
Connectable transducers		$U_B = 1 V_{rms}$		$U_B = 2.5 V_{rms}$			
S.G. half and full bridge	W	40...5000		80...5000			
Inductive half and full bridge, LVDT's	mH	6...19		2.5...20			
Permissible cable length between transducer and amplifier	m	max. 500		max. 500			
Measurement frequency range, adjustable (-1 dB)	Hz	0.05...200					
Input level		low	medium	high			
Measuring range $U_B = 2.5 V$	mV/V	0.2...4	2...40	20...400			
$U_B = 1 V$	mV/V	0.5...10	5...100	50...1000			
Bridge balance range $U_B = 2.5 V$	mV/V	± 4	± 40	± 400			
$U_B = 1 V$	mV/V	± 10	± 100	± 1000			
Noise voltage ¹⁾ 0...200 Hz	mV/V _{PP}	0.5	1	10			
0...1.25 Hz	mV/V _{PP}	0.015	0.1	1			
Ambient temperature effect ¹⁾ for 10 K modification (Autocalibration on / off)							
Sensitivity	%	0.04 / 0.1	0.04 / 0.1	0.04/0.1			
Zero point	mV/V	0.2/2	2/20	20/200			
Measurement frequency range		NomVal.	-1dB	-3dB	RunTm.	RiseTm.	
Butterworth low-pass		fc (Hz)	(Hz)	(Hz)	(ms)	(ms)	
						Over-shoot approx.10%	
		500	485	580	1.1	0.7	12
		200	245	290	1.7	1.3	11
		80	78	98	4.3	3.8	10
		40	38	50	7.1	7.3	8
		20	19	26	12	14	7
		10	9.1	12.5	22	28	6
		5	4.6	6.3	41	56	5
Bessel low pass		Nom.val	-1dB	-3dB	RunTm.	RiseTm.	Over-shoot
		fc (Hz)	(Hz)	(Hz)	(ms)	(ms)	%
		400	400	750	0.8	0.6	2
		200	215	395	1.3	1.0	2
		100	111	190	2.5	2.1	2.5
		40	39	68	5	5.5	1.1
		20	21	37	8.1	10	1
		10	11	19	14	19	0.7
		5	5.3	9.7	25	38	0.3
		2.5	2.7	4.9	48	75	0
		1.25	1.4	2.4	90	150	0
		0.5	0.7	1.2	180	300	0
		0.2	0.17	0.3	700	1200	0
		0.1	0.09	0.16	1400	2300	0
		0.05	0.044	0.075	2900	4700	0

¹⁾ For $U_B=2.5 V$, relative to the input

Max. permissible common-mode voltage	V	± 5 V
Common-mode rejection	dB	typically 110
Max. differential voltage DC	V	± 10
Linearity variation	%	typically 0.05
Long-term drift over 48 hours, Meas. range 2 mV/V 30 minutes after switching on (warm-up time)	mV/V	Autocalibration on / off <0.2 / <0.4
Analogue output Applied voltage Permissible load resistance, min. Internal resistance, max. Impressed current Permissible load resistance, max. Internal resistance, min. The analogue output can show gross, net, positive and negative peaks and peak/peak values.	V kOhm Ohm mA Ohm kOhm	± 10V (asymmetric) 5 1.5 ± 20 ; 4...20 500 100
Interference voltage at the output, typ. Residual carrier voltage 38.4 kHz Residual carrier voltage 4800 Hz	mV _{PP} mV _{PP} mV _{PP}	4 3 2
Long-term drift (over 48 h) (30 minutes after switching on)	mV	< 3
Effect of 10 K change in ambient temperature (additional effect to digital value) Zero point Sensitivity	mV %	< 3 < 0.05
Limit switches Number Reference level Reference excit. (independently adjustable) Factory settings, hysteresis Adjustment accuracy Response time	V V V mV ms	4 Gross, Net, Peak value -10 ... +10 0.1 0.33 0.83 (all Butterworth filter frequencies and Bessel filters >1.25 Hz. The values double each time for the next lower measurement frequency)
Peak value stores Number Function Update rate	ms	2 Positive; negative; peak-to-peak 0.03 (for Butterworth filters and Bessel filters ≥ 100 Hz)
Clearing the peak value store.	ms	3.3 (remote contacts)
Recording of the current value/ Peak value	ms	3.3 (remote contacts)
Time constant for envelopes	ms	100...60 000 (± 6 %)

Control outputs (limit value 1...4, warning V_{CTRL}) Nominal voltage, external power supply Permissible supply voltage range Output current, max. Short-circuit current, typ. Short-circuit period Isolation voltage, typ.	V V A A V_{rms}	24 11...30 0.5 0.8 unlimited 350
Remote contacts Input voltage range, LOW Input voltage range, HIGH Input current, typ., HIGH level = 24 V	V V mA	0...5 10...24 12
Interface Measuring rate, ASCII output Binary output Number of data bits Baud rate Parity Stop bit	Meas./s Bit Baud	approx. 25 approx. 50 8 300, 600, 1200, 2400, 4800, 9600 ¹⁾ uneven, even ¹⁾ and none 1 ¹⁾ ; 2
Parameter memory (EEPROM)		8 (parameter sets)
Display Number of points Character height Type Keyboard Dialogue languages	mm	± 10 (16-segment, plus var. special characters) 12,5 LCD (inverse with LED background lighting) Touch-sensitive keypad with 7 deposited button elements on the printed circuit board German/English/French/Italian/Spanish
Effect of operating voltage in the case of changes in the specified range, relative to the full scale on zero point on sensitivity Nominal temperature range Operating temperature range storage temperature range Degree of protection, under DIN IEC 60 529 Protection class Dimensions, over everything (WxHxD) Weight, approx.	% % 5C 5C 5C mm kg	0.01 0.01 -20...+50 -20...+50 -20...+50 IP40 (device) IP51 (front, touch-sensitive keypad) I 176 x 98 x 211.6 1.88

¹⁾ Factory settings

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