Operating manual

Measuring amplifier in desktop housing

SCOUT55

A0236-6.1 en

Contents **Page**

Safety instructions

SCOUT55 can be operated either at 230 VAC or 110 VAC, 48...60 Hz mains voltage.

For adapting the device to the mains voltage, please see chapter 2.3.1 in the operating manual.

Before connecting the device, make sure that the mains voltage and current type specified on the name plate correspond to the mains voltage and current type at the site of installation and that the current circuit used is sufficiently safe.

An earthed socket must be used for the mains plug (protection class I and II). Do in no case use the device when the mains line has suffered damage.

Do in any case switch off the device before opening it; disconnect the mains plug.

The device complies with the safety requirements of DIN EN 61010-part1 (VDE 0411-part1); protection class I. The device has a mains switch. Ensure that it is easily accessible at any time.

The supply connection, as well as the signal and sense leads, must be installed in such a way that electromagnetic interference does not adversely affect device functionality (HBM recommendation: ”Greenline shielding design”, downloadable from the Internet at http://www.hbm.com/Greenline).

Automation equipment and devices must be covered over in such a way that adequate protection or locking against unintentional actuation is provided (such as access checks, password protection, etc.).

When devices are working in a network, these networks must be designed in such a way that malfunctions in individual nodes can be detected and shut down.

Safety precautions must be taken both in terms of hardware and software, so that a line break or other interruptions to signal transmission, such as via the bus interfaces, do not cause undefined states or loss of data in the automation device.

Appropriate use

The SCOUT55 with the connected transducers may be used for measurement and directly related control and regulation tasks, only. Any other use is not appropriate. To ensure safe operation, the transducer may only be used according to the specifications given in this 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.

Each time, before starting up the equipment, you must first run a project planning and risk analysis that takes into account all the safety aspects of automation technology. This particularly concerns personal and machine protection.

Additional safety precautions must be taken in plants where malfunctions could cause major damage, loss of data or even personal injury. In the event of a fault, these precautions establish safe operating conditions.

This can be done, for example, by mechanical interlocking, error signaling, limit value switches, etc.

Conditions on site

Protect desktop devices from moisture or atmospheric influences such as rain, snow, etc.

Protect the device from direct sunlight. Ensure sufficient ventilation.

General dangers in the case of non-observance of the safety instructions

The SCOUT55 complies with the state of the art and is operationally reliable. If the device is used and operated inappropriately by untrained personnel, residual dangers might develop.

Any person charged with device installation, operation, maintenance or repair must in any case have read and understood the operating manual and the safety instructions, in particular.

Residual dangers

The SCOUT55's scope of performance and supply covers part of the measuring-technology, only. The plant designer/constructor/operator must in addition design, realise and take responsibility for the measuring-system's safety such that potential residual dangers are minimized. The respective regulations must in any case be observed. Residual dangers regarding the measuringsystem must be specified explicitly.

After making settings and carrying out activities that are password-protected, you must make sure that any controls that may be connected remain in safe condition until the switching performance of the amplifier system has been tested.

In this manual, the following symbols are used to point out residual dangers:

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 bodily injury.

Symbol:  **WARNING**

Meaning: **Dangerous situation**

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

Symbols pointing out notes on use and waste disposal as well as useful information:

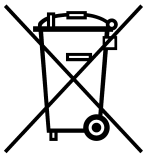
Symbol:  **NOTE**

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

Symbol: CE

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/HBMdoc).

Symbol: 

Meaning: **Statutory marking requirements for waste disposal**

National and local regulations regarding the protection of the environment and recycling of raw materials require old equipment to be separated from regular domestic waste for disposal.

For more detailed information on disposal, please contact the local authorities or the dealer from whom you purchased the product.

Safe operation

Do only quit error messages if the reason for the error has been eliminated and there is no more danger.

Reconstruction and modifications

HBM's express consent is required for modifications regarding the SCOUT55's construction and safety. HBM does not take responsibility for damage resulting from unauthorized modifications.

In particular, repair and soldering works on the boards are prohibited. If complete componentry is replaced use original HBM components, only.

The product is delivered from the factory with a fixed hardware and software configuration. Changes can only be made within the possibilities documented in the manuals.

Qualified personnel

The device may be used by qualified personnel, only; the technical data and the special safety regulations must in any case be observed. When using the device, the legal and safety regulations for the respective application must also be observed. The same applies if accessories are used.

Qualified personnel means: personnel familiar with the installation, mounting, start-up and operation of the product, and trained according to their job.

This includes people who meet at least one of the three following requirements:

- Knowledge of the safety concepts of automation technology is a requirement and as project personnel, you must be familiar with these concepts.
- As automation plant operating personnel, you have been instructed how to handle the machinery and are familiar with the operation of the equipment and technologies described in this documentation.
- As commissioning engineers or service engineers, you have successfully completed the training to qualify you to repair the automation systems. You are also authorized to activate, to ground and label circuits and equipment in accordance with safety engineering standards.

Maintenance and cleaning

SCOUT55 devices are maintenance-free. Please note the following points when cleaning the housing:

- Withdraw the mains plug from the socket before carrying out any cleaning.
- Clean the housing with a soft, slightly damp (not wet!) cloth. You should **on no account** use solvent, since it may damage the labelling on the front panel and the indicator box.
- When cleaning, ensure that no liquid gets into the device or connections.

1 Introduction

1.1 Scope of supply

- Device with mounting frame / carrying handle
- 1 male cable connector DB-15P, order no.: 3.3312-0182
- 1 mains cable
- 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

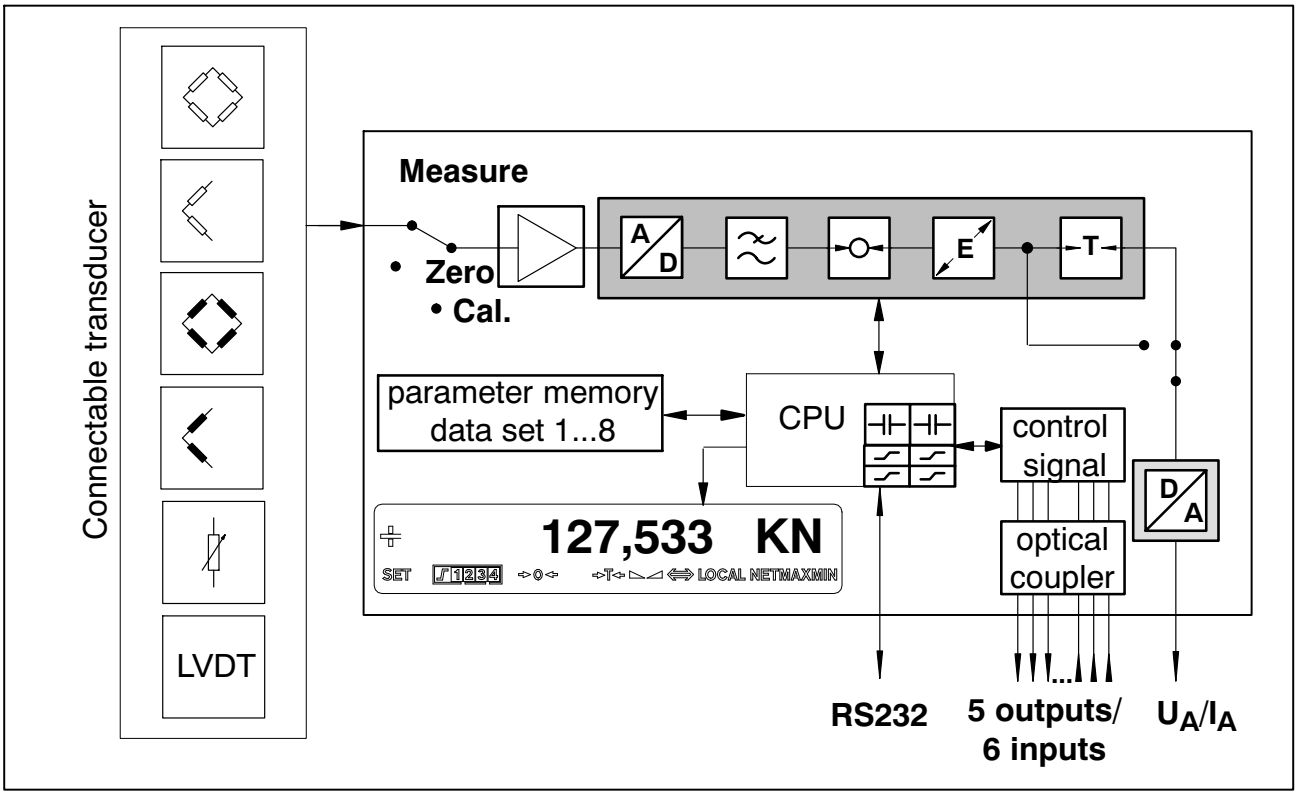


Fig. 1.1: SCOUT 55 block diagram

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

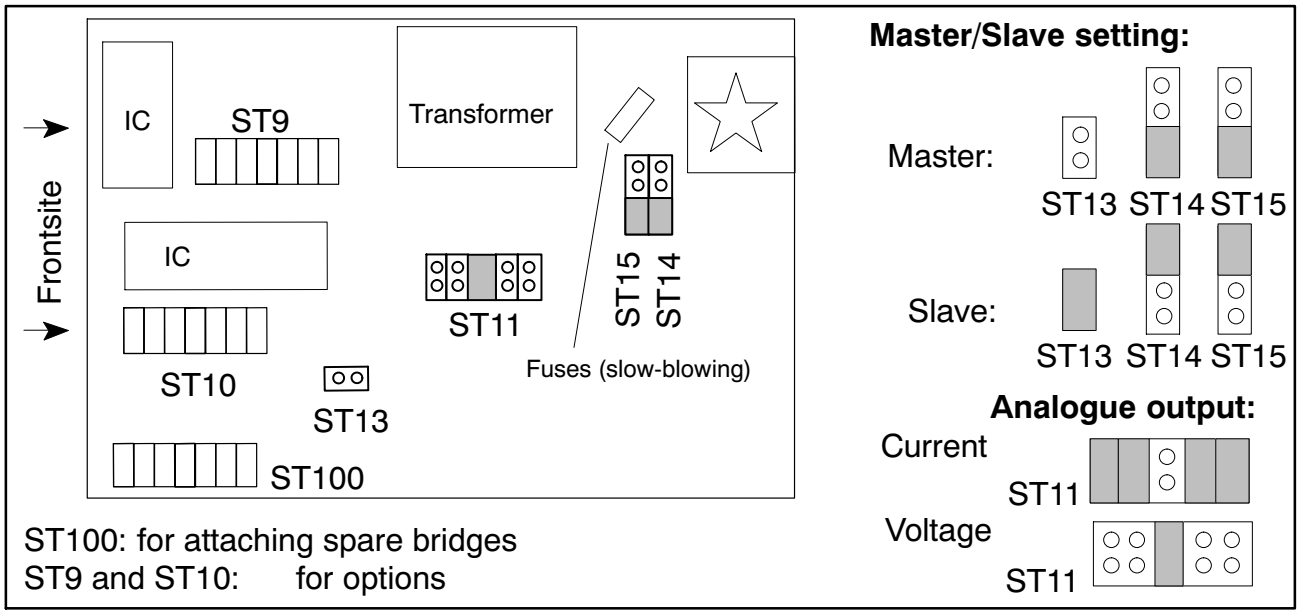


Fig. 2.1: Location of jumpers on motherboard

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 .

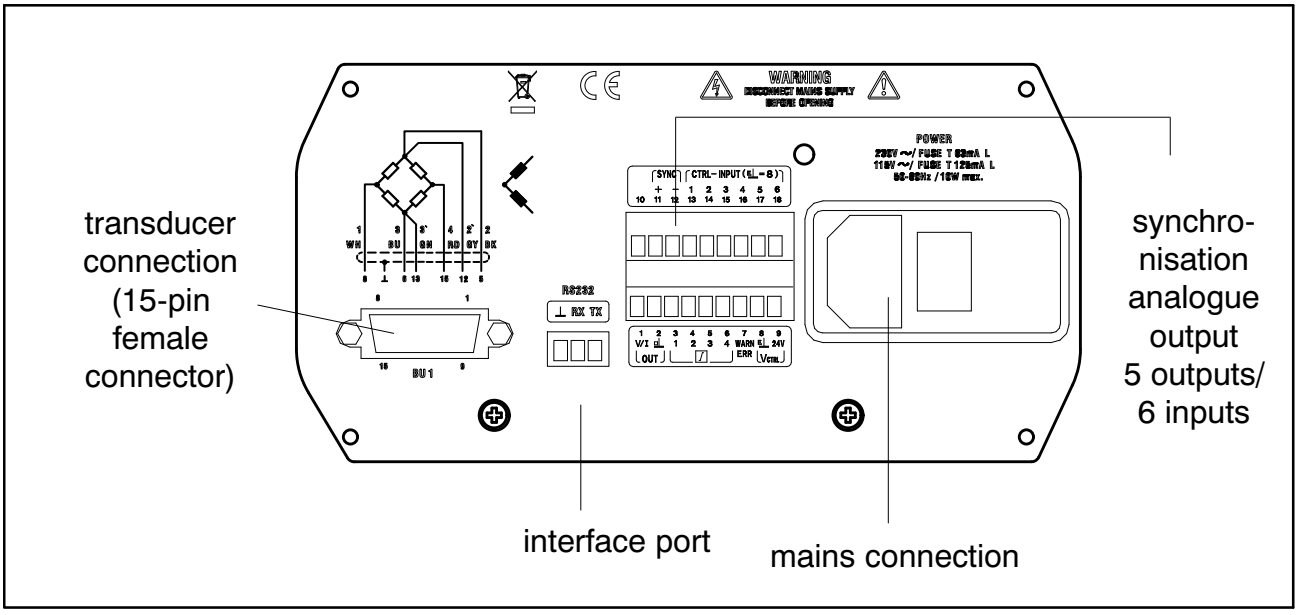


Fig. 2.2: Back of the device

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.

Country-specific versions are available as accessories.

2.3.1 Changing the mains voltage selection/replacing the fuse

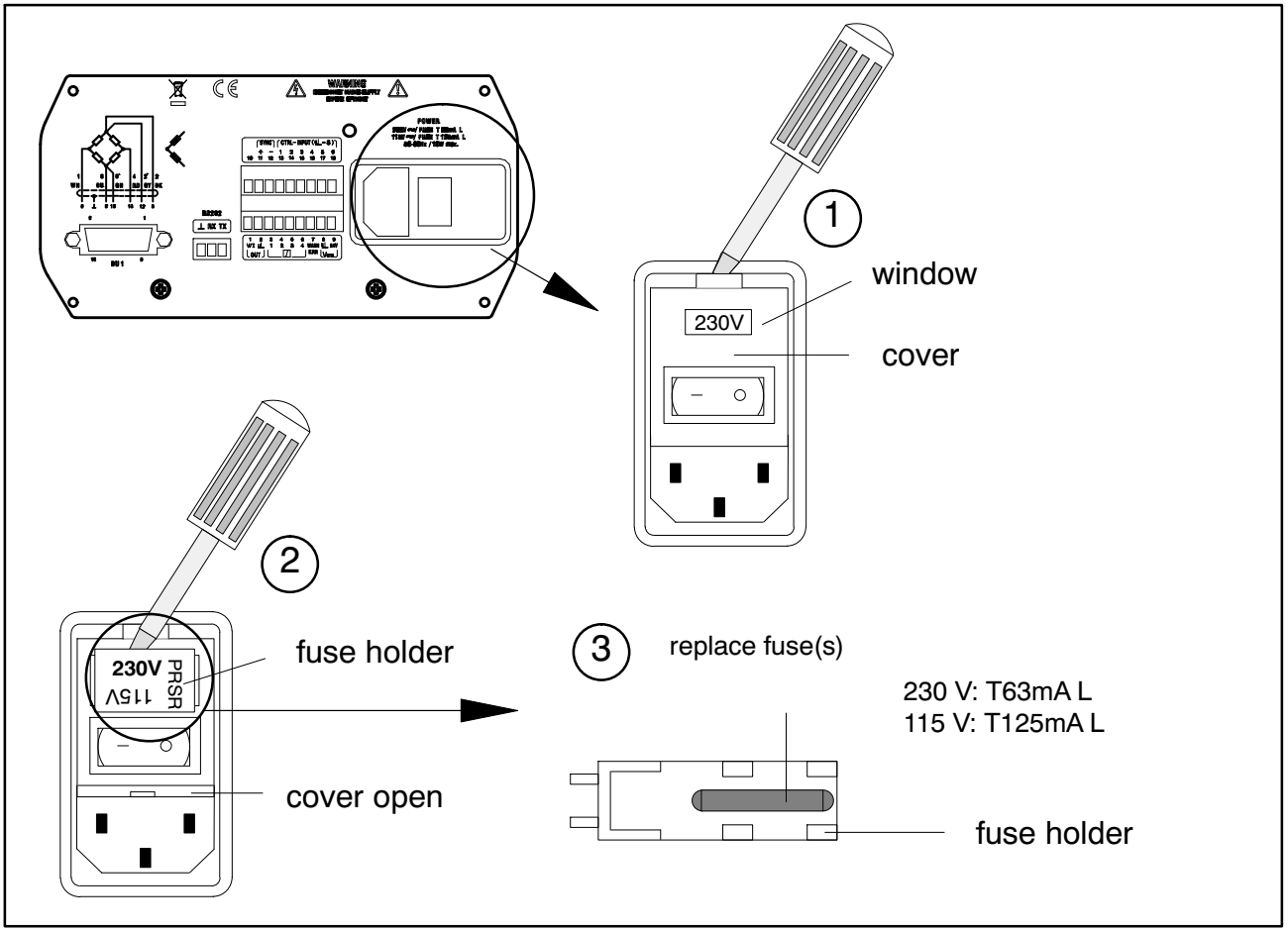


Fig. 2.3: Back of device: choosing mains voltage, replacing fuses

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

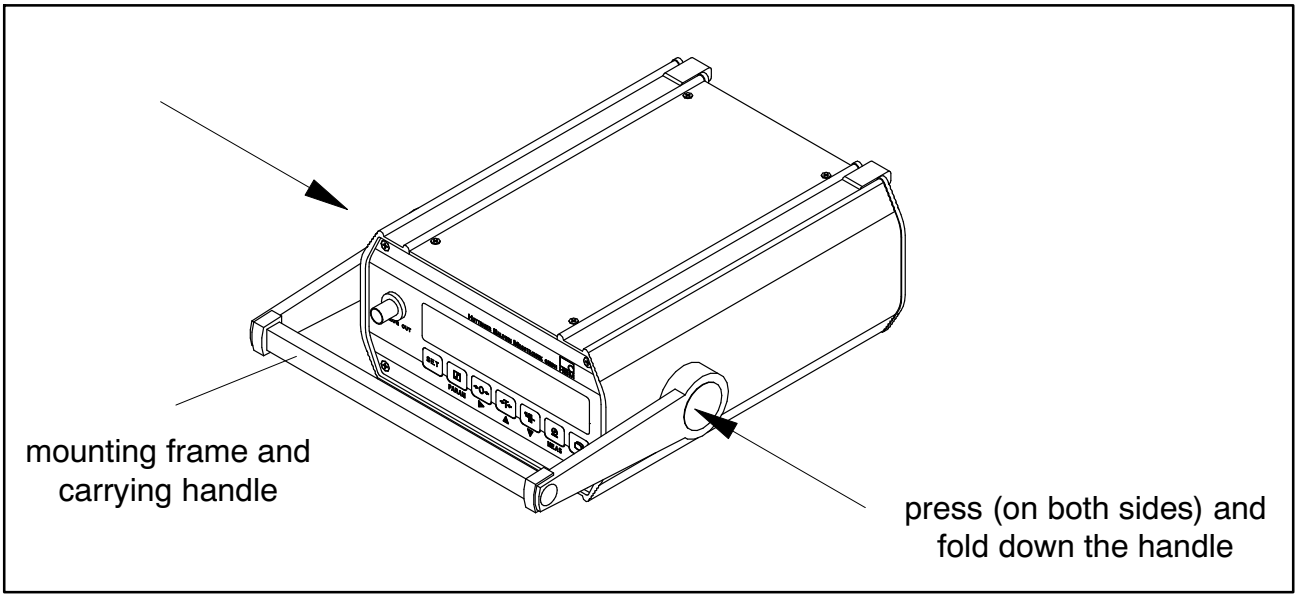


Fig. 2.4: SCOUT 55 mounting

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.

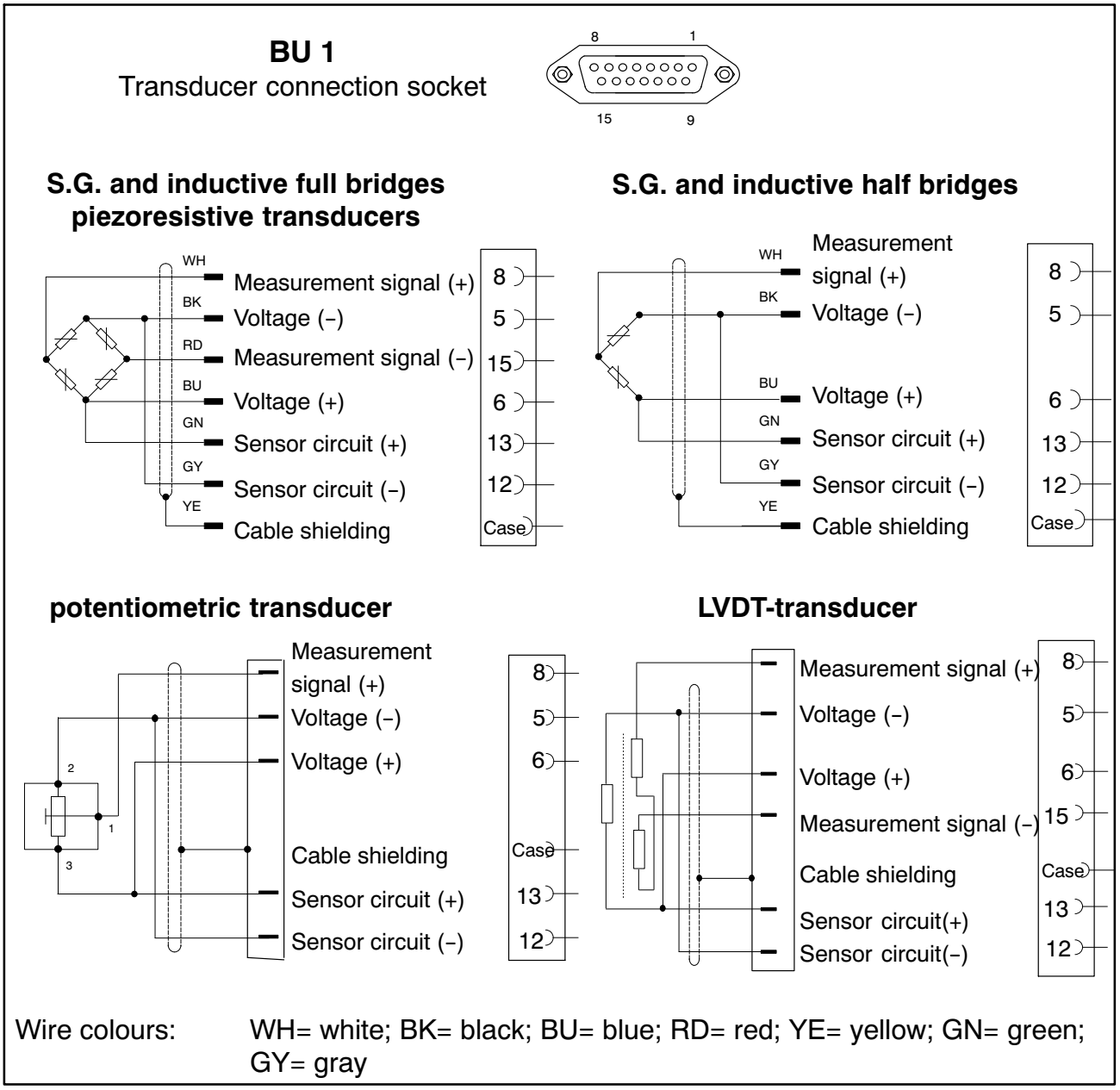


Fig. 2.5: Connecting various transducers

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).

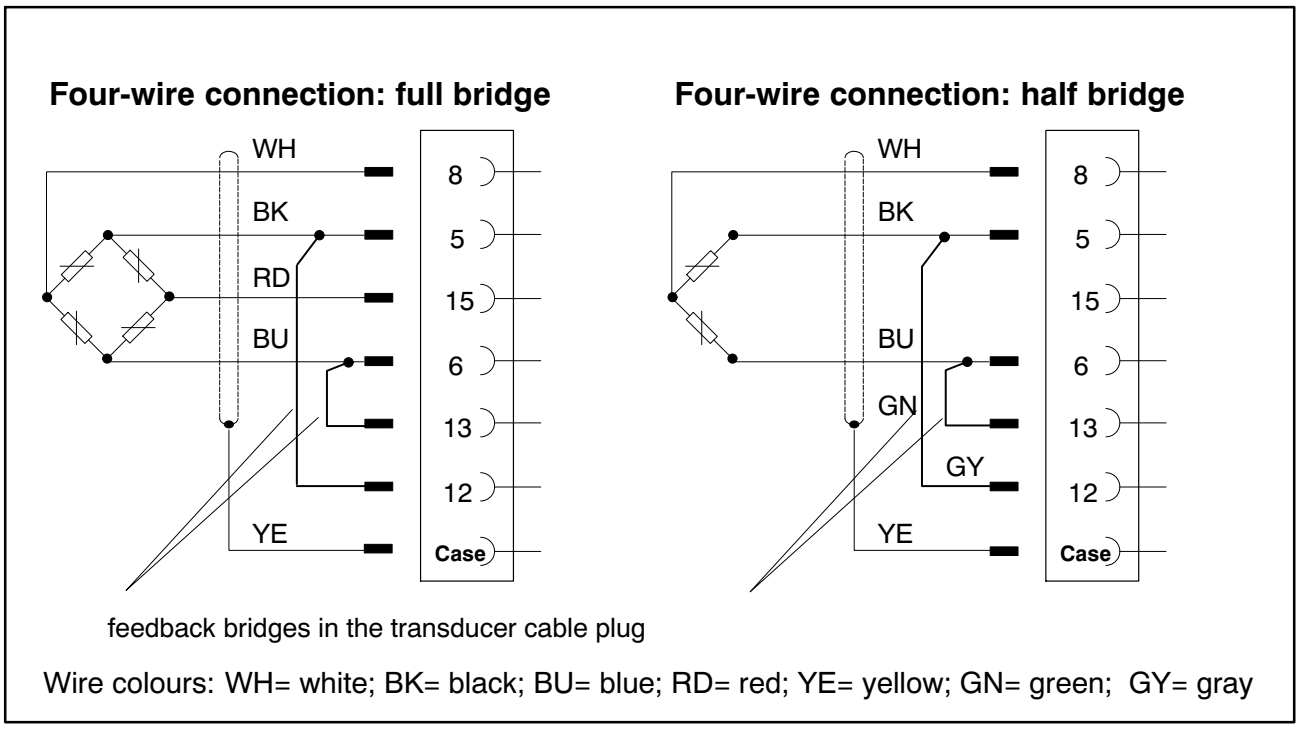


Fig. 2.6: Transducer connection in four-wire technique

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 (see http://www.hbm.com/Greenline). 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	Remote1 (...)
5	LIMITVAL.3	14	Remote2 (...)
6	LIMITVAL.4	15	Remote3 (...)
7	Warning	16	Remote4 (...)
8	Ground	17	Remote5 (...)
9	External supply voltage 24V=	18	Remote6 (...)

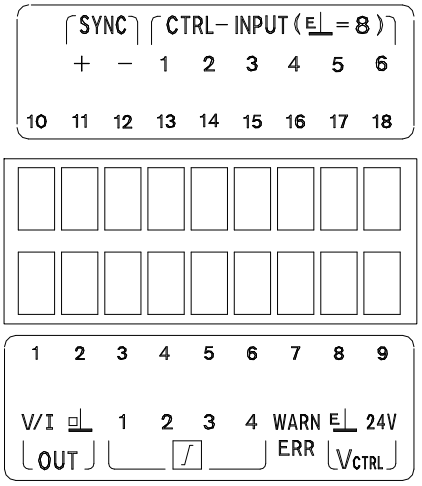


Fig. 2.7: Output pin assignment

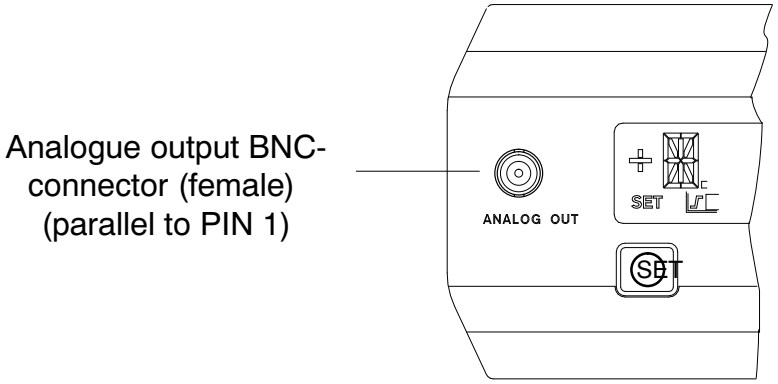


Fig. 2.8: BNC connector (female) on the front of the device

2.6 Control inputs / outputs

Input/ Output	Terminal	Function	
←	3	Output LIMITVAL. 1	For positive logic in acordance 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 remote1–6 (function selectable)	see table on Page 46
→	8	Ground	$V_{ext.}$ 0 V
→	9	External supply voltage	$V_{ext.}$ 24 V

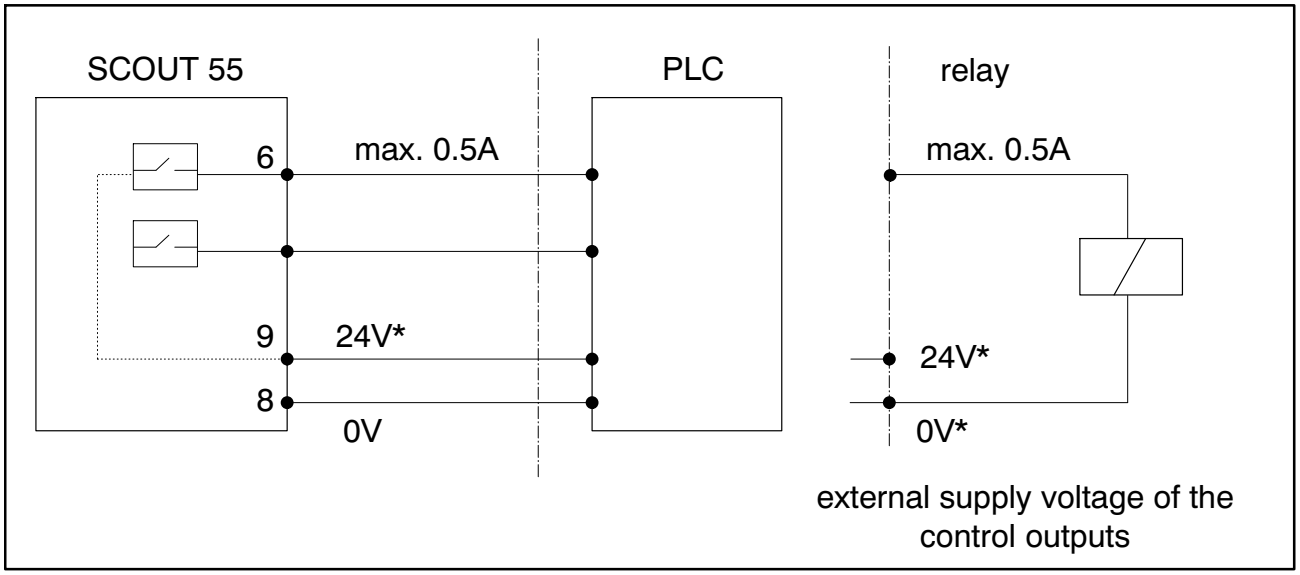


Fig. 2.9: Output assignments

* 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.

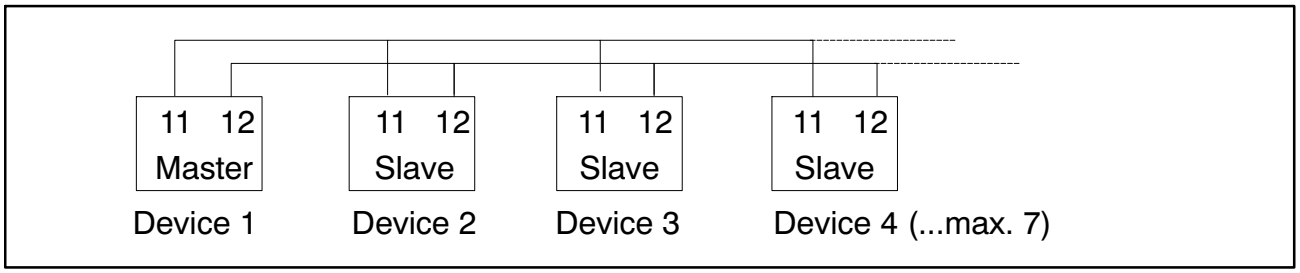
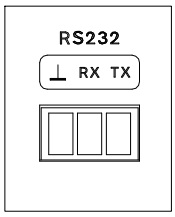


Fig. 2.10: Terminal connections for synchronisation

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:

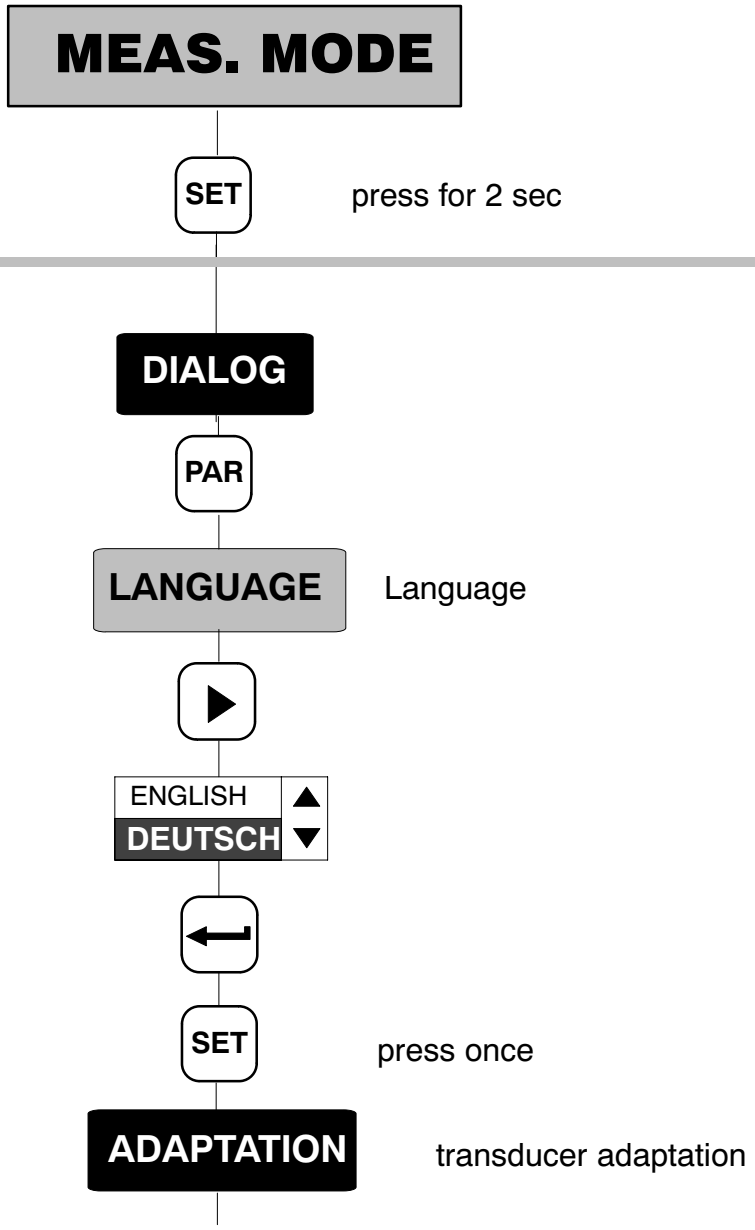
Adaptation:

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

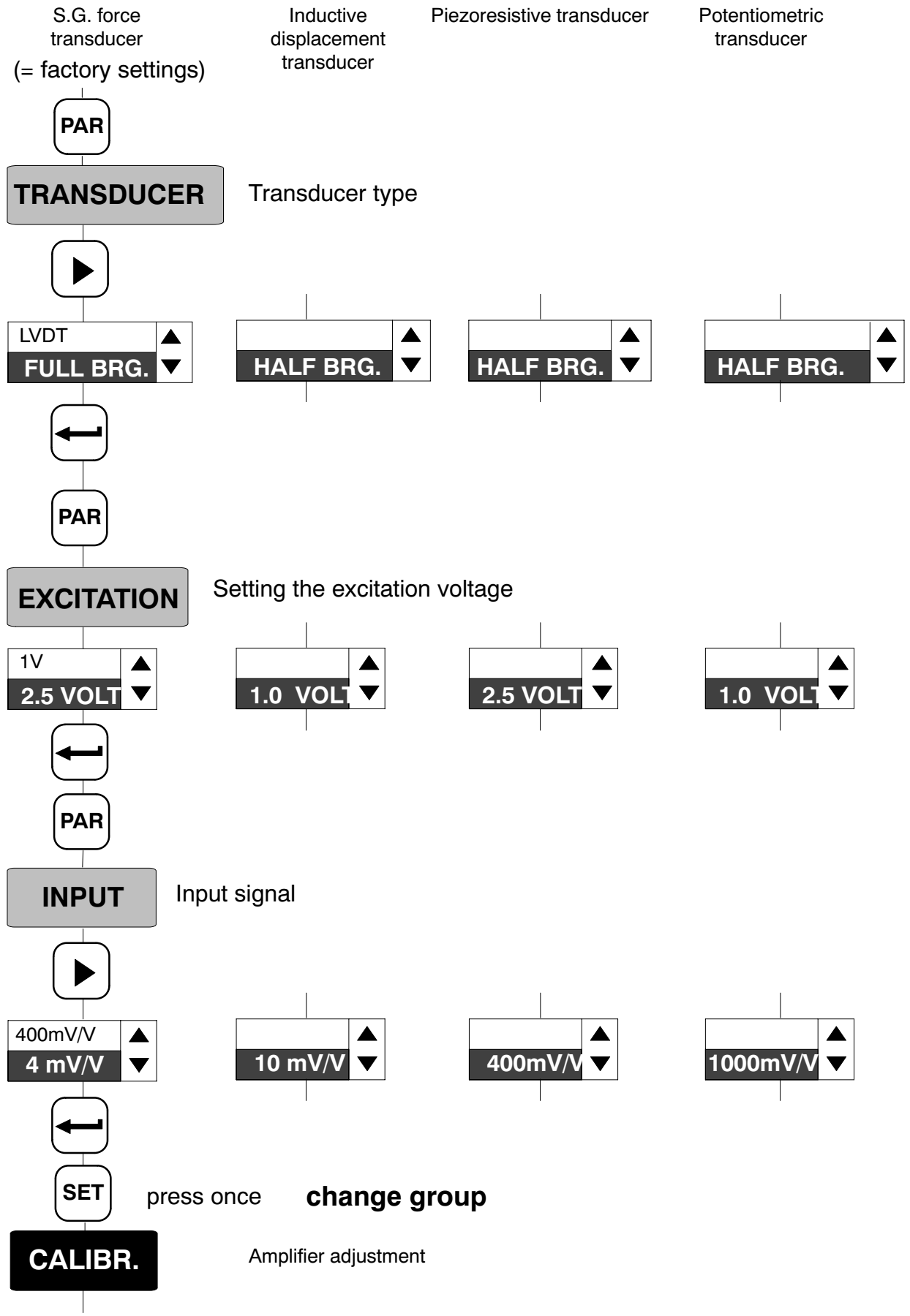
Calibration:

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

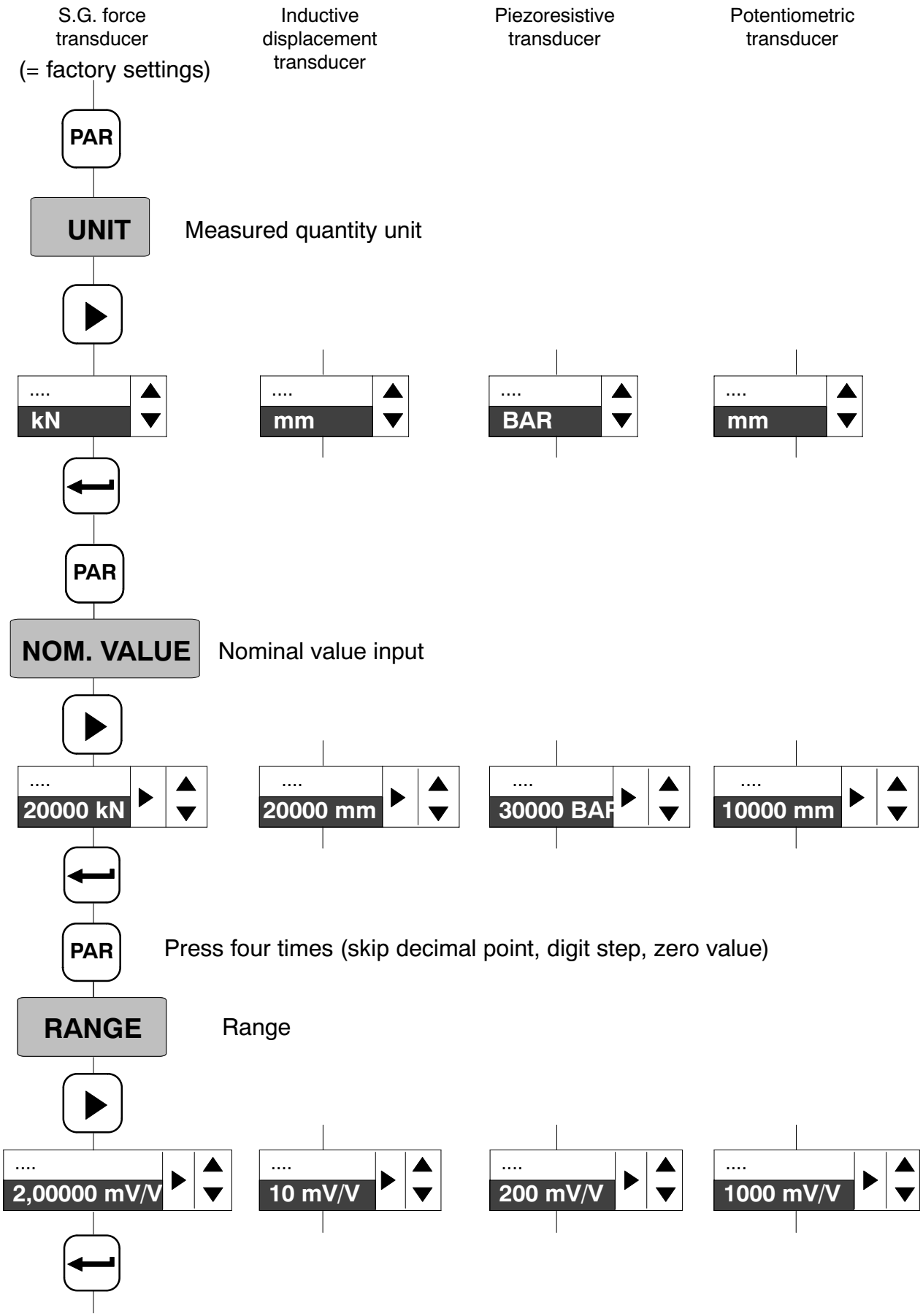
Key to symbols



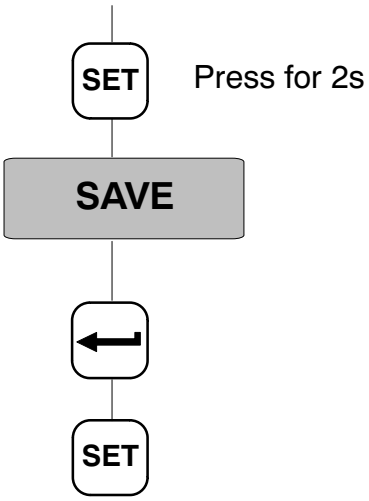
Continued on next page



Continued on next page


S.G. force transducer
(= factory settings)
Inductive displacement transducer
Piezoresistive transducer
Potentiometric transducer
PAR
UNIT
Measured quantity unit
.... kN
.... mm
.... BAR
.... mm
PAR
NOM. VALUE
Nominal value input
.... 20000 kN
.... 20000 mm
.... 30000 BAR
.... 10000 mm
PAR
Press four times (skip decimal point, digit step, zero value)
RANGE
Range
.... 2,00000 mV/V
.... 10 mV/V
.... 200 mV/V
.... 1000 mV/V

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.

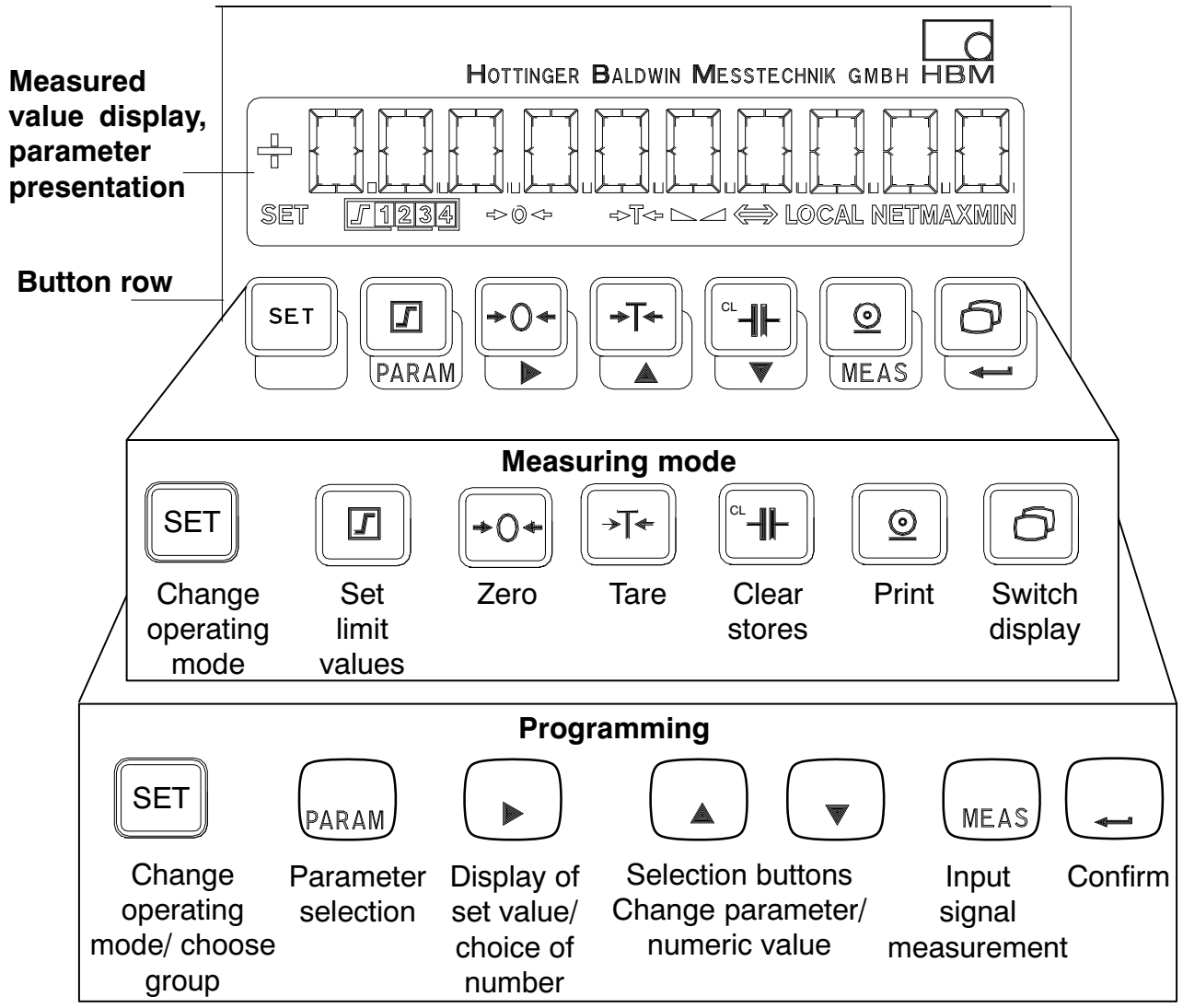
NOTE

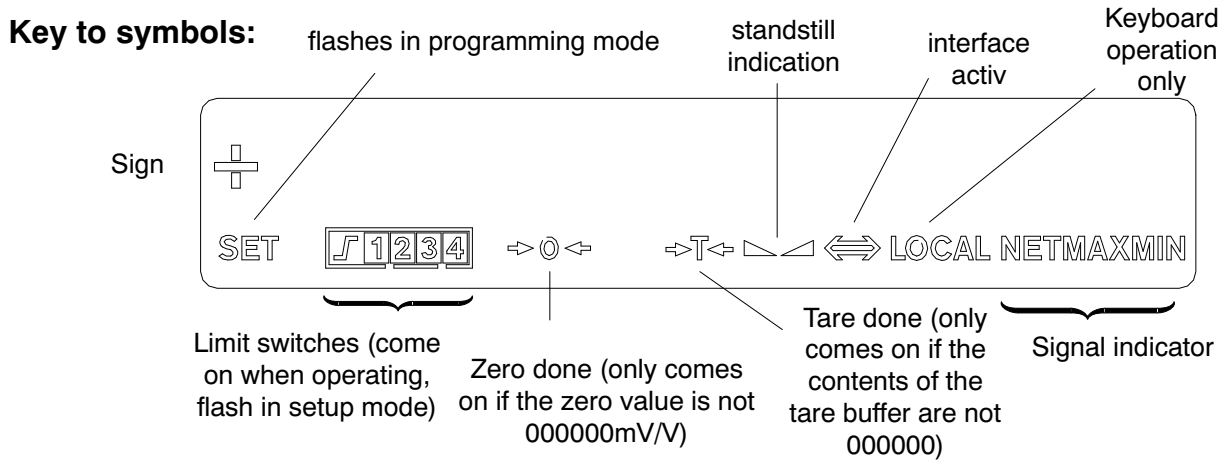
The settings are only power fail safe once they have been saved under one of the parameter sets.

3.2 Control concept and functional overview

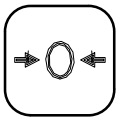
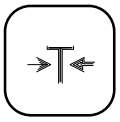
The control concept makes a distinction between two types of button functions:

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





3.3 Button functions in measuring mode

Key	Meaning
SET	Change from Measuring mode to Programming mode (and vice versa) by pressing **for approx. 2s**.
	Set the limit values LV1...4 (see from Page 41) 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 41).
	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 47. Only those parameters (PRINT xxx) selected in additional functions will be printed.
	Switches the measured value display between: 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

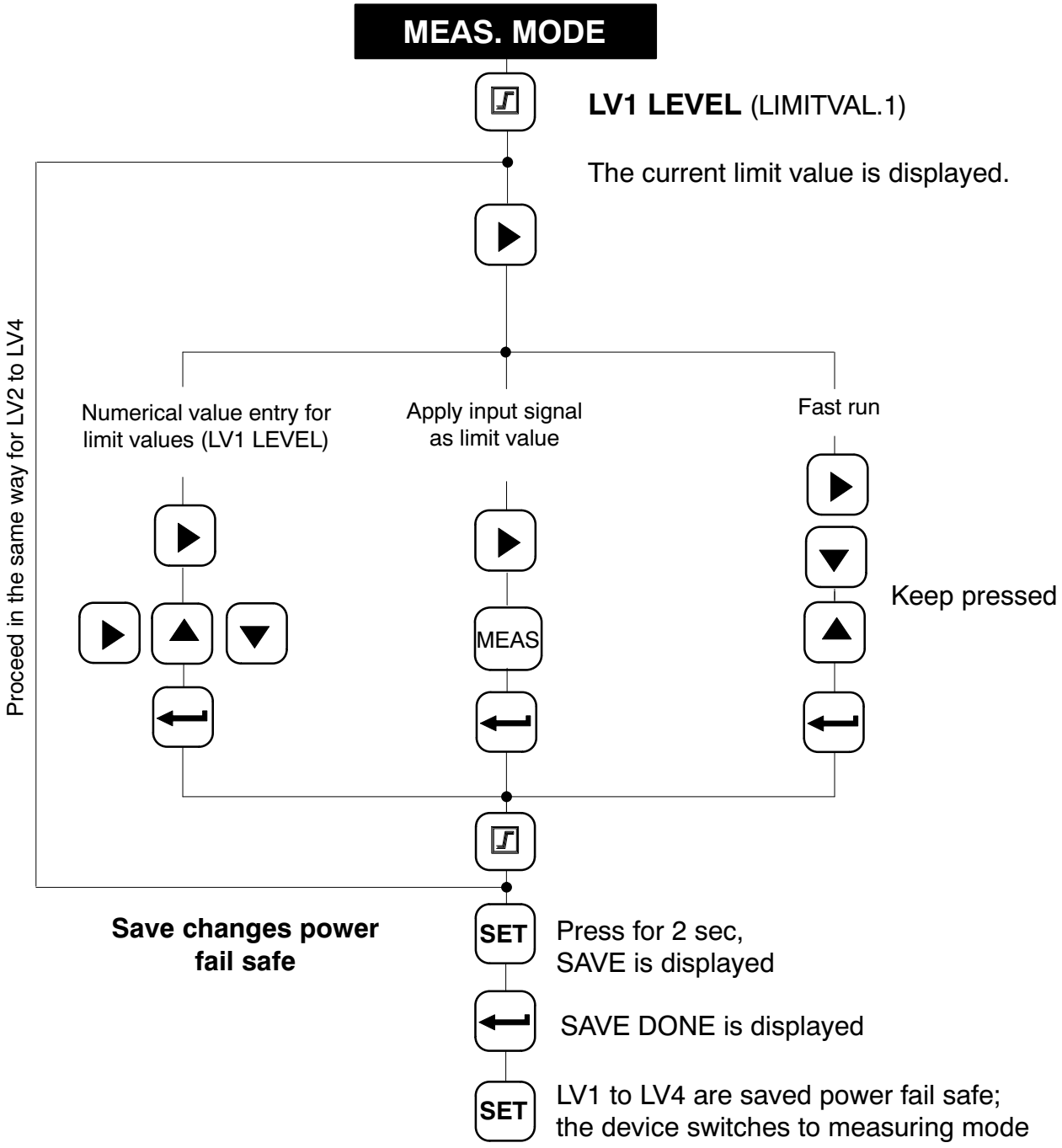
3.3.1 Querying and setting limit values in measuring mode

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)



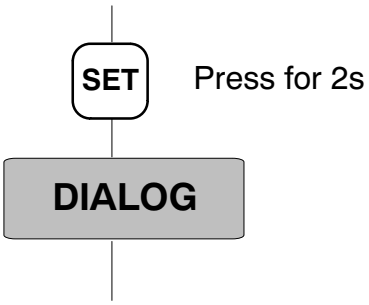
3.4 Button functions in programming mode

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:

SET	Change mode (press for 2 sec), select group (e.g. CALIBR.)
PAR	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.
MEAS	Apply measured value.
↵	Confirms input/modification

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



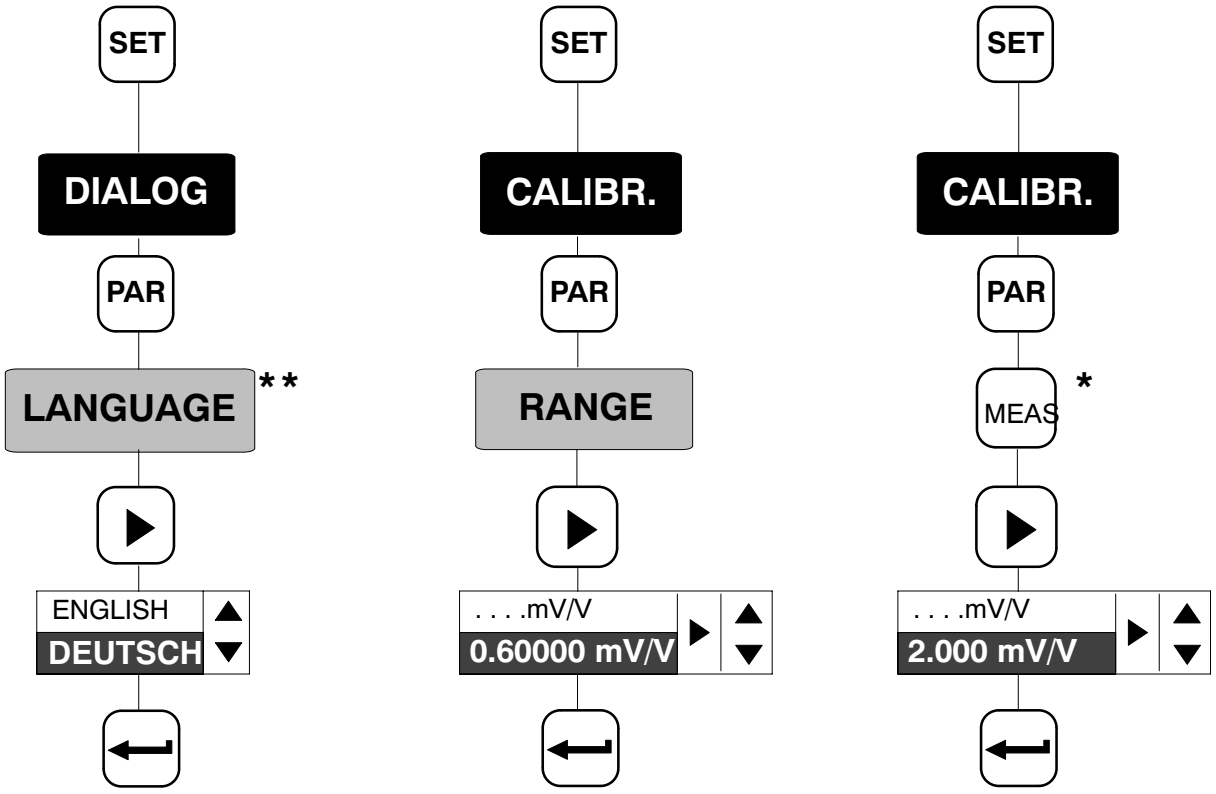
3.4.2 Programming

Typical programming mode operations

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

Entering a numerical value as a parameter (example CALIBR./ RANGE)

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

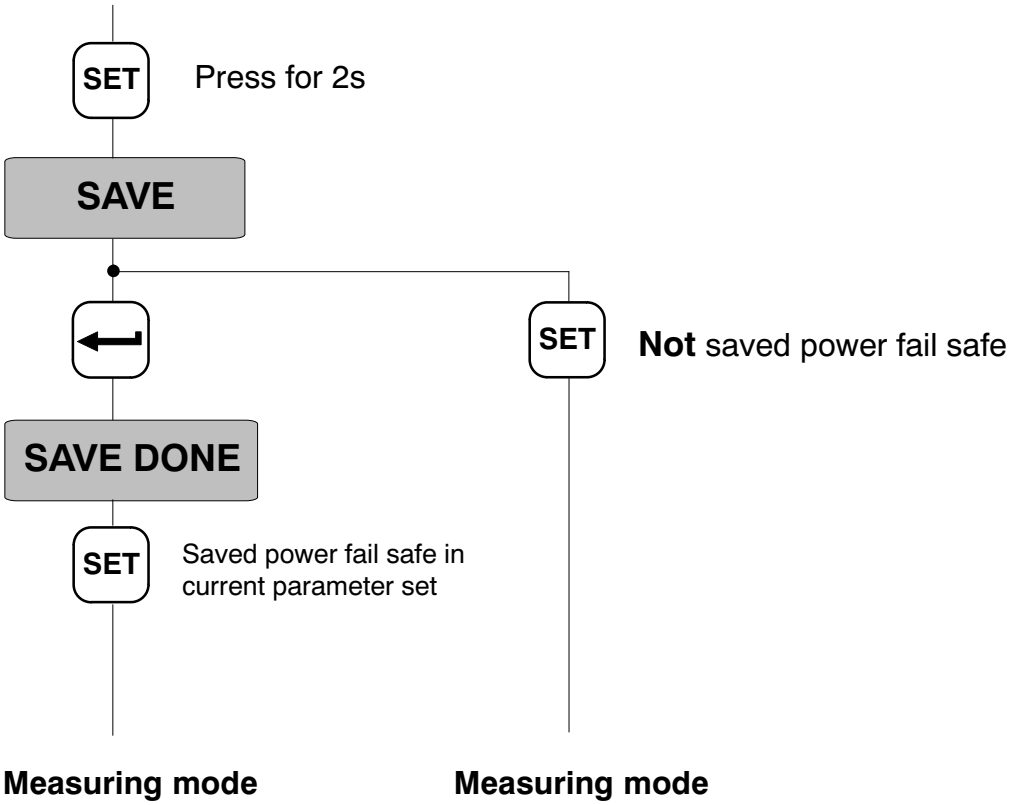


* Only possible when setting the zero value, the measuring range and the limit values

* * see page 37

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

PARAM

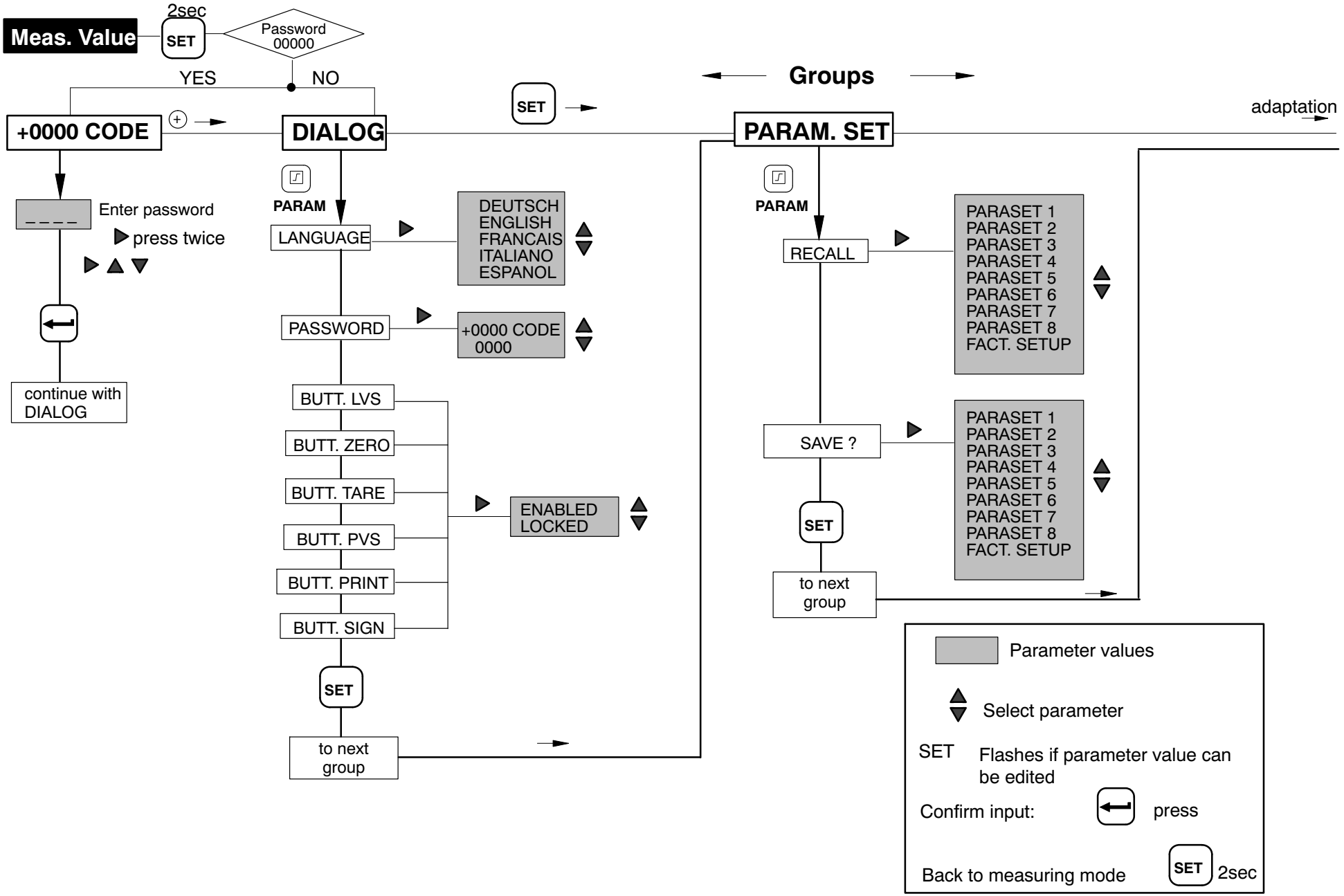
Parameters

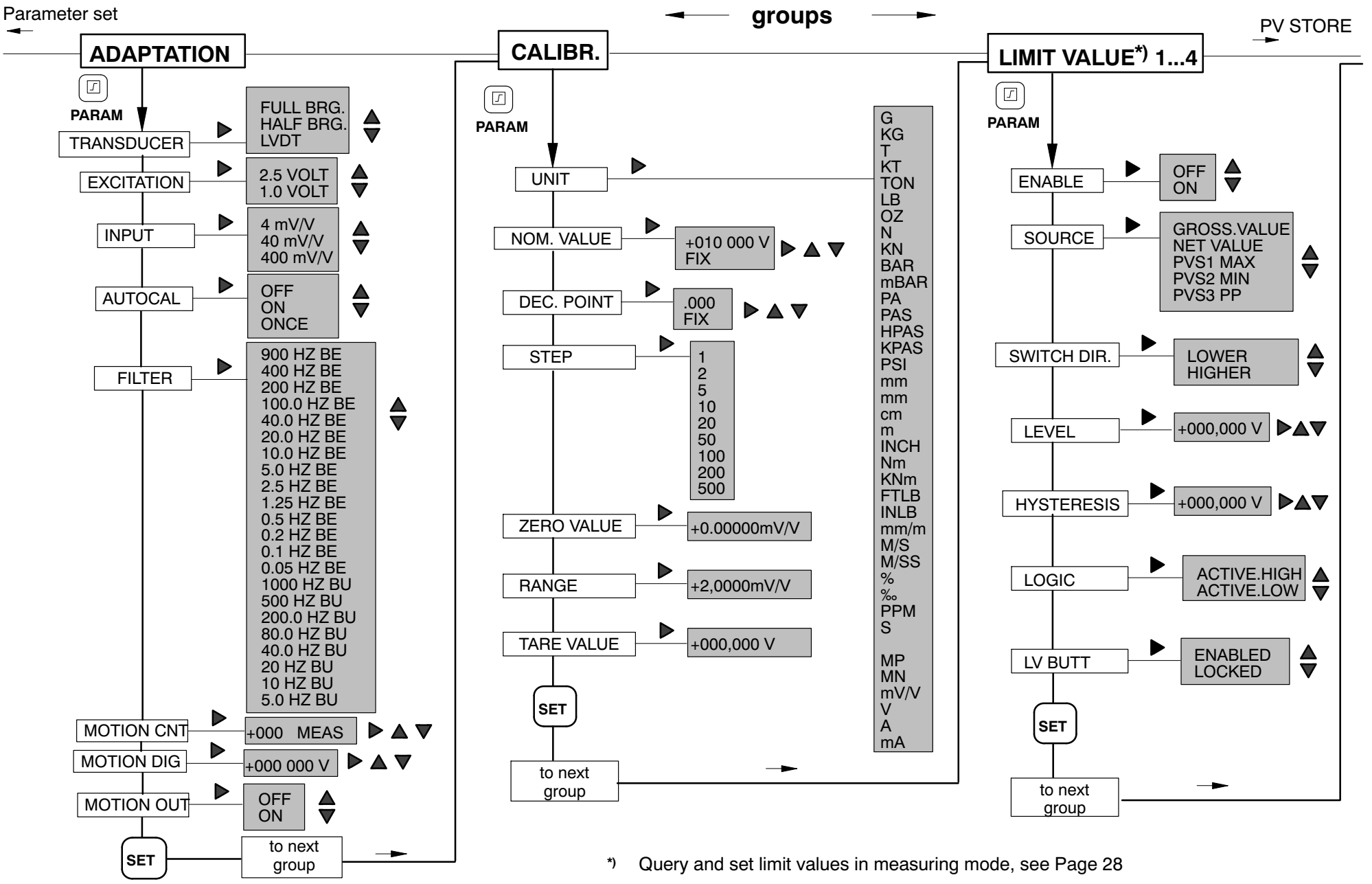
SET → **Groups**

DIALOG	PARAM. SET	ADAPTATION	CALIBR.	LIMITVAL.1...4	PV STORE	IN/OUT	ADD. FUNCT.
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
SET[1)]		**SET**				CONTACT 6	PRINT MAX
						REMOTE	PRINT MIN
						SET	PRINT PP
							PRINT LVS
							PRINT OVERL
							PRINT PAR.
							ZERO/TARE
							SET

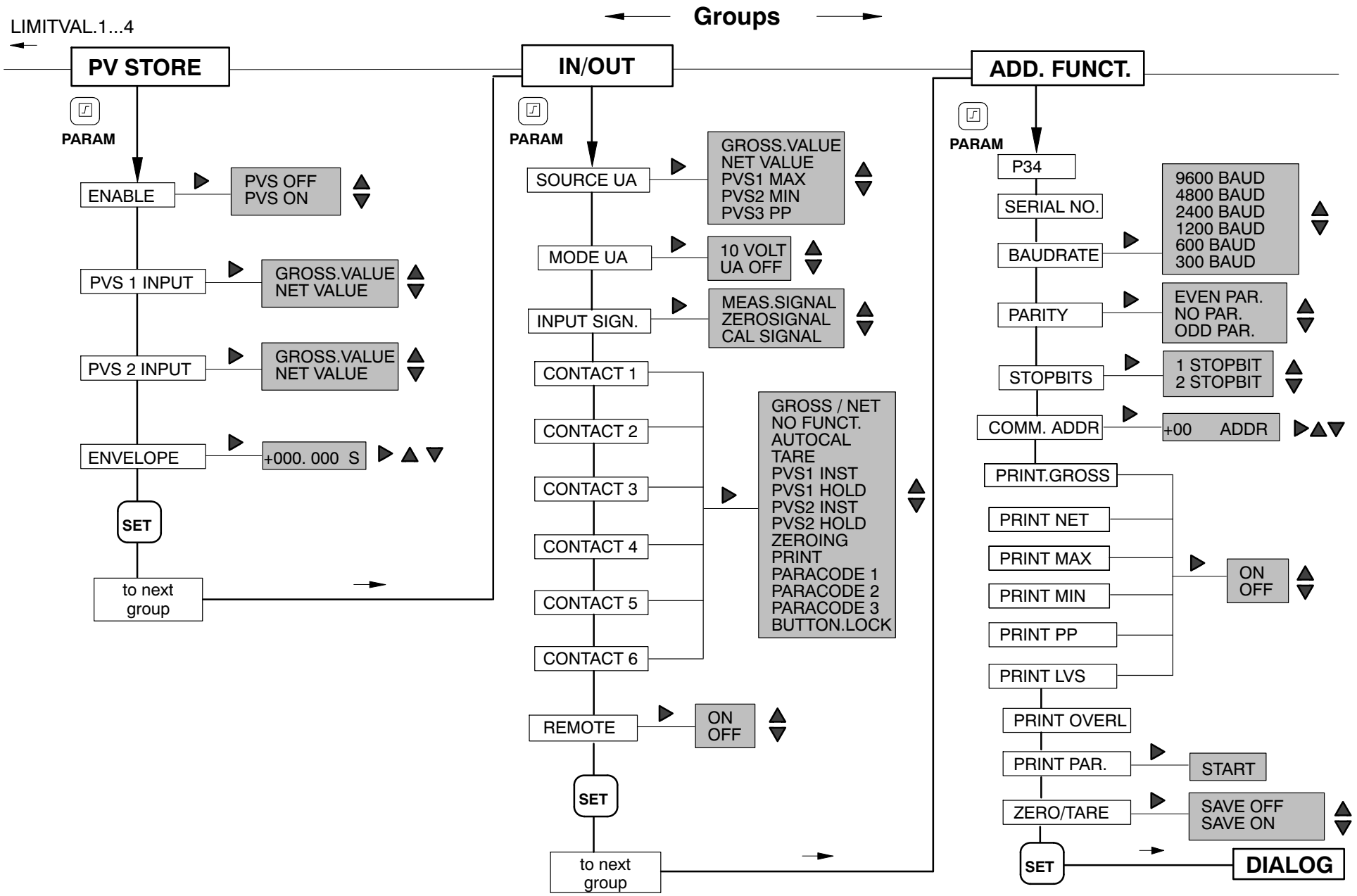
1) Use SET to next group

3.5.1 Setting all parameters





*) Query and set limit values in measuring mode, see Page 28


LIMITVAL.1...4
Groups
PV STORE
IN/OUT
ADD. FUNCT.
PARAM
ENABLE
PVS OFF
PVS ON
PVS 1 INPUT
GROSS.VALUE
NET VALUE
PVS 2 INPUT
GROSS.VALUE
NET VALUE
ENVELOPE
+000. 000 S
SET
to next group
SOURCE UA
GROSS.VALUE
NET VALUE
PVS1 MAX
PVS2 MIN
PVS3 PP
MODE UA
10 VOLT
UA OFF
INPUT SIGN.
MEAS.SIGNAL
ZEROSIGNAL
CAL SIGNAL
CONTACT 1
CONTACT 2
CONTACT 3
CONTACT 4
CONTACT 5
CONTACT 6
GROSS / NET
NO FUNCT.
AUTOCAL
TARE
PVS1 INST
PVS1 HOLD
PVS2 INST
PVS2 HOLD
ZEROING
PRINT
PARACODE 1
PARACODE 2
PARACODE 3
BUTTON.LOCK
REMOTE
ON
OFF
SET
to next group
P34
SERIAL NO.
BAUDRATE
9600 BAUD
4800 BAUD
2400 BAUD
1200 BAUD
600 BAUD
300 BAUD
PARITY
EVEN PAR.
NO PAR.
ODD PAR.
STOPBITS
1 STOPBIT
2 STOPBIT
COMM. ADDR
+00 ADDR
PRINT.GROSS
PRINT NET
PRINT MAX
PRINT MIN
PRINT PP
PRINT LVS
ON
OFF
PRINT OVERL
PRINT PAR.
START
ZERO/TARE
SAVE OFF
SAVE ON
SET
DIALOG

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	2400
0.2	75	20	2400
0.5	300	40	2400
1.25	600	80	2400
2.5	1200	200	2400
5.0	2400	500	2400
10	2400	1000	2400
20	2400		
40	2400		
100	2400		
200	2400		
400	2400		
900	2400		

*) 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 39).

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

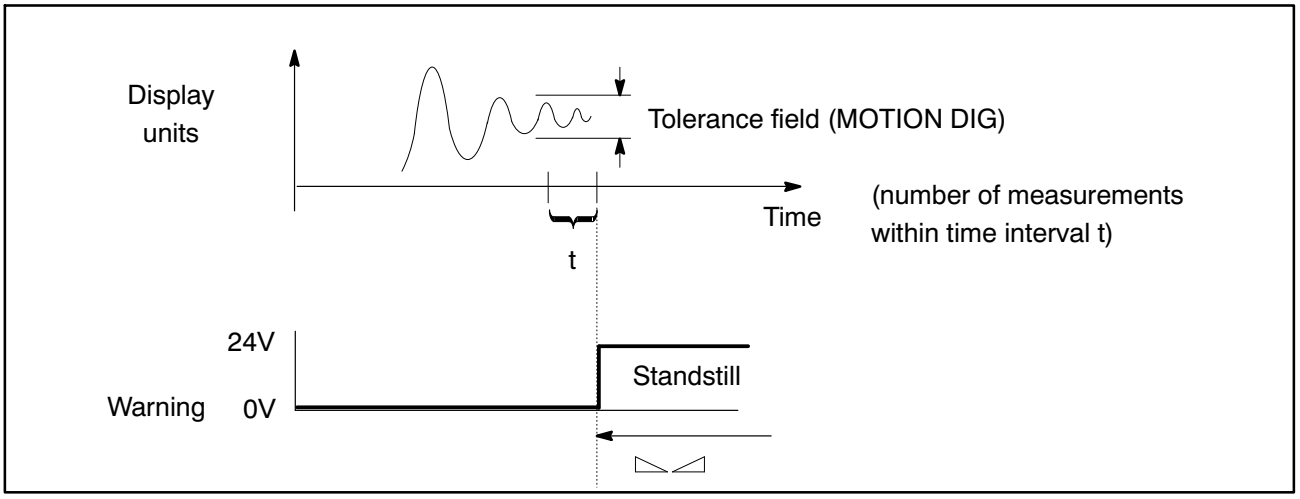


Fig. 3.1: Effect of the motion count

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:

a. You want to measure in a pressure range between 0 and 1000.00 bar.
   Enter nominal value: 100000

b. 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:

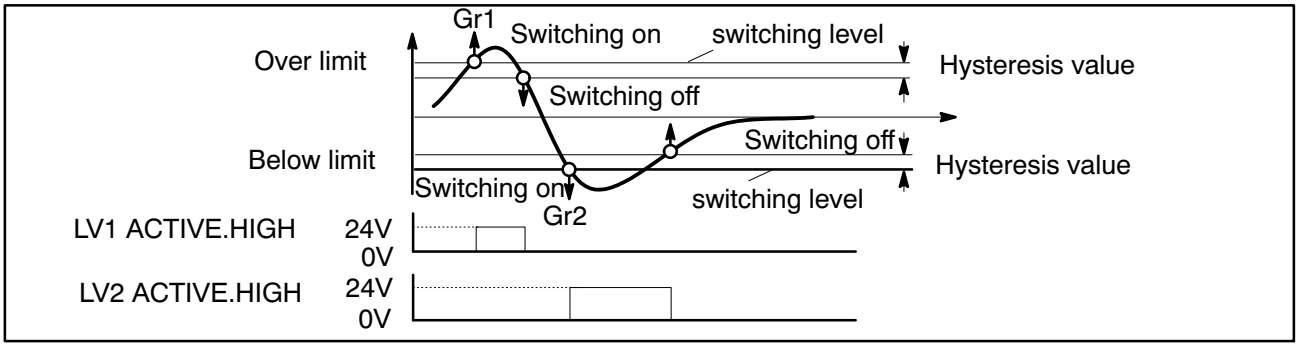


Fig. 3.2: Limit value functions and parameters

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  key 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 46).

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:

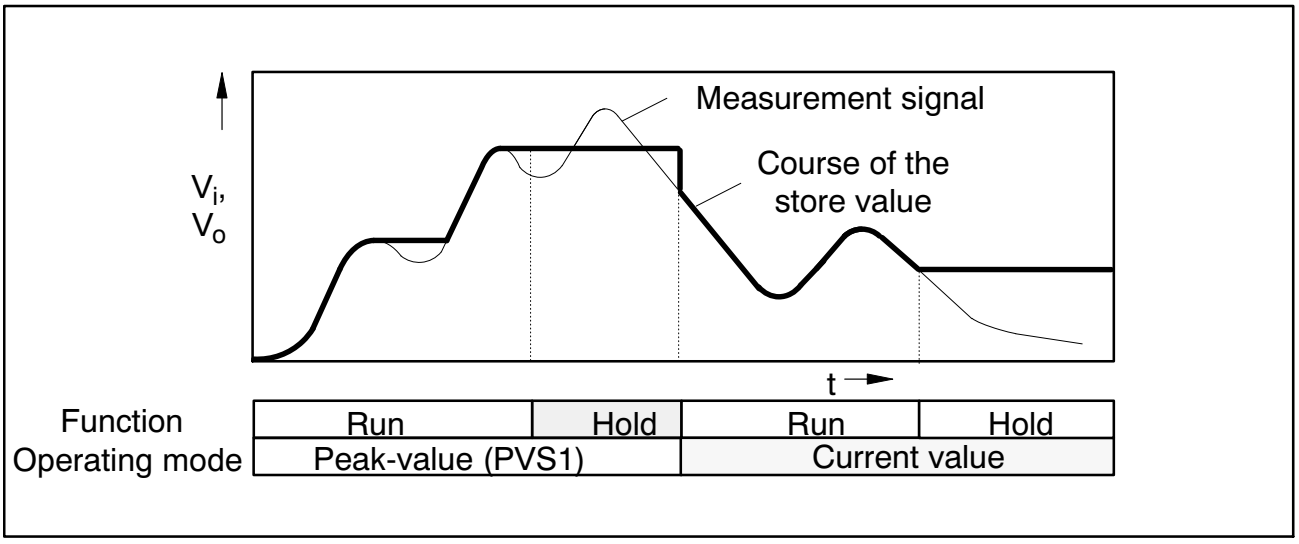


Fig. 3.3: Function of the remotes shown in the example of PVS1, peak value and instantaneous value storage (also applies to PVS2 and PVS3).

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.

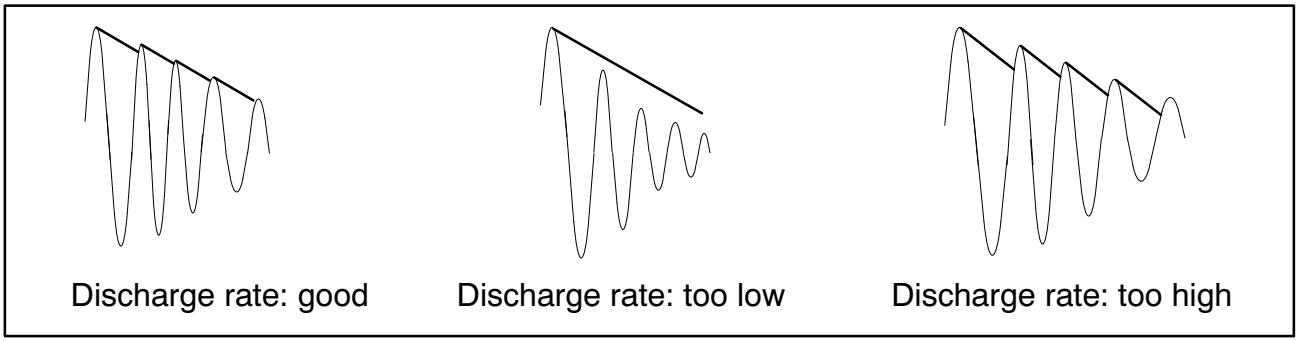


Fig. 3.4: Envelope function

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 46.

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.

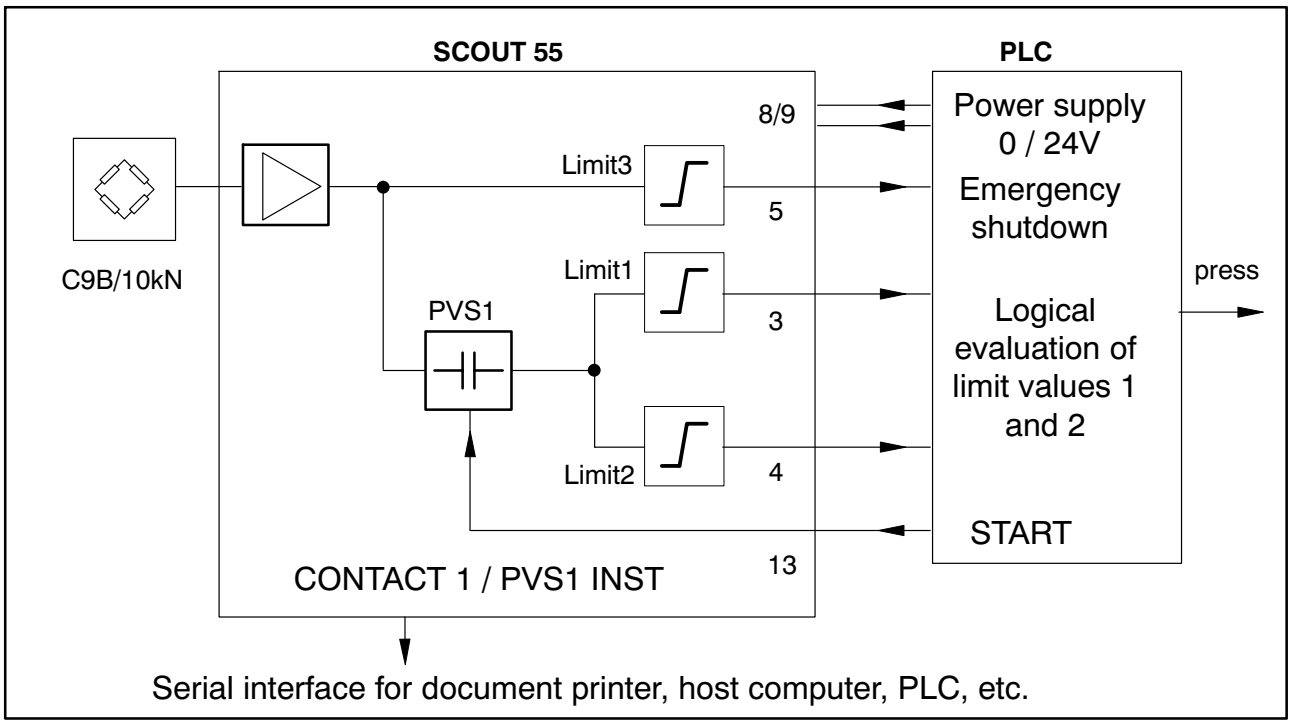
Problem definition:

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.

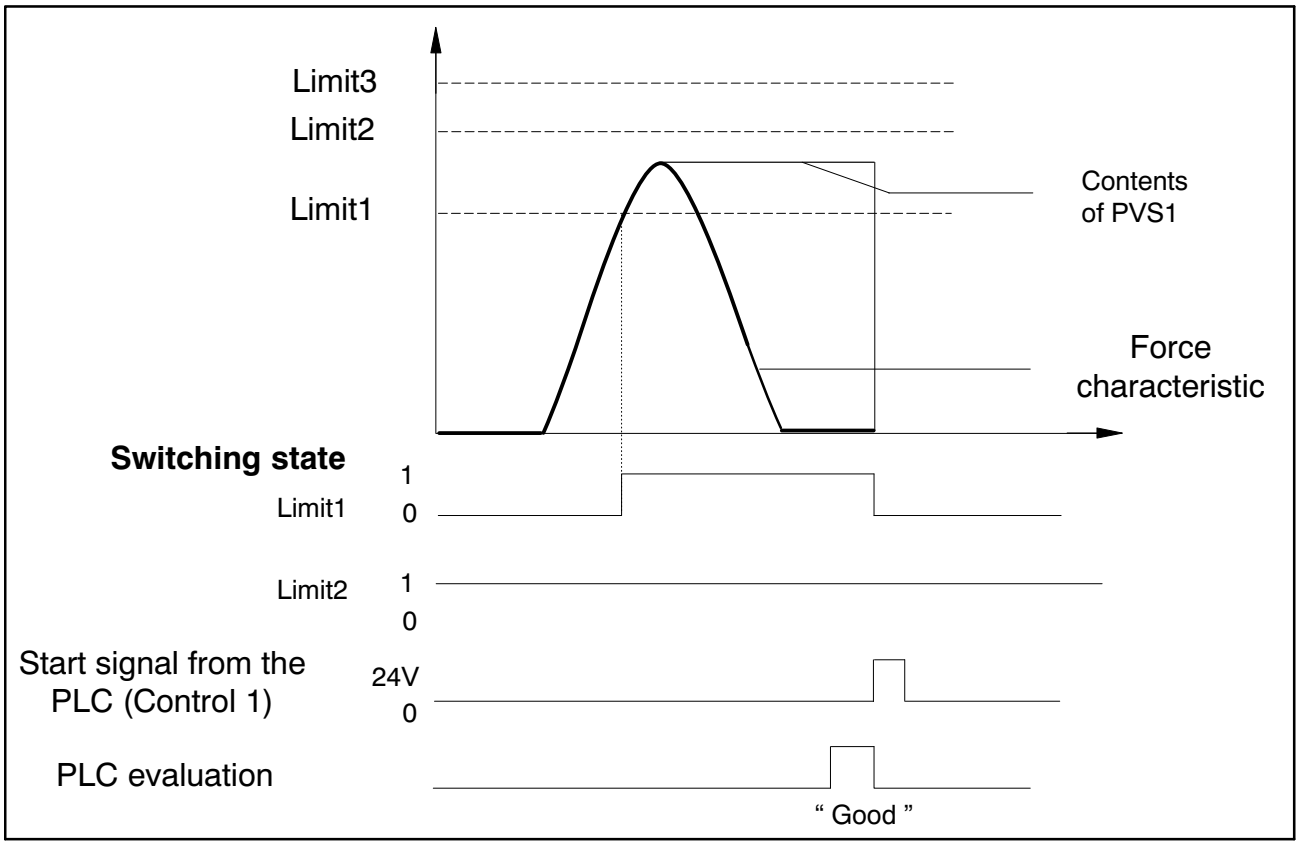
Solution:

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.

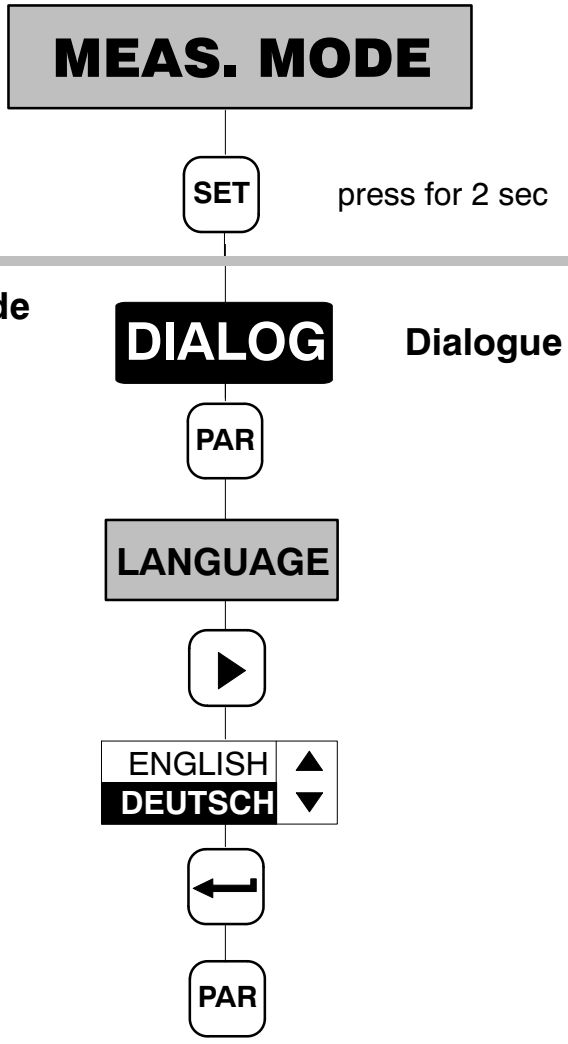
Limit2 — Checks whether the upper force limit has been reached. The input signal is the output of the peak value store (maximum value). If limit LV2 is exceeded, a Low signal is generated. A positive switch direction must be set with positive output logic.

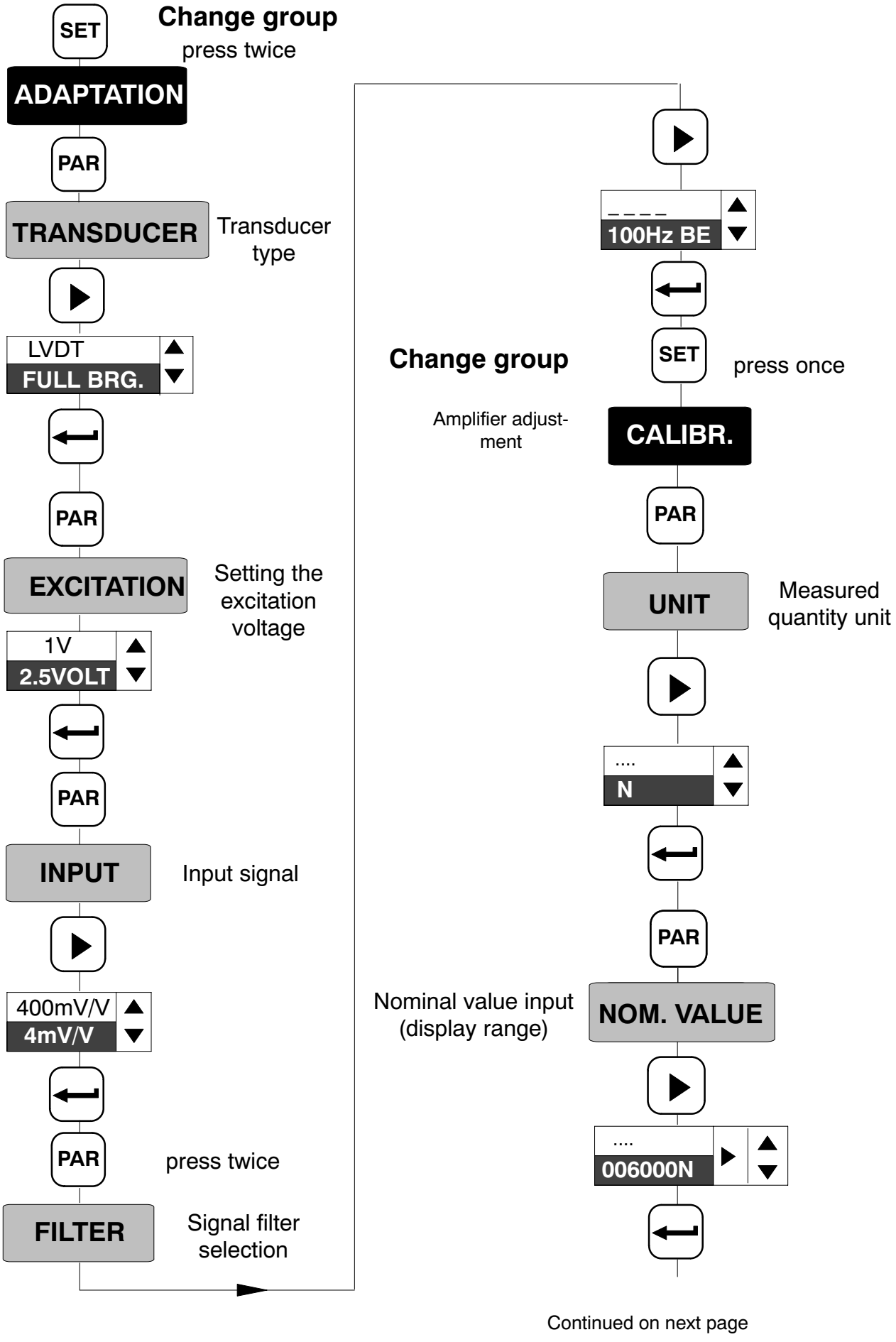
Limit3 — Checks whether the maximum load limit of the machine is exceeded (emergency shutdown function). The input signal is the gross measured value. If limit LV3 is exceeded, a High signal is generated. A positive switch direction must be set with positive output logic.

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.

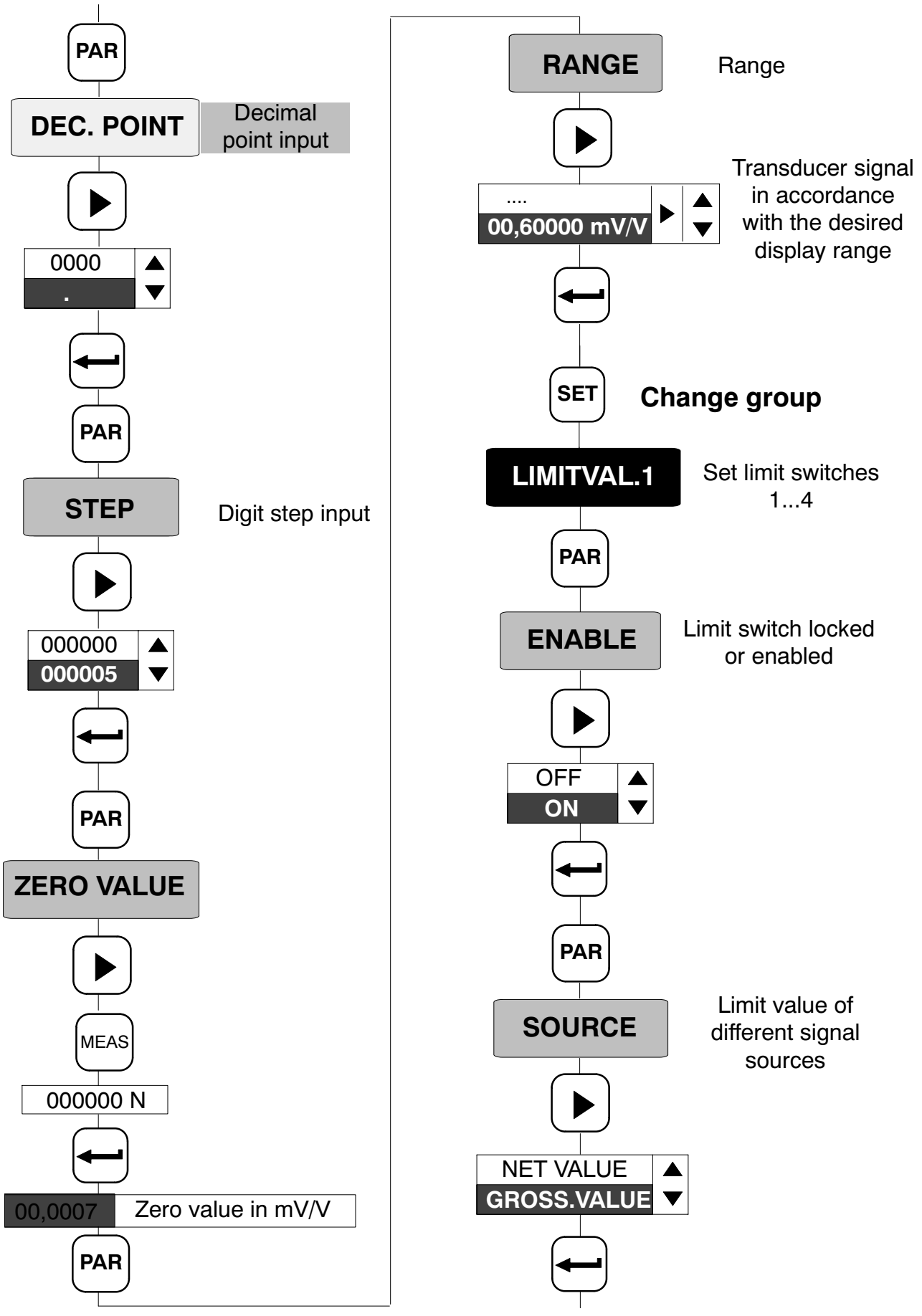
Remote 1 — Clears the contents of the peak value store. The function PVS1 INST must be selected. **The remote must be activated.**

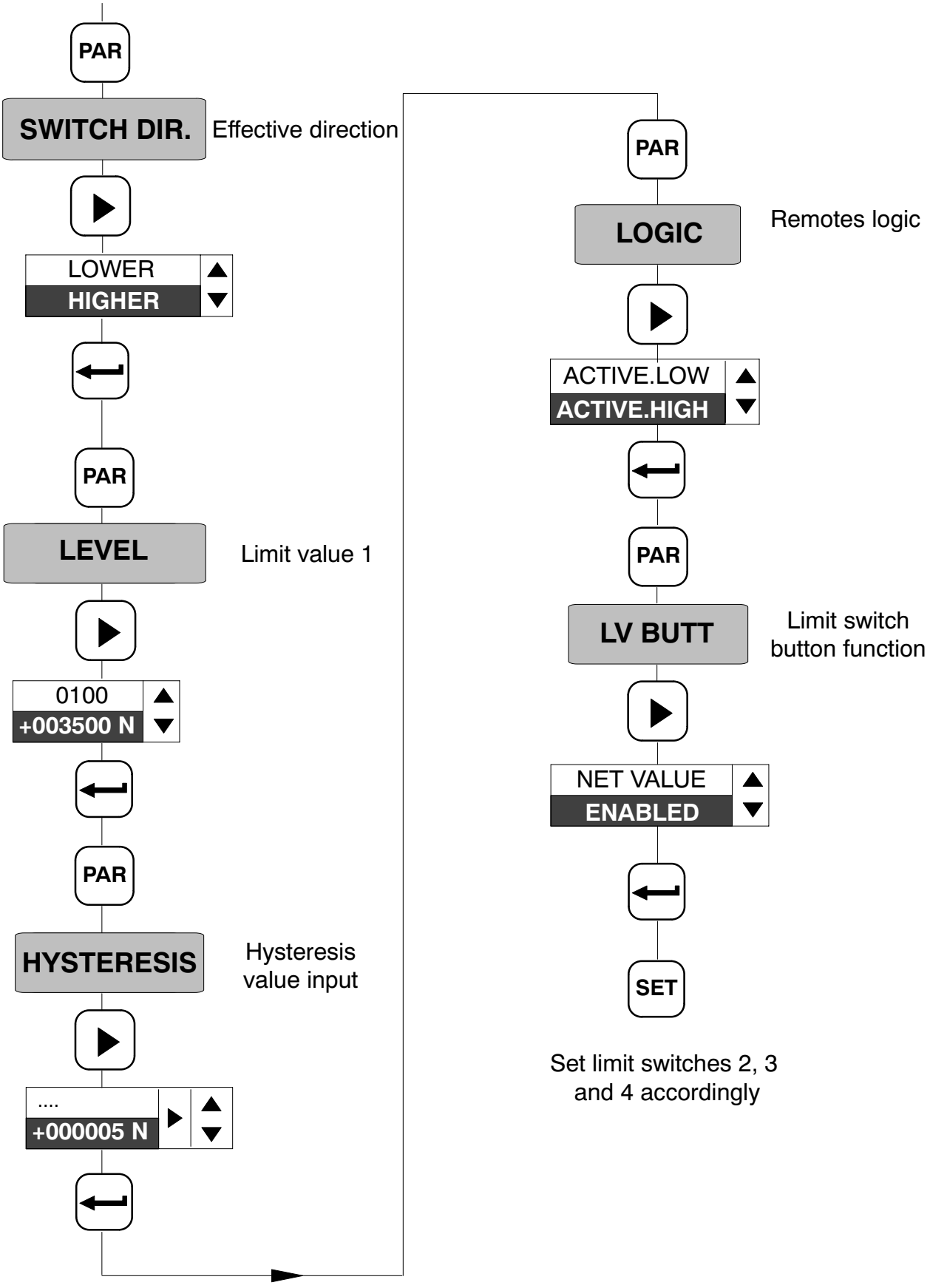
Key to symbols

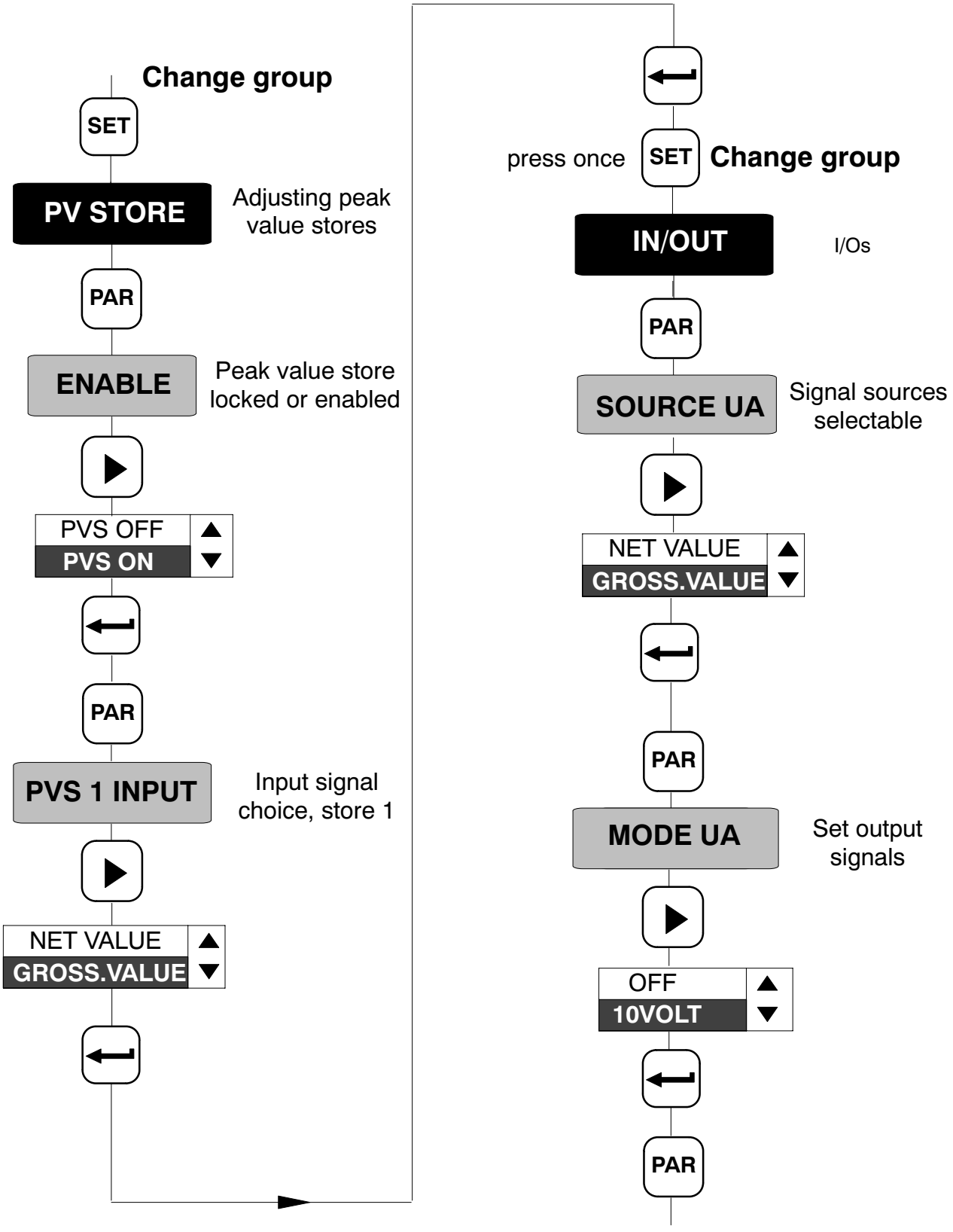


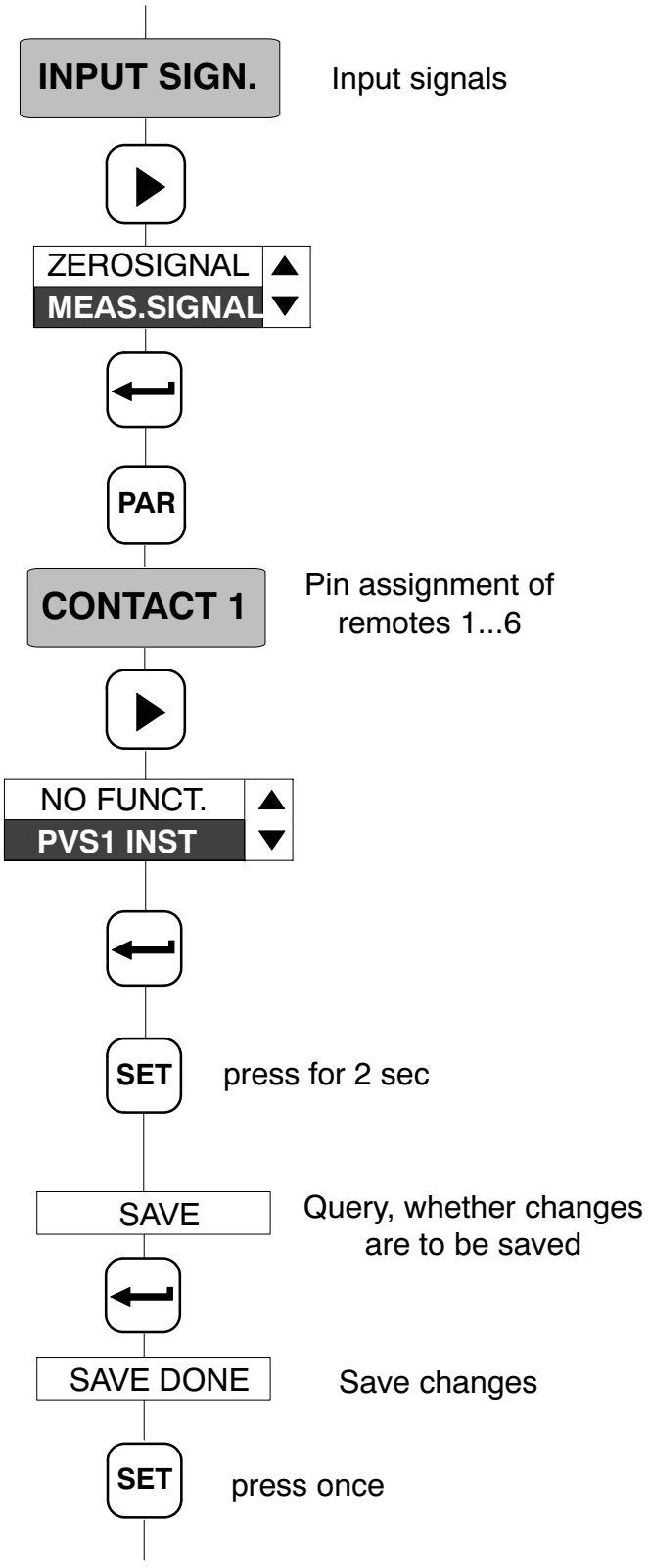


Continued on next page


PAR
DEC. POINT
Decimal point input
0000
.
PAR
STEP
Digit step input
000000
000005
PAR
ZERO VALUE
MEAS
000000 N
00,0007
Zero value in mV/V
PAR
RANGE
Range
....
00,60000 mV/V
Transducer signal in accordance with the desired display range
SET
Change group
LIMITVAL.1
Set limit switches 1...4
PAR
ENABLE
Limit switch locked or enabled
OFF
ON
PAR
SOURCE
Limit value of different signal sources
NET VALUE
GROSS.VALUE


PAR
SWITCH DIR.
Effective direction
LOWER
HIGHER
PAR
LEVEL
Limit value 1
0100
+003500 N
PAR
HYSTERESIS
Hysteresis value input
....
+000005 N
PAR
LOGIC
Remotes logic
ACTIVE.LOW
ACTIVE.HIGH
PAR
LV BUTT
Limit switch button function
NET VALUE
ENABLED
SET
Set limit switches 2, 3 and 4 accordingly


Change group
SET
PV STORE
Adjusting peak value stores
PAR
ENABLE
Peak value store locked or enabled
PVS OFF
PVS ON
PAR
PVS 1 INPUT
Input signal choice, store 1
NET VALUE
GROSS.VALUE
press once
SET
Change group
IN/OUT
I/Os
PAR
SOURCE UA
Signal sources selectable
NET VALUE
GROSS.VALUE
PAR
MODE UA
Set output signals
OFF
10VOLT
PAR



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 Index

P

R

S

T

V

Z

托驰（上海）工业传感器有限公司
上海市嘉定区华江路348号1号楼707室
电话：+86 021 51069888
传真：+86 021 51069009
邮箱：zhang@yanatoo.com
网址：www.sensor-hbm.com

7-2002.0674
A0236-6.1 en

measure and predict with confidence

HBM