Operating manual

Measuring amplifier for instrument panel mounting

MVD2555

A0104–6.0 en

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1 Safety instructions

Appropriate use

The MVD2555 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.

WARNING

Due to the fact that the device has not been equipped with a proper mains switch, the supply cable must not be connected directly to the mains. VDE guidelines require that the device can be disconnected from the mains via a switching device (double-break disconnector). It is essential that the disconnector is labeled accordingly and easy to access and operate by the user.

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.

Devices designed for panel mounting may only be operated in an EMC-tested control cabinet. (see page 16).

The device complies with the safety requirements of DIN EN 61010-part1 (VDE 0411-part1); protection class I.

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

The MVD2510 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.

Conditions on site

- Protect the device from direct contact with water.
- Protect the PMX system from moisture and humidity or weather conditions such as rain, snow, etc. The degree of protection per EN 60529 standard is IP 40 (device as a whole); IP51 (front, membrane keypad)
- Do not expose the device to direct sunlight.
- Please observe the permissible maximum ambient temperatures stated in the specifications.
- The permissible relative humidity at 31 °C is 95 % (non condensing); linear reduction to 50 % at 40 °C.
- It is safe to operate the MVD2555 system up to a height of 2000 m.
- Mounting in an EMC-tested control cabinet with line filter (see page 16).

Maintenance and cleaning

MVD2555 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.

Residual dangers

The MVD2555'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.

Product liability

In the following cases, the protection provided for the device may be adversely affected. Liability for device functionality then passes to the operator:

- The device is not used in accordance with the operating manual.
- The device is used outside the field of application described in this Chapter.
- The operator makes unauthorized changes to the device.

Warning signs and danger symbols

Important instructions for your safety are specifically identified. It is essential to follow these instructions in order to prevent accidents and damage to property.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type of danger

Consequences of non-compliance

Averting the danger

- **Warning sign:** draws your attention to the danger
- **Signal word:** indicates the severity of the danger (see table below)
- **Type of danger:** mentions the type or source of the danger
- **Consequences:** describes the consequences of non-compliance
- **Defense:** indicates how the danger can be avoided/bypassed

Danger class according to ANSI

Warning sign, signal word	Significance
WARNING	This marking warns of a *potentially* dangerous situation in which failure to comply with safety requirements *can* **result in death or serious physical injury.**
CAUTION	This marking warns of a *potentially* dangerous situation in which failure to comply with safety requirements *can* **result in slight or moderate physical injury.**
NOTE	This marking draws your attention to a situation in which failure to comply with safety requirements *could* **lead to damage to property**.

On the module

Meaning: **Take details in the operating manual into account**

On the module

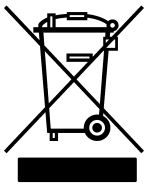
Meaning: **Disconnect mains supply before opening**

CE

On the module

Meaning: **CE mark**

The CE mark is used by the manufacturer to declare that the product complies with the requirements of the relevant EC directives (the Declaration of Conformity can be found at http://www.hbm.com/HBMdoc).



On the module

Meaning : **Statutory waste disposal mark**

The electrical and electronic devices that bear this symbol are subject to the European Waste Electrical and Electronic Equipment Directive 2002/96/EC.

The symbol indicates that the device must not be disposed of as household garbage.

In accordance with national and local environmental protection and material recovery and recycling regulations, old modules that can no longer be used must be disposed of separately and not with normal household garbage.

If you need more information about waste disposal, please contact your local authorities or the dealer from whom you purchased the product.

As waste disposal regulations within the EU may differ from country to country, we ask that you contact your supplier as necessary.

Working safely

Note

Due to the fact that the device has not been equipped with a proper mains switch, the supply cable must not be connected directly to the mains. VDE guidelines require that the device can be disconnected from the mains via a switching device (double-break disconnector). It is essential that the disconnector is labeled accordingly and easy to access and operate by the user.

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.

Reconstruction and modifications

HBM's express consent is required for modifications regarding the MVD2555'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

Qualified personnel means persons entrusted with siting, mounting, starting up and operating the product, who possess the appropriate qualifications for their function (qualified electrician, or by someone with electrical training under the supervision of a qualified electrician).

This device is only to be installed and used by qualified personnel strictly in accordance with the specifications and with the safety rules and regulations which follow.

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.

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.

Important

The safety instructions are also included in paper format with the product ("Documentation and Safety instructions PMX" A3260-2.0).

2 Introduction

2.1 Scope of supply

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

2.2 General

The panel–frame measuring amplifier MVD2555 for instrument panel mounting (in accordance with DIN43700) is suitable for recording and processing measured values from passive transducers in the industrial test bench engineering sector and for monitoring production processes.

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
- Touch–sensitive keypad control; individual buttons can be locked
- 2 peak value stores for maximum and minimum values, as well as envelope and instantaneous value
- 4 limit switches
- RS232 **or** RS485 serial interface for connecting a computer or a printer
- Parameter memory for saving up to 8 data sets
- Control inputs and outputs (potential–separated through optical couplers)
- The MVD 2555-RS485 version can be operated together with other MVD2555s (at a common RS485 bus)

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 MVD2555 by Computer**” .

2.3 Block diagram

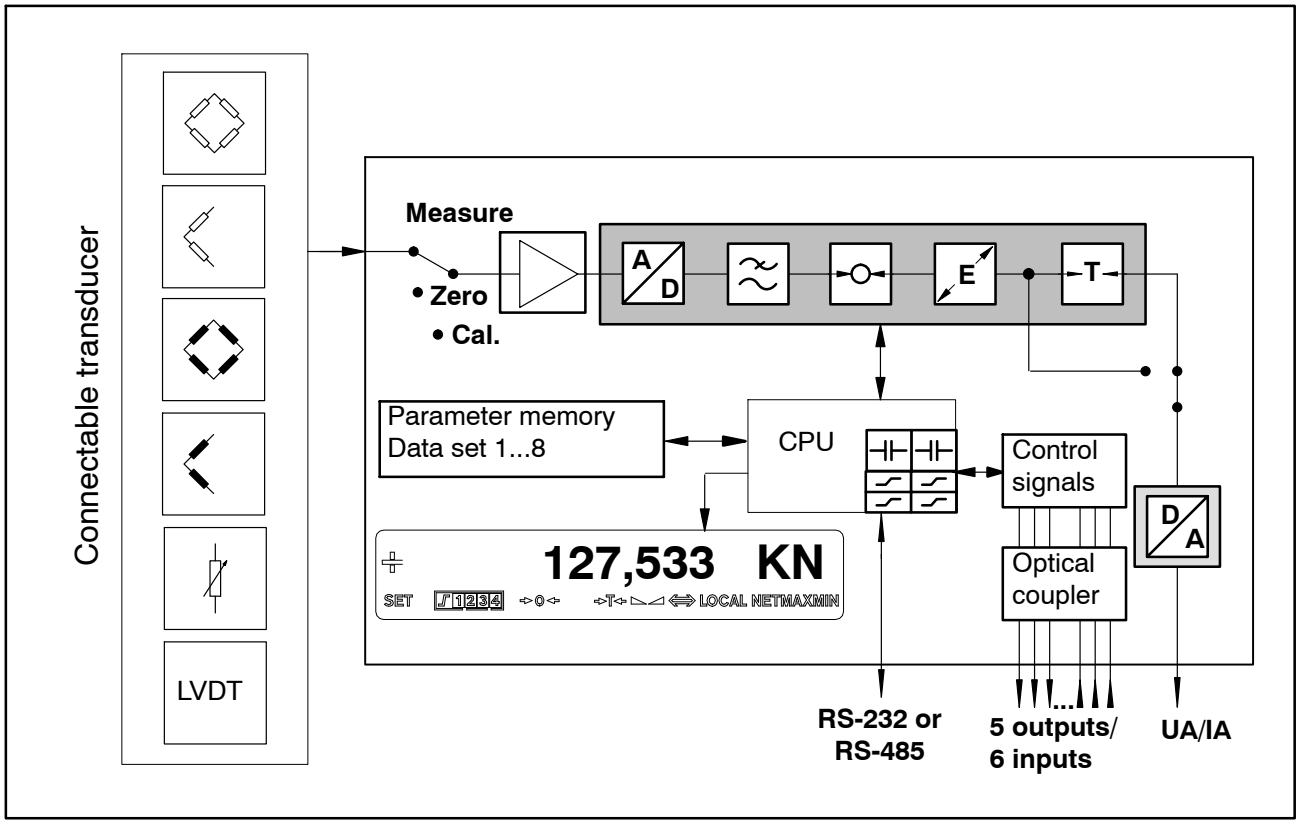


Fig. 2.1 MVD2555 block diagram

3 Mounting

3.1 Pre-installation notes, factory settings

Before installing the device, check the parameters set at the factory, as the elements for selecting the analogue output signal (current/voltage output) and for setting synchronization, are located on the motherboard.

Important

The device must be mounted in an EMC-tested control cabinet with line filter (see page 16).

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
- Synchronization: Master

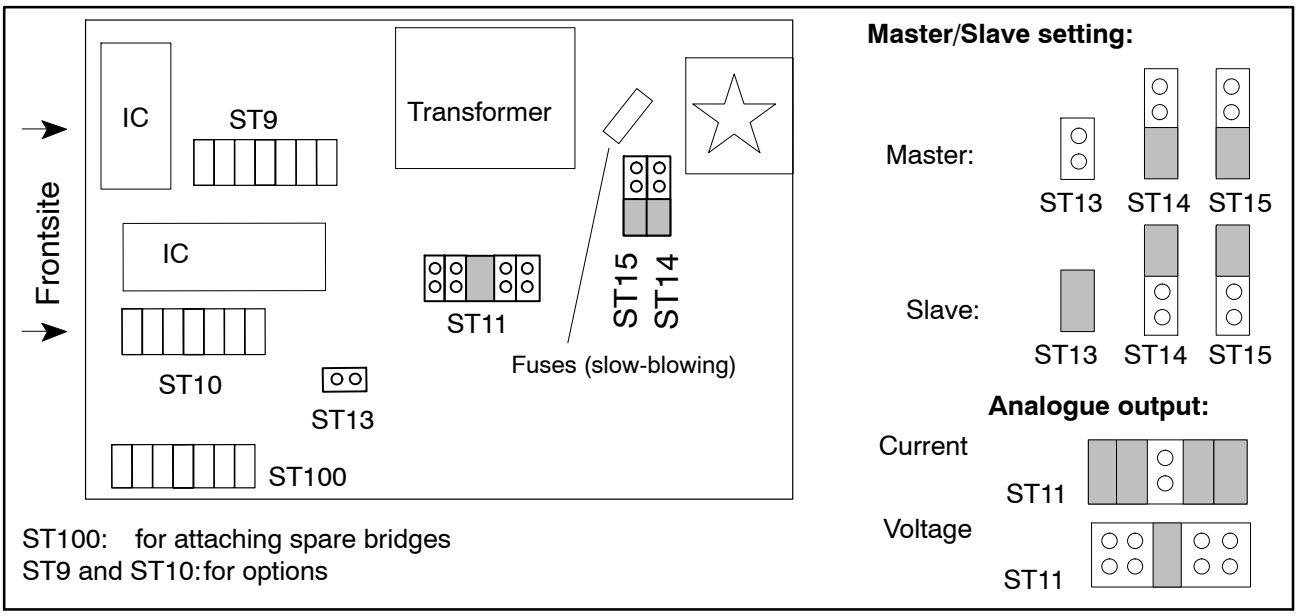


Fig. 3.1: Location of jumpers on motherboard

3.2 Changing the factory settings

To change the factory settings, proceed as follows:

- Loosen the four screws at the back of the housing.
- Carefully extract the back panel of the housing backward, with the motherboard attached, until the jumper arrangement is accessible. You can place a screwdriver between the connection board and the housing and lever out the back panel.
- By following the diagram, change whichever setting is relevant to you with the aid of the jumpers.

3.2.1 Setting the analogue output signal

To make the analogue output signal setting (voltage or current), use jumpers ST11. Choose between ±20 mA or 4 ... 20 mA in the control dialogue.

3.2.2 Choosing the operating mode for synchronization

To synchronize several devices, set one device as the Master. All the other devices should then set to Slave. To make the ”Master” and ”Slave” selections, use jumpers ST13, ST14 and ST15.

3.2.3 Replacing the fuses

WARNING

Disconnect the device from the mains supply before opening the MVD2510.

To replace the fuse, remove the back panel of the housing as described. The fuse (230 V/T63mA L; 115 V/T125mA L) will then be accessible on the motherboard (see Fig. 3.1).

3.3 Installing the amplifier in a panel–frame

The MVD2555 is designed to be installed in panel–frames, in accordance with DIN43700.

Installation steps:

- Remove the fastening strap.
- Insert the housing into the cutout in the panel–frame from the front.

- Hang up the fastening strap on both sides and fasten it to the cutout with the two threaded rods.
- Then connect the supply voltage and the transducer, as shown in chapter 3.

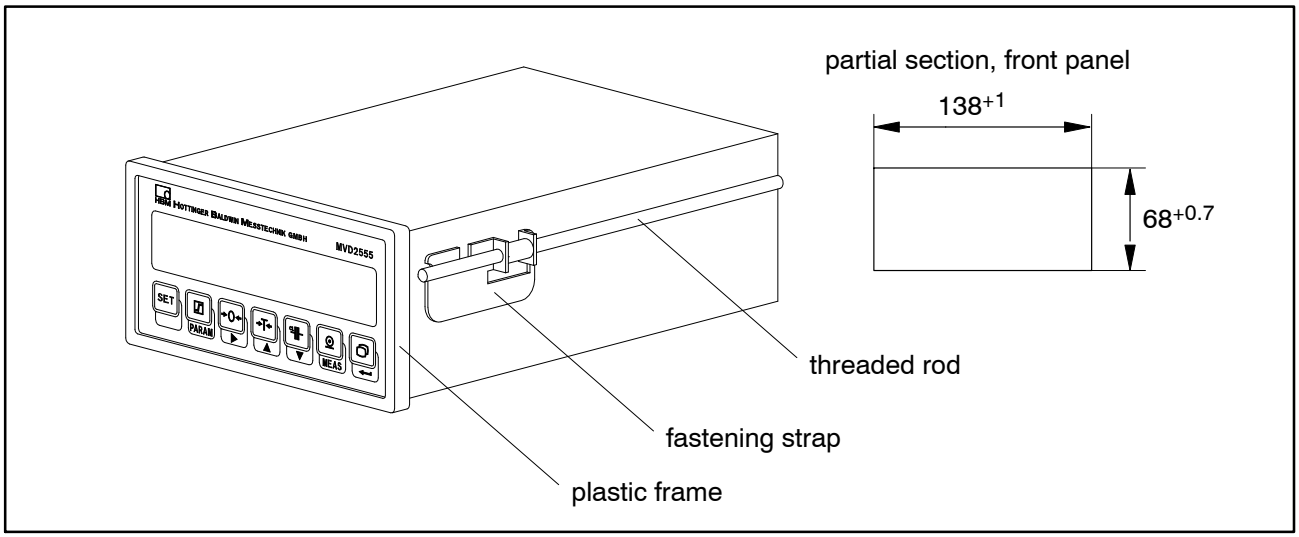


Fig. 3.2: Housing with fastening components

4 Connections

4.1 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, please contact the appropriate HBM branch or HBM representative.

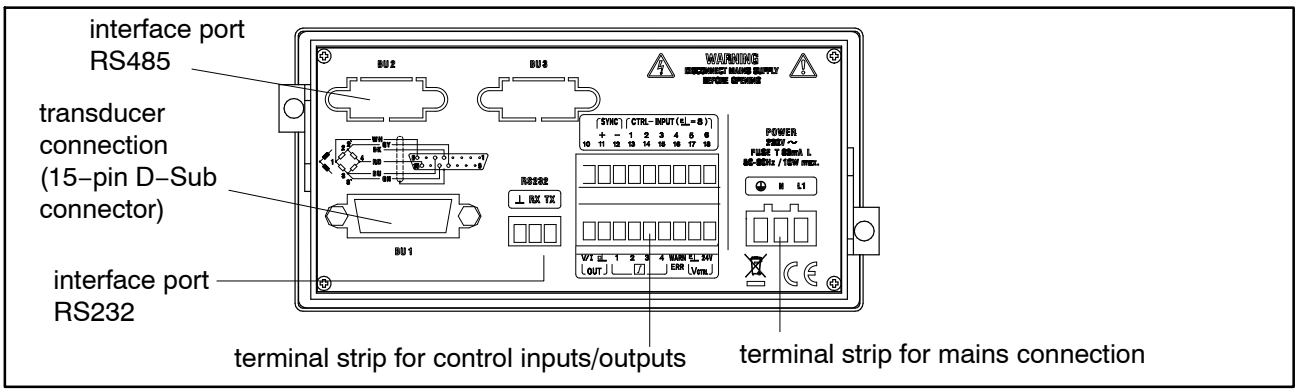


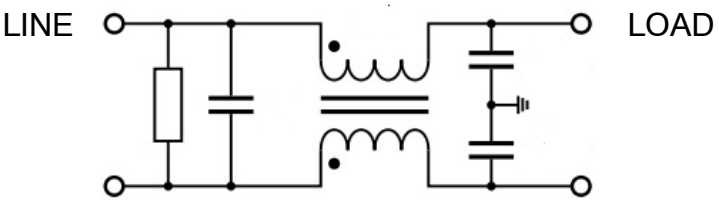
Fig. 4.1: Back of the device

WARNING

Due to the fact that the device has not been equipped with a proper mains switch, the connected supply cable may not be connected to mains directly. According to a VDE recommendation the device must be equipped with a switching device that can be disconnected from the mains supply.

Note

Ensure that the device is installed in an EMC-tested control cabinet and connected to a suitable mains filter, e.g. a single-stage filter, 1 ampere with the following structure:



Mounting of the line filter:

- Make sure that the line filter is laid out flat on the inside of the control cabinet and that the connecting cables are led directly to the filter's input connectors.
- The filter is laid out flat on the control cabinet.
- The contact area needs to be clean and blank.

For more information please refer to the mounting instructions provided by the manufacturer of the control cabinet.

Connecting the mains cable:

- **The cable must not be connected to the mains !**
- Twist the wire ends of the mains cable and fit the end sleeves for strands
- Screw the wire ends to the terminal strip connector (3–pin)

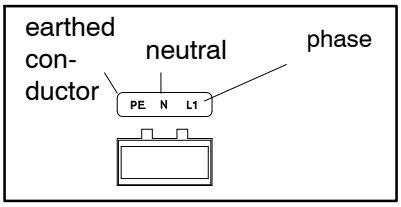
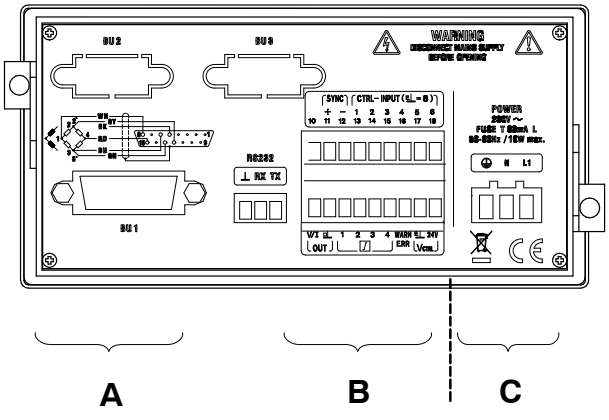


Fig. 4.2: Pin assignment of the terminal strip connector (3–pin)

- Plug the terminal strip connector (3–pin) into the mains connection socket

Note

It is essential that the cables are suitable for the mains voltage. Between the connectors of the nine- and three-pin terminals, appropriate measures need to be taken to prevent disturbance voltages. Ensure separate cable routing between sensor connector (A), signal output (B) and voltage supply (C).



4.2 Connecting transducers

The following transducer types can be connected to the device:

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

The connection is made using a 15–pin D–Sub connector on the back panel of the housing, labelled BU1 (cable end connector: DB-15P, Order No. 3-3312-0182).

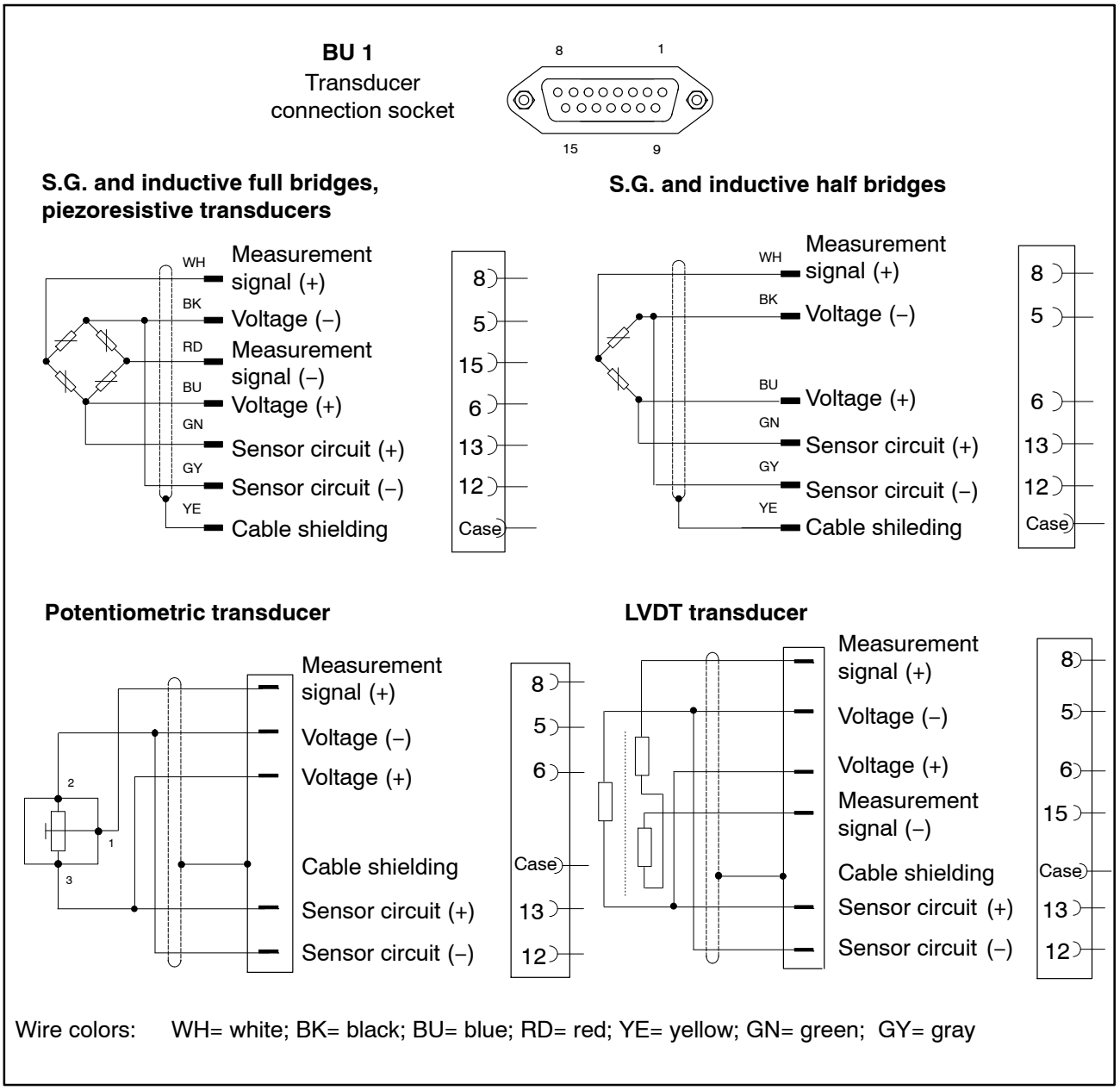


Fig. 4.3: Connecting different transducers

When connecting a transducer using four−wire technique, 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).

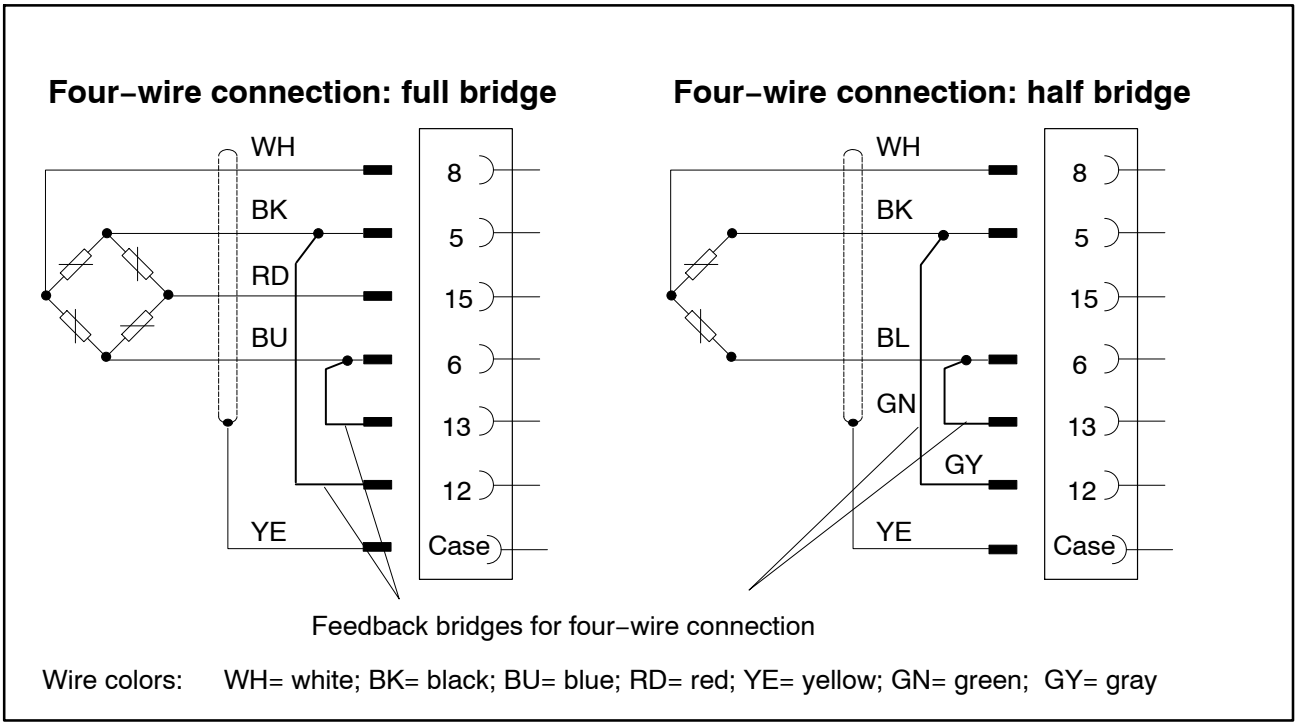


Fig. 4.4: Transducer connection in four−wire technique

Note

Use HBM standard cable for transducer connection. When using other screened, low-capacitance cable types connect the transducer cable screen to the plug housing according to the HBM Greenline information, thus ensuring optimum EMC protection.

4.3 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.

To choose current or voltage, use the jumpers on the amplifier motherboard, as described in Chapter 3.1.

Pin	Function	Pin	Function
1	Output signal (V/I)	10	no function
2	Output signal (ground)	11	Synchronization (+)
3	LIMITVAL. 1	12	Synchronization (–)
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 24 V=	18	Remote 6 (...)

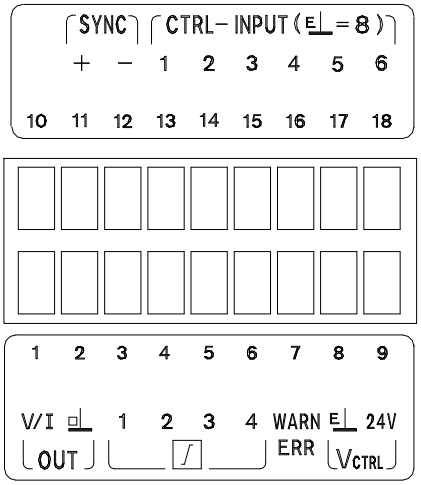


Fig. 4.5: Output pin assignment

4.4 Control inputs / outputs

Input/ Output	Terminal	Function	
←	3	Output LIMITVAL. 1	With positive logic equivalent to $V_{ext.}$ 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 0 V = Warning
→	8	Ground	$V_{ext.}$ 0 V
→	9	External supply voltage	$V_{ext.}$ 24 V
→	13–17	Input remote 1–6 (function selectable)	see table on Page 50

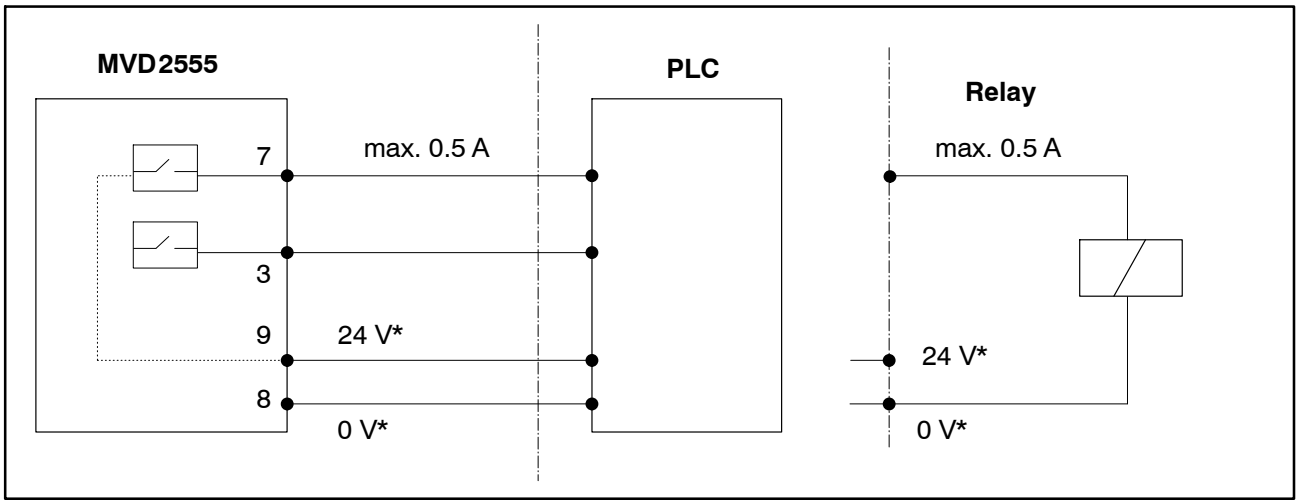


Fig. 4.6: Output assignments

WARNING

The control inputs and outputs on the terminal-strip socket (9 pins) are electrically isolated by optocouplers. The control outputs must be supplied with an external DC voltage (ground and 24 V) and must have protective separation from the mains (safety extra low voltage as per EN 61140 and IEC 61140 respectively; safety transformers as per EN 6155826 and IEC 6155826 respectively).

4.5 Synchronization

If several devices are used right next to one another or if their cables run parallel, the devices should be synchronized. To achieve this, one device is set to Master and all the others (max. seven) to Slave. The setup with jumpers on the amplifier motherboard is described in Chapter 3.1. As well as these settings, the devices must be linked together for synchronization.

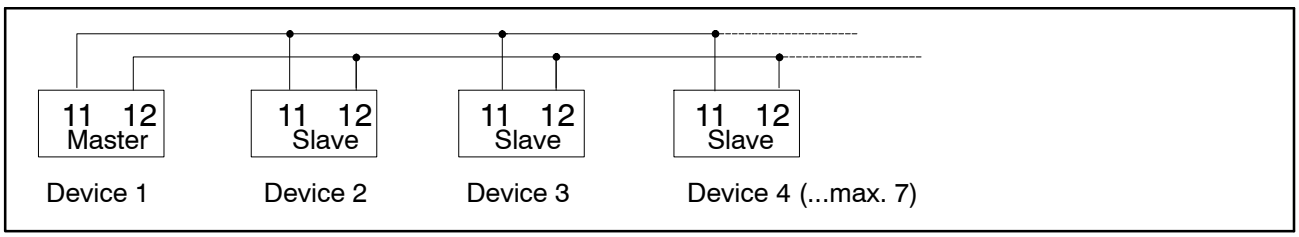


Fig. 4.7: Terminal connections for synchronization

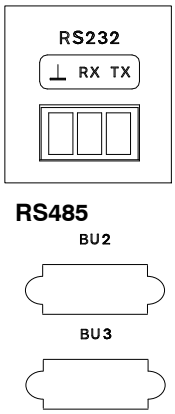
4.6 Setting the reading angle of the display

Depending on the mounting position, it may be possible to adjust the reading angle. A potentiometer is used for this limited adjustment. The potentiometer is located behind the keyboard under the display. To set a new viewing angle, proceed as follows:

- Remove the plastic frame of the display from the housing.
- Carefully lever out the keyboard (e.g. with the aid of a screwdriver).
- Use a screwdriver to turn the potentiometer and set the optimum reading angle.
- Put back the keyboard. Make sure that the plug is correctly threaded at the bottom edge of the keyboard. Quickly test the keyboard by pressing a key. If it functions correctly, you can continue.
- Insert and tighten the fastening screws.
- Push the plastic frame back on the housing.

4.7 Connecting the serial interface

RS232-interface:



On the back of the device, there is an RS232 or RS485 serial interface for connecting a computer or a terminal. The RS485-interface is brought out at sockets Bu2 and Bu3.

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 4.4.11.

When connecting a computer, it is possible to enter into dialogue with the MVD2555. 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 **“Operating the MVD2555 by computer”**.

5 Setting up and operation

5.1 Commissioning and factory settings

Some of the steps you need to take to commission your measurement chain (panel–frame 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 MVD2555 to the transducer type to be 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.

⚠ CAUTION

Observe the safety instructions!

- Turn on the power switch.
- The device runs a function test and is then in measuring mode. Duration of the function test: 1.5 s (if autocalibration is enabled, approx. 2.5 s). **During the function test, the warning output stays at 0 V**. 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, this can have the following 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.

Note

If the error message “OVFL B, OVFL N," appears, you must adjust the amplifier for your type of transducer. The steps to take for each amplifier are described below.

- To get from measuring mode to device setup mode, press SET for about 2 s. ”DIALOG” will appear in the display.

- Follow the examples given below to adjust the device to the connected transducer type.

Transducer types:

S.G. force transducer:

Adaptation:	*Example*	
	Transducer type:	Full bridge/2 mV/V=20 kN
	Excitation:	2.5 V
	Input:	4 mV/V
Calibration:	Unit, nominal value/decimal point:	20.000 kN
	Measuring range:	2 mV/V

Inductive displacement transducer:

Adaptation:	*Example*	
	Transducer type:	Half bridge, 10 mV/V (80 mV/V)
	Excitation:	1.0 V
	Input:	10 mV/V (100 mV/V)
Calibration:	Unit, nominal value/decimal point:	20.000 mm
	Measuring range:	10 mV/V (80 mV/V)

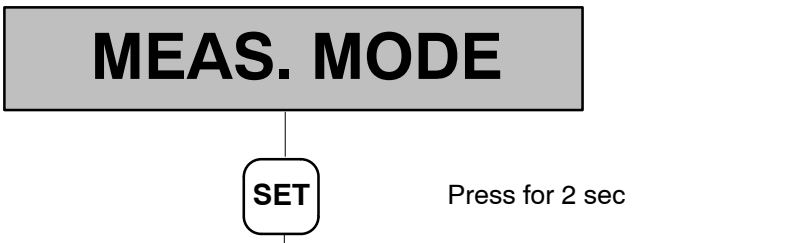
Piezoresistive transducer:

Adaptation:	*Example*	
	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

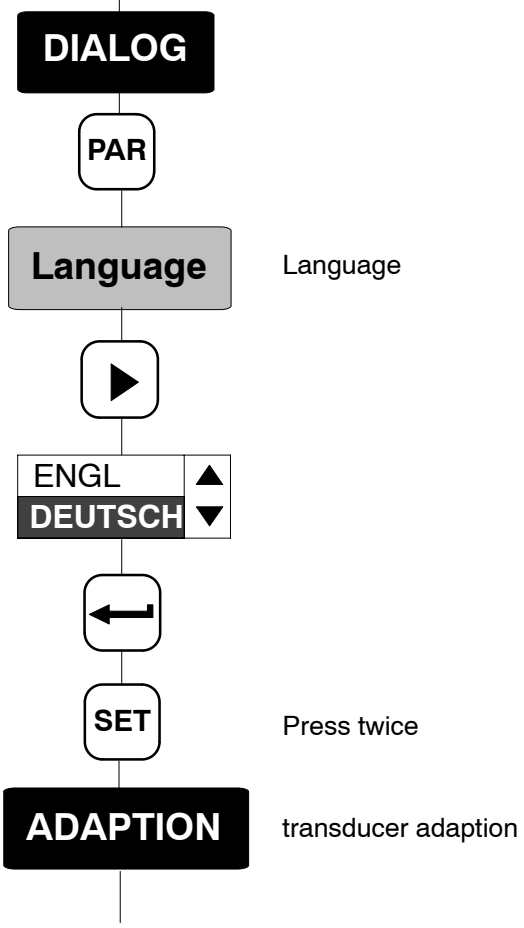
Potentiometric transducer:

Adaptation:	*Example*	
	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



Programming mode



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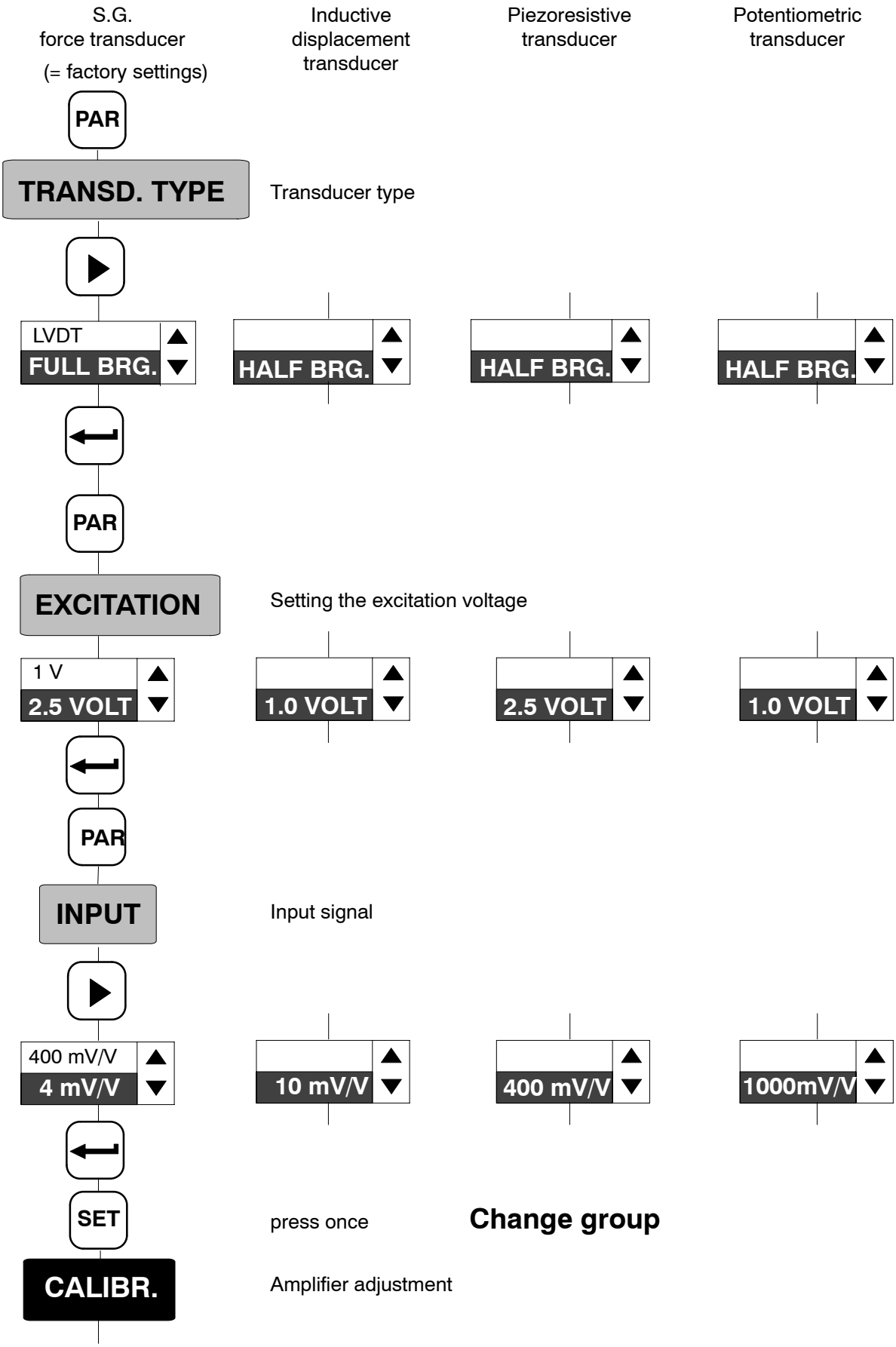

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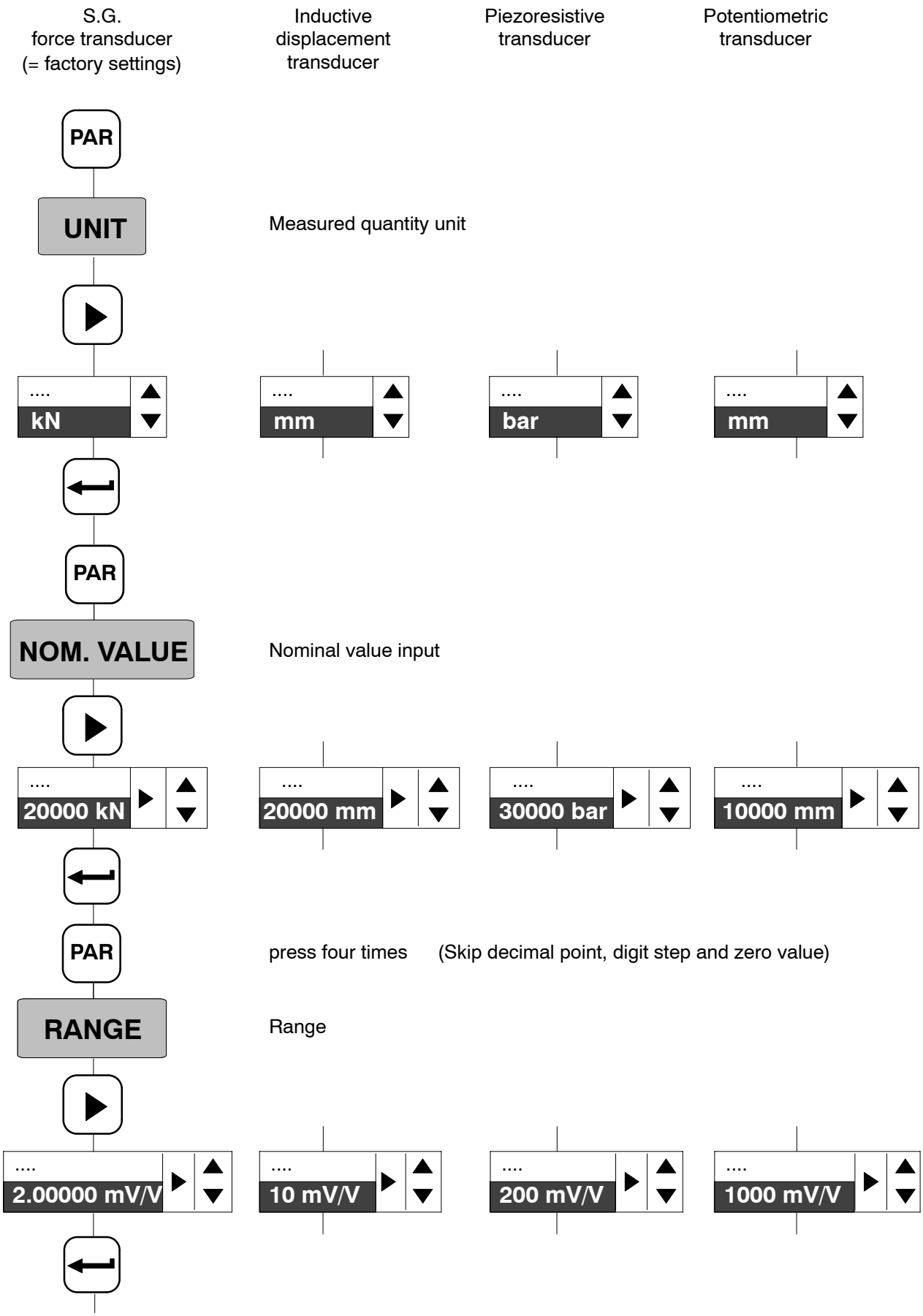

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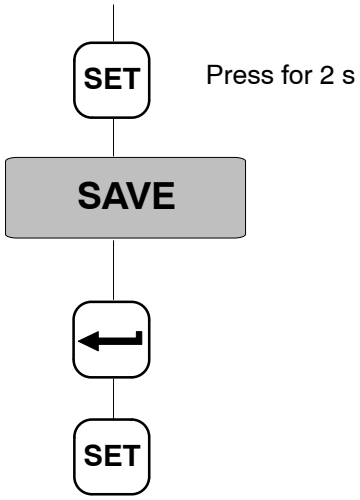
Switch to measuring mode



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

You can now run an initial function test.

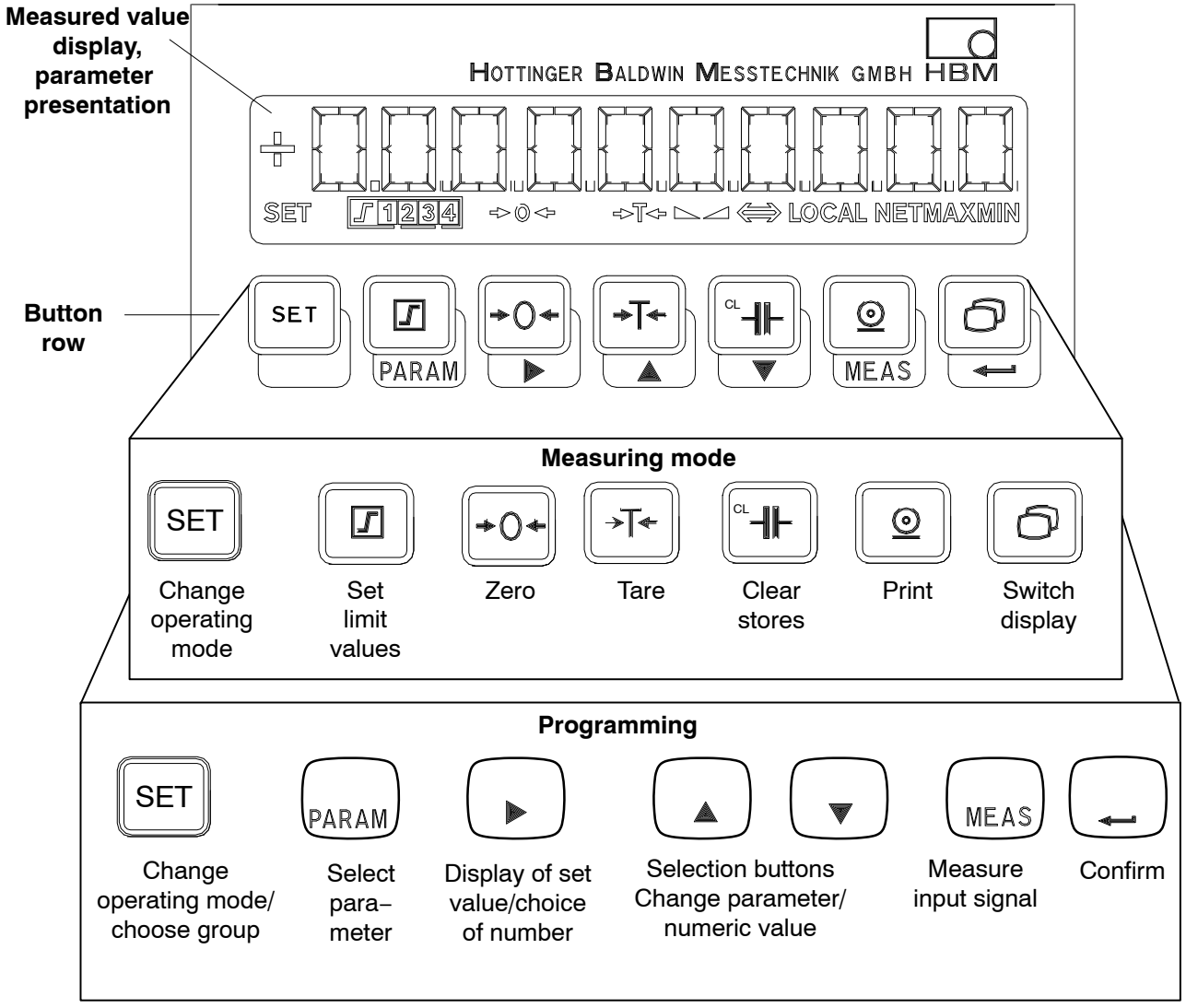
CAUTION

The settings are only saved buffered against mains failure when they have been saved under one of the parameter sets.

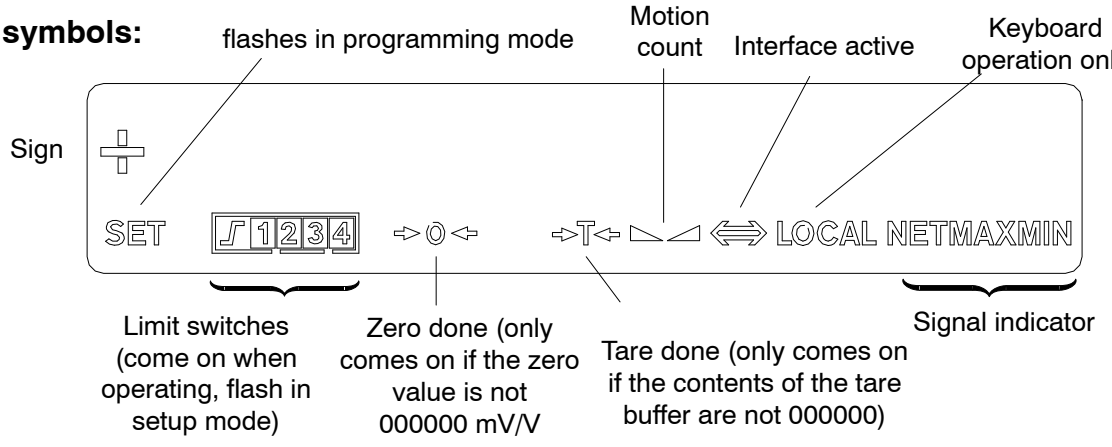
5.2 Control concept and functional overview

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

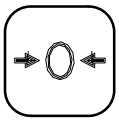
– Buttons that are operative during measuring mode and
– Buttons needed for programming.



Key to symbols:



5.3 Button functions in measuring mode

Key	Meaning
SET	Switch from measuring operating mode to programming (and vice versa) by **pressing for approx. 2 s**.
	Set the limit values LV1 ... 4 (see from Page 31) The additional parameters of the limit switches such as hysteresis, direction etc., are unchanged. Limit value changing can be enabled in menu LIMITVAL 1 ... 4 (see Page 46).
	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 in the tare buffer.
	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 or parameters over the interface (also possible by remote). For possible print parameters, see ”Additional function” starting on Page 51. Only those parameters (PRINT xxx) selected in additional functions will be printed.
	Switches the measured value display between: Gross value — No labeling 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

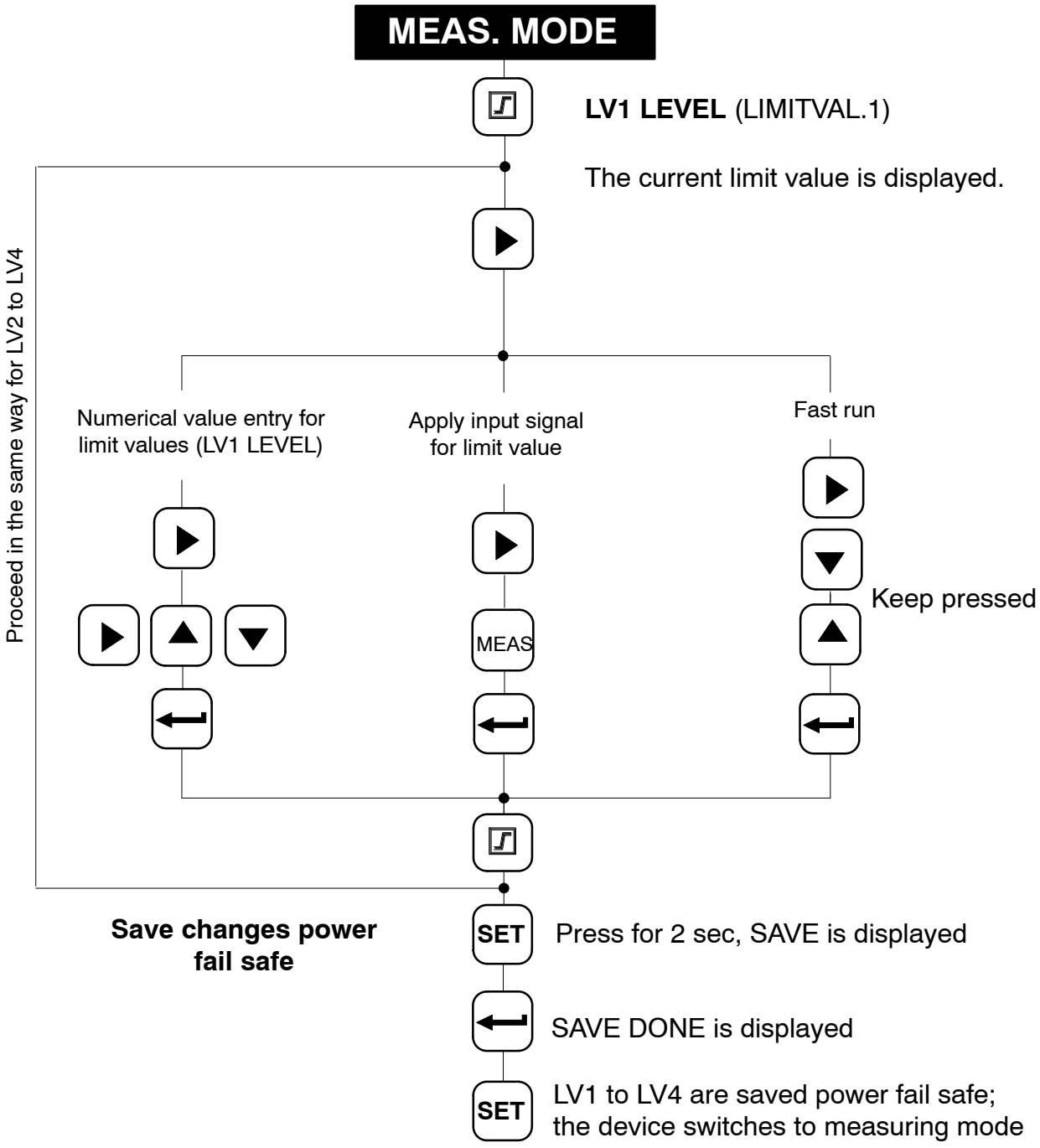
5.3.1 Querying and setting limit values in measuring mode

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)



5.4 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.

Significance of the buttons:

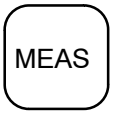
Change operating mode, select group (e.g. CALIBR.)

Parameter selection (e.g. NOM. VALUE)

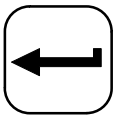
Display last value set.
Select desired number.

Changes the number in ascending order.

Changes the number in descending order.

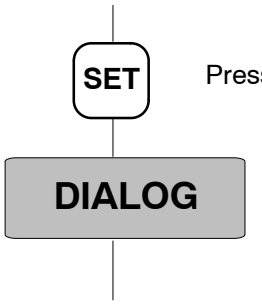


Apply measured value.



Confirms input/modification

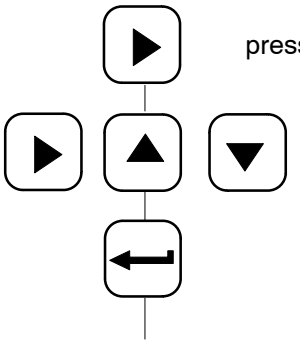
5.4.1 Changing from ”Measuring” operating mode to ”Programming”



If the password is 0000 (factory setting), the device changes the operating mode.

If a password has already been entered (and is not 0000), **CODE** appears, that is, the password has to be entered if you wish to continue ”Programming”.

Enter password:

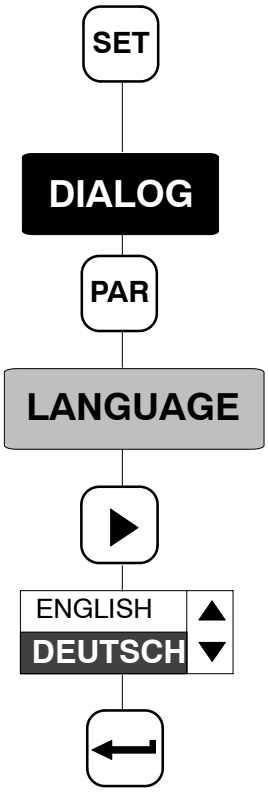


If you enter an incorrect password, the device goes back to measuring mode. If the password matches, the **DIALOG** group appears in the display.

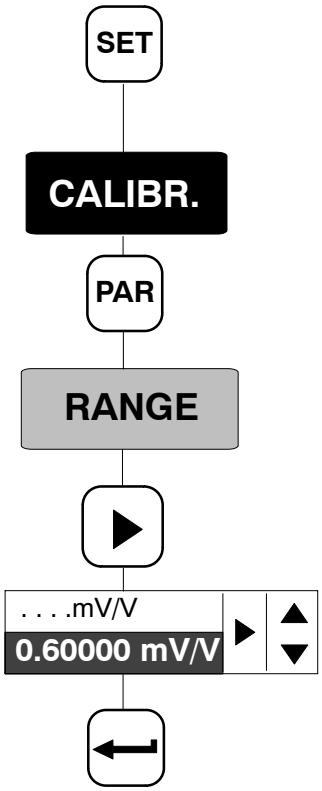
5.4.2 Programming

Typical programming mode operations

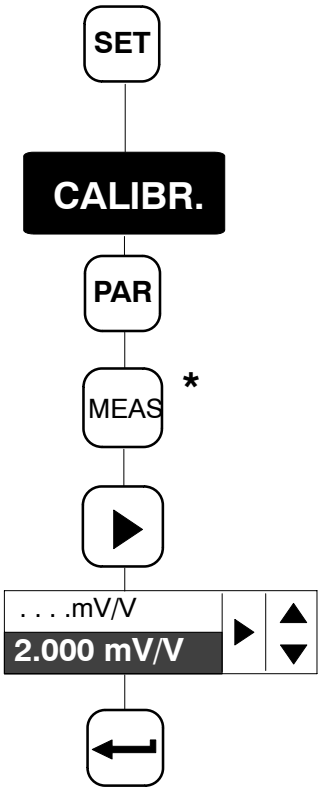
Select the value/ parameter from a given table (example DIALOGUE LANGUAGE)



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



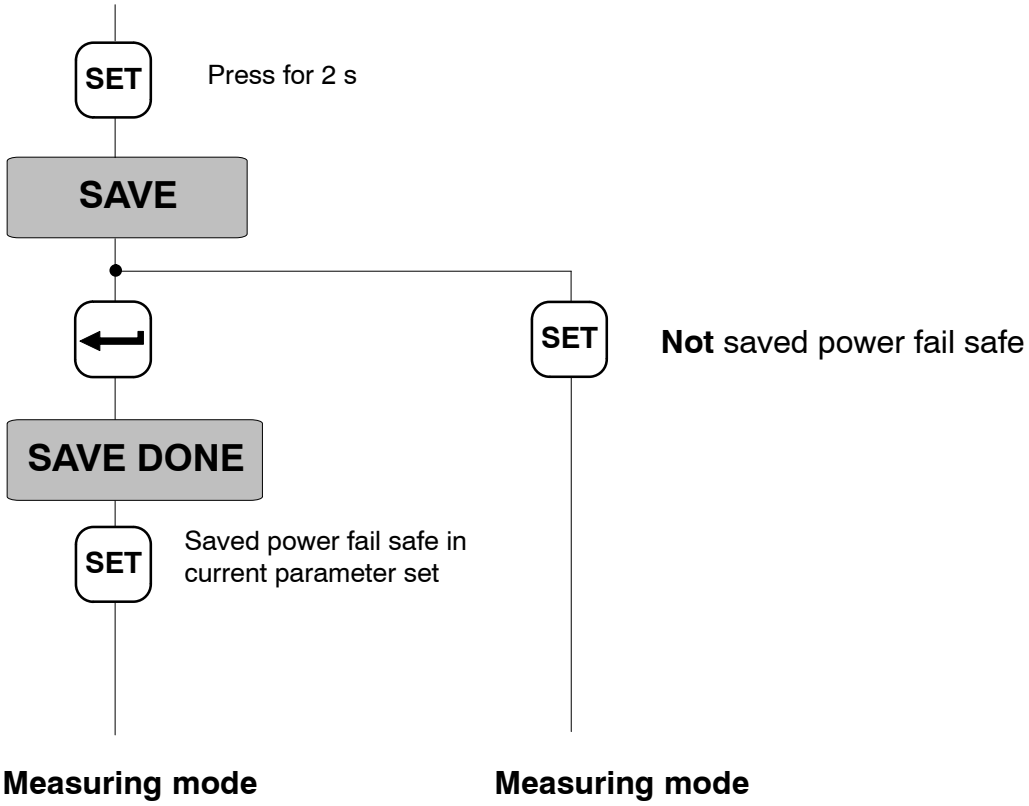
Apply a signal produced by the transducer when a defined loading occurs.



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

5.4.3 Switching from ”Programming” mode to ”Measuring”

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



CAUTION

The settings are only saved buffered against mains failure when they have been saved under one of the parameter sets.

5.5 Overview of all groups and parameters

PARAM

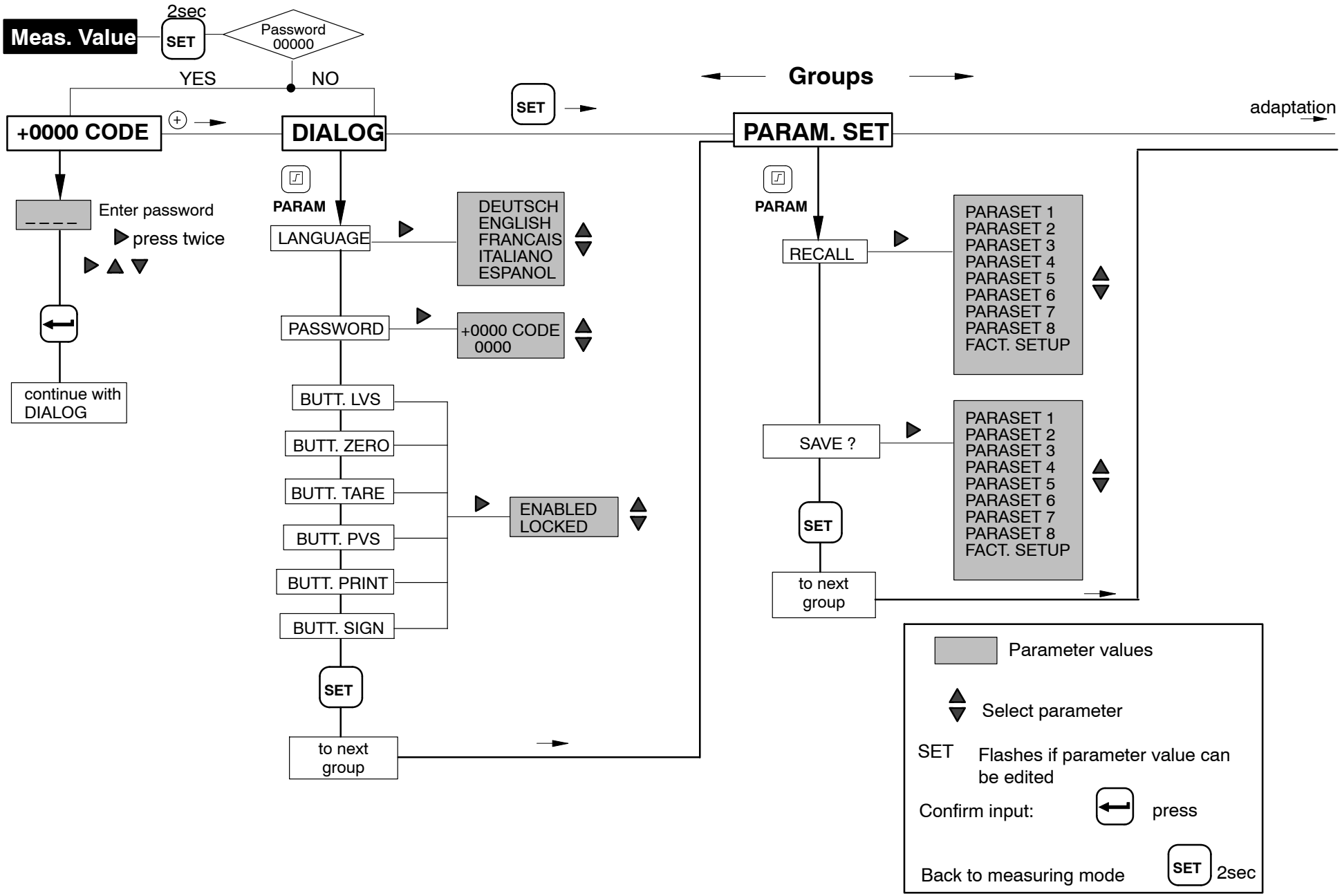
Parameter

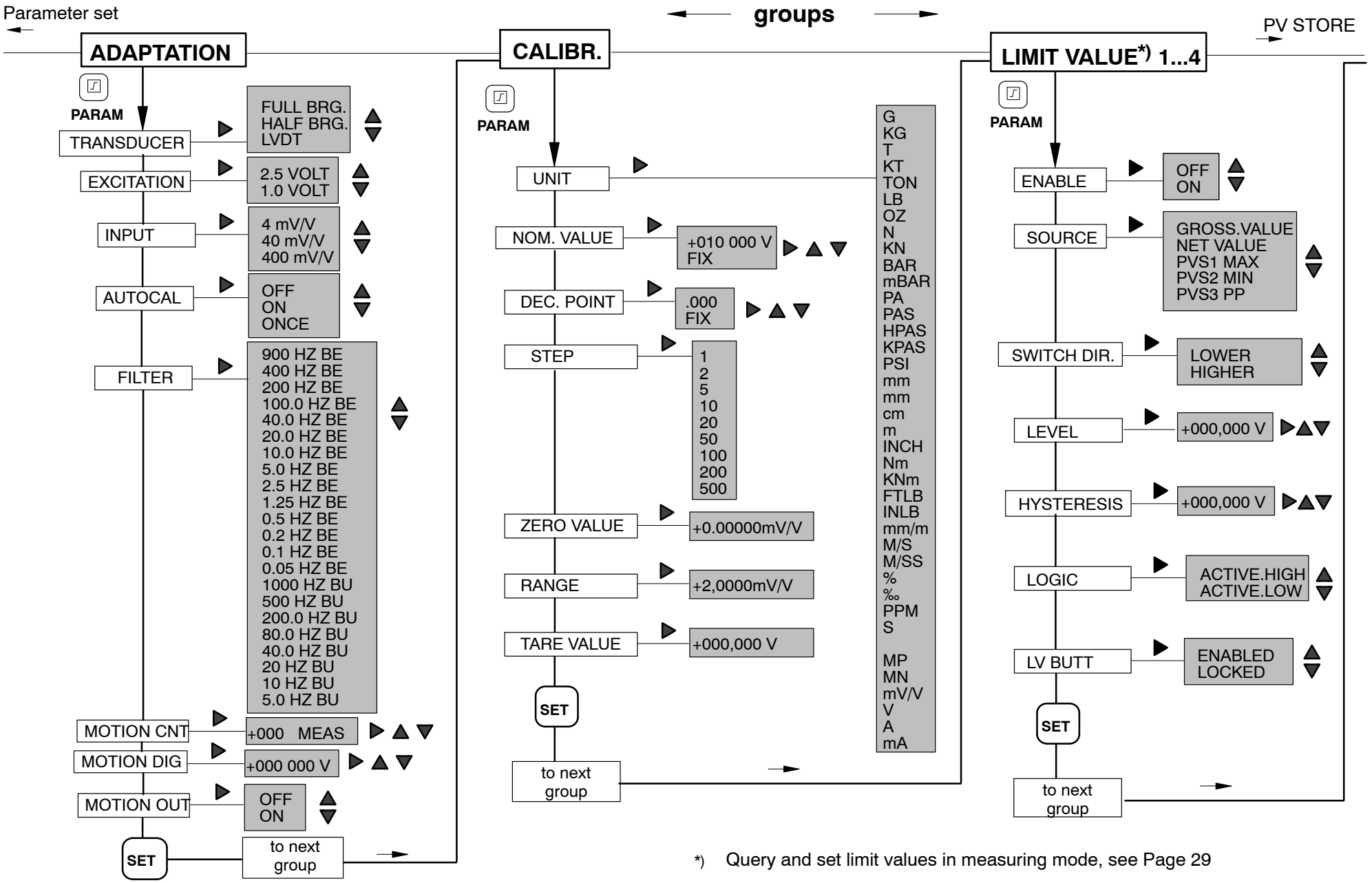
SET → **Groups**

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

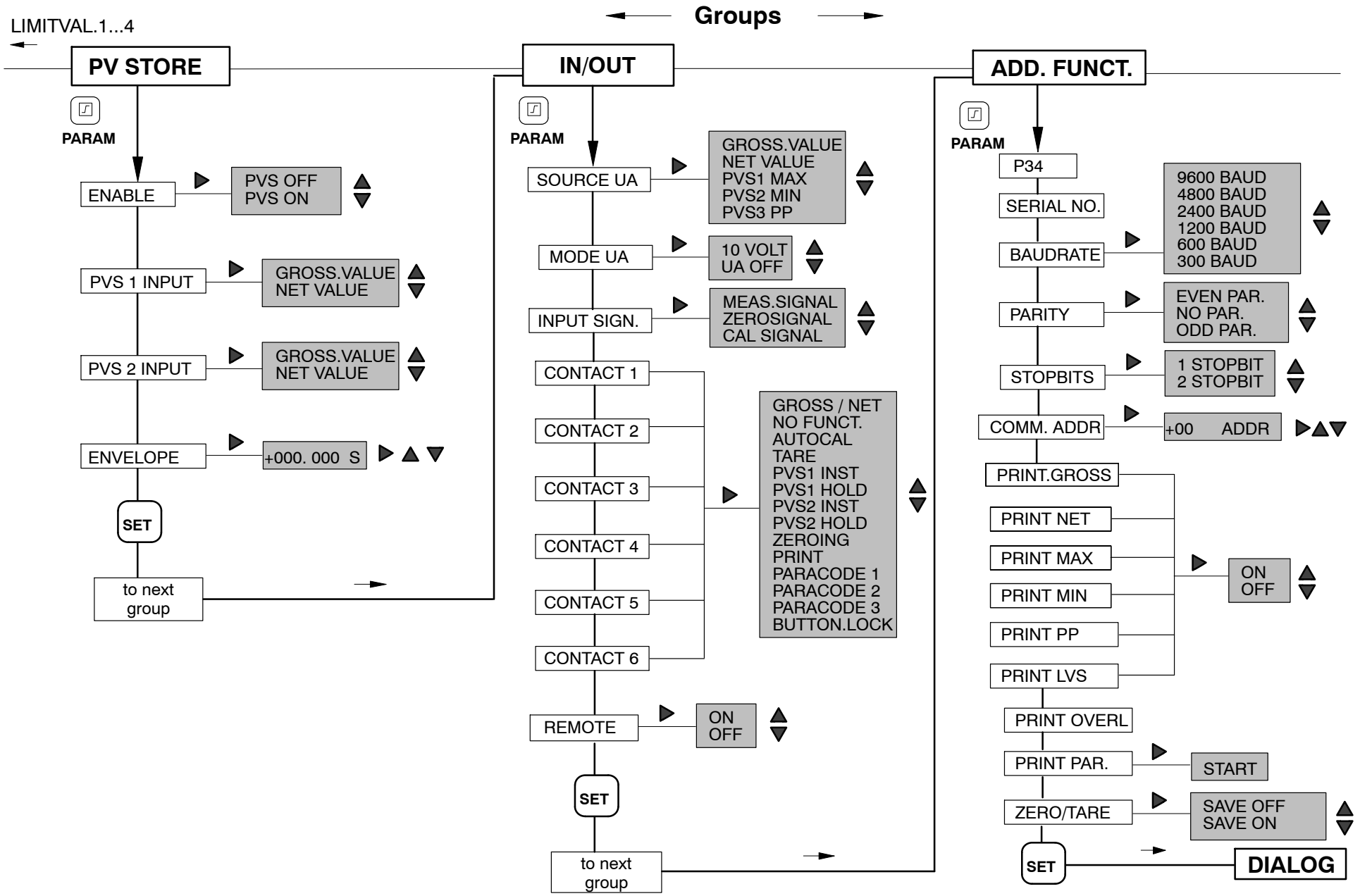
1) Use SET to next group

5.5.1 Setting all parameters





*) Query and set limit values in measuring mode, see Page 29


LIMITVAL.1...4
Groups
PV STORE
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
IN/OUT
PARAM
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
ADD. FUNCT.
PARAM
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

5.5.2 Dialogue

Select language (LANGUAGE)

Factory setting: DEUTSCH

You can choose the following languages:

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

Choose password (PASSWORD)

When switching from **Measuring** to **Programming**, you are asked for a password (see Page 33).

The password prevents unauthorized operation of the MVD2555. Parameters can only be changed if the valid password is entered. The password can only be changed if the old password is known.

CODE	Function
0000	no password; factory setting
0001 ... 9999	password set

Enable/lock buttons

BUTT. LVS :  Factory setting: ENABLED

BUTT. ZERO:  Factory setting: ENABLED

BUTT. TARE:  Factory setting: ENABLED

BUTT. PVS:  Factory setting: ENABLED

BUTT. PRINT:  Factory setting: ENABLED

BUTT. SIGN :  Factory setting: ENABLED

5.5.3 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 5.4.3 .

You can also use remotes (PARACODE1 ... 2, see Chapter 5.5.8) to Activate/Load parameter sets.

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

SAVE: Save as parameter set 1 ... 8

5.5.4 Adaptation

TRANSDUCER:

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

Selectable bridge types	Full bridge [1)]	Half bridge [1)]	LVDT

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	**U_B = 2.5 V**	**U_B = 1 V**
I	±4 mV/V	±10 mV/V
II	±40 mV/V	±100 mV/V
III	±400 mV/V	±1000 mV/V

[1)] No distinction is made here between transducers with strain gauges and inductive transducers

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

FILTER:

Different filter cutoff frequencies and the filter characteristics can be selected:

Bessel (BE) (Hz)	Sampling rate[2)] (measured values per sec)	Butterworth (BU) (Hz)	Sampling rate[2)] (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		

2) 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 42).

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

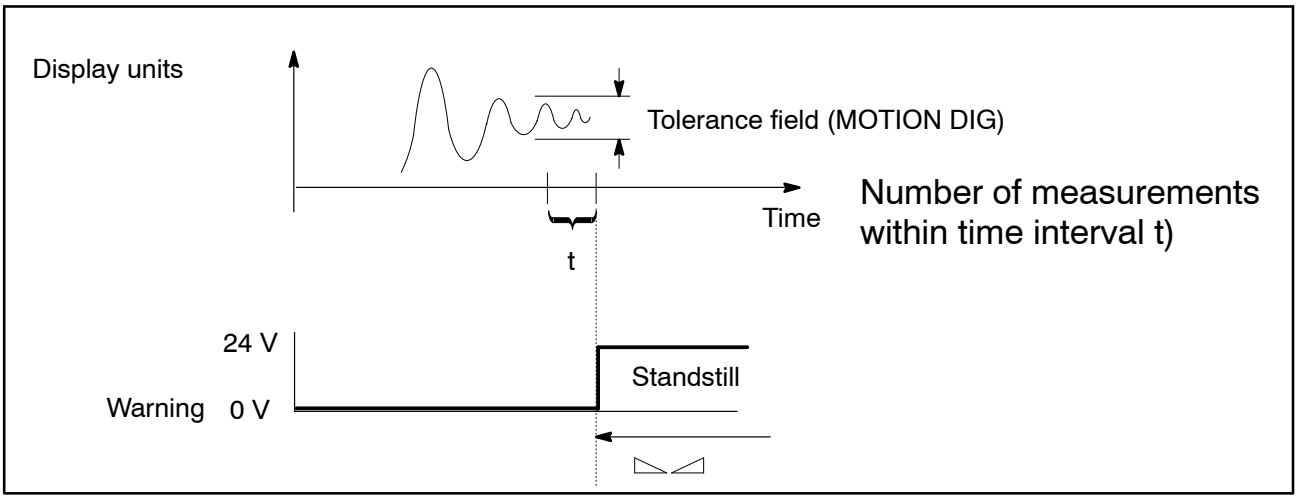


Fig. 5.1: Effect of the motion count

5.5.5 Calibration (CALIBR.)

UNIT

You can select the following units:

Selectable unit		
N	S	cm
OZ	PPM	mm
LB	%	µm
TON	%	PSI
KT	M/SS	KPAS
T	M/S	HPAS
KG	µm/m	PAS
G	INLB	PA
V	FTLB	mBAR
mV/V	KNm	BAR
MP	INCH	KN
----	m	A
		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	Measuring range at U_B = 2.5 V	Measuring range at U_B = 1 V
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

When the measuring range is set, an analogue output signal is allocated to the input signal range.

TARE VALUE:

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

5.5.6 Limit switches 1 ... 4 (LIMITVAL.1 ... 4)

The parameters for setting the limit switches are collected 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:

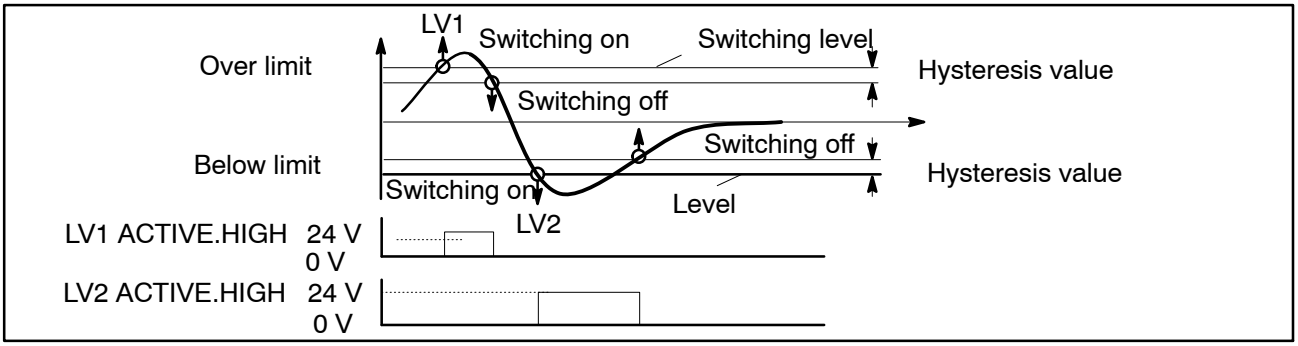


Fig. 5.2: Limit switch functions and parameters

ENABLE

OFF	Disable individual limit switches
ON	Enable individual limit switches

SOURCE

Limit switch 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 here the switch direction or the working direction (see Fig. 4.2.).

HIGHER	The switch–on level is higher than the switch–off level for a **rising** measured value
LOWER	The switch–off level is higher than the switch–on level for a **falling** measured value

LEVEL

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

HYSTERESIS

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

The value is set in display units (e.g. 2 kN).

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 off = High Switched on = Low

LV BUTT:

ENABLED	Setting the limit value with possible
LOCKED	Setting the limit value with locked

5.5.7 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 the Min/Max 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 50).

PVS1 INST	Instantaneous or peak value for PV1/PV3
PVS1/Hold	Run / Hold mode for PV1/PV3
PVS2 INST	Instantaneous or peak value for PV2
PVS2/Hold	Run / Hold mode for PV2

The following diagram shows the function of the remotes:

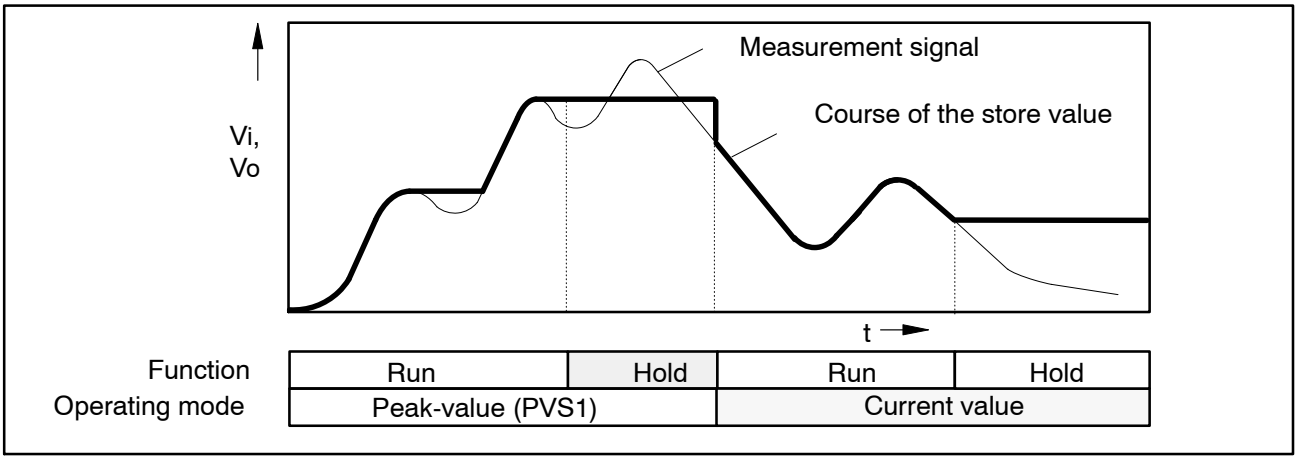


Fig. 5.3: Function of the remotes shown in the example of PVS1, peak value and instantaneous value storage (also applies to PVS2 and PVS3).

If the stores are operated as peak value stores, it is possible to display an envelope by setting a discharge rate.

This discharge rate affects all peak value stores.

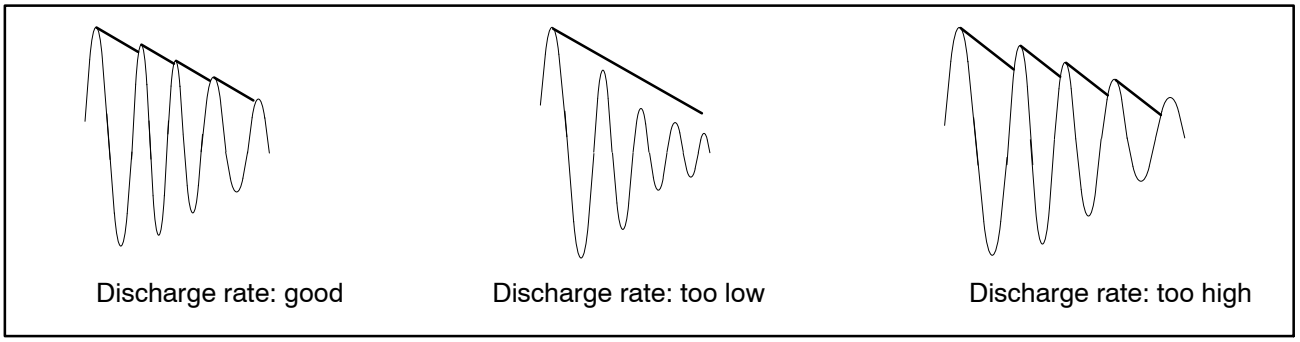


Fig. 5.4: Envelope function

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 store locked

PVS1 INPUT:

Choice of input signal for peak value store PV1.

GROSS.VALUE	**NET VALUE**

PVS2 INPUT:

Choice of input signal for peak value store PV2.

GROSS.VALUE	**NET VALUE**

ENVELOPE:

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

000.00	envelope function off
000.100 to 60.000 s	envelope function on

5.5.8 Inputs and outputs (IN/OUT)

In this menu, you can make the required settings for the MVD2555 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 13.

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[3)]	The display corresponds to 50 % of the current full scale value
ZEROSIGNAL[3)]	Internal zero point

[3)] To display the measurement signal, you must return to measuring mode.

CONTACT 1 ... 6:

Remotes are available on the connector strip for controlling MVD2555 functions. The pin assignment or allocation of the remotes is freely configurable.

Functions	Level 0 V	Level 24 V
NO FUNCT.	No function (factory setting)	
AUTOCAL	Autocalibration ON	Autocalibration OFF
TARE	For the transition 0 V - 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 0 V - 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		
BUTT. 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.

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

5.5.9 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.

Baud rate:

Choose the baud rate to match the baud rate of the connected device (PC, PLC).

Selectable baud rates	300	600	1200	2400	4800	9600

PARITY:

The following settings are possible:

Selectable parity	EVEN PAR.	ODD PAR.	NO PAR.

Stop bit:

The following settings are possible:

1 STOPBIT
2 STOPBIT

COMM. ADDR:

Input the device address

Selectable device addresses[4)]	00 to 31

4) 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:

A change to the tare value or zero value by using the buttons →T← or →0← is automatically stored in the current parameter set (EEPROM) power fail safe. This backup can be switched on or off:

SAVE OFF
SAVE ON

Important

The EEPROM is restricted to approx. 10000 write cycles.

6 Example

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

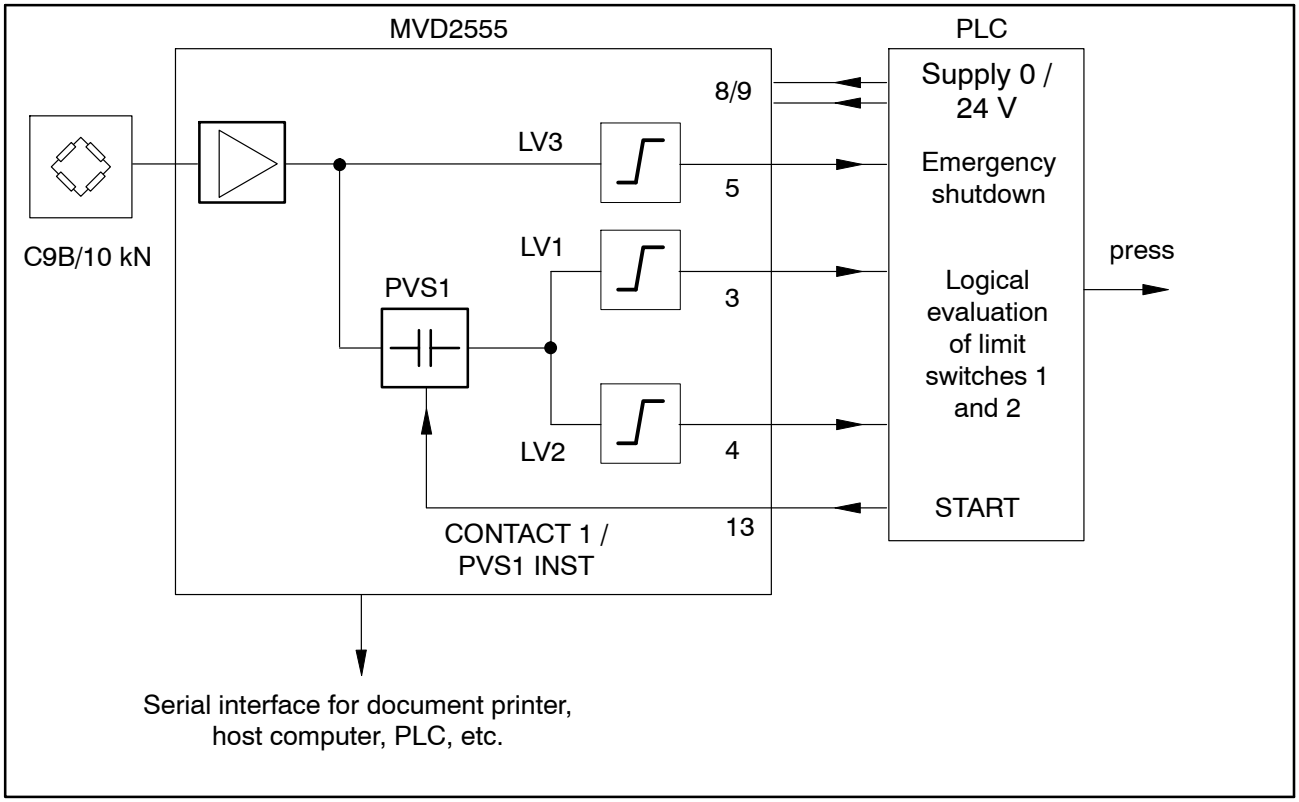
Problem definition:

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.

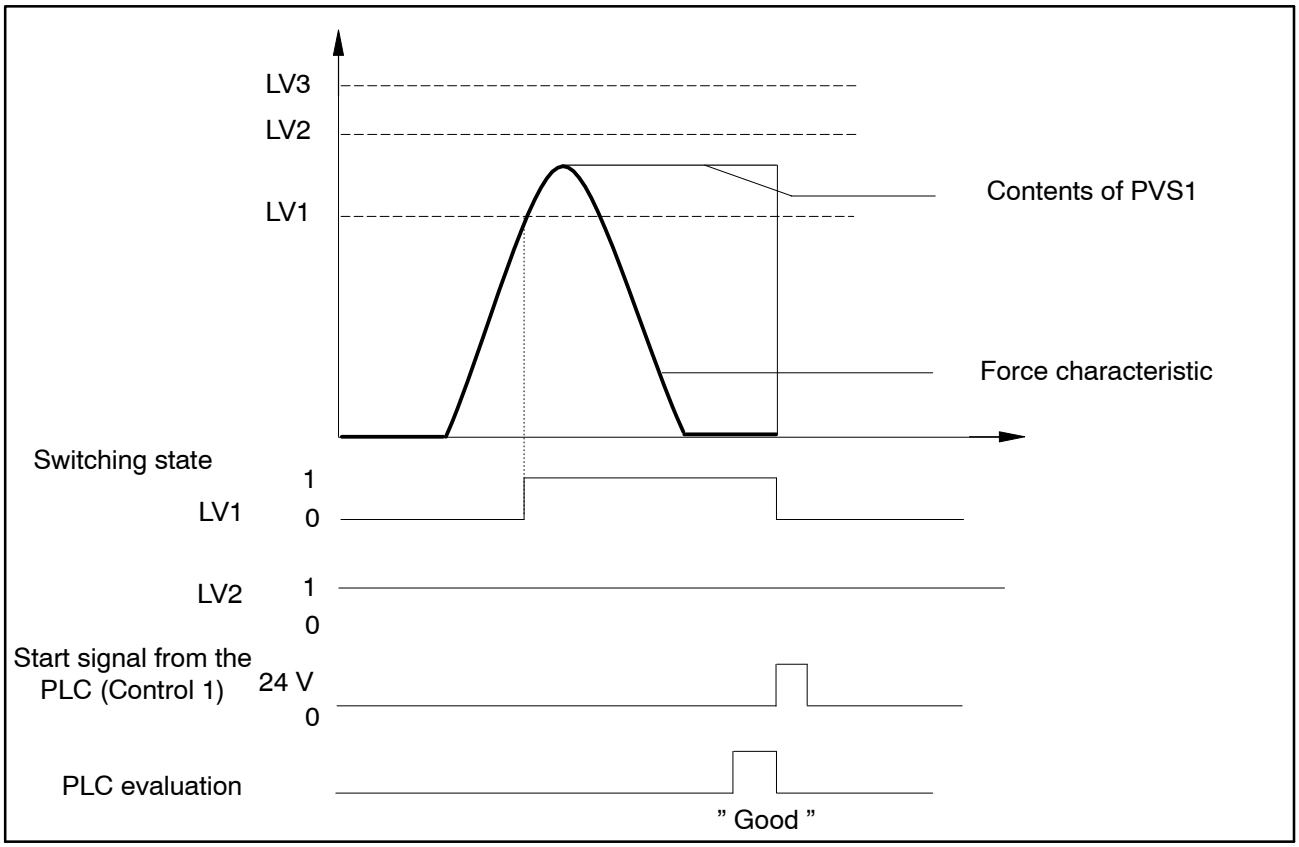
Solution:

The force characteristic measured with an S.G. force transducer (e.g. C9B/10 kN; 1 mV/V) is amplified and evaluated by the MVD2555. 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 MVD2555 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 MVD2555 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 unauthorized modification by a password.
Device control through the remotes (remote control) must be activated.

Wiring diagram:



Time chart:



Evaluation of limit value message by the PLC:

	Good	Reject	
LV1	1	0	1
LV2	1	1	0

Choose the following settings:

LV1 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.

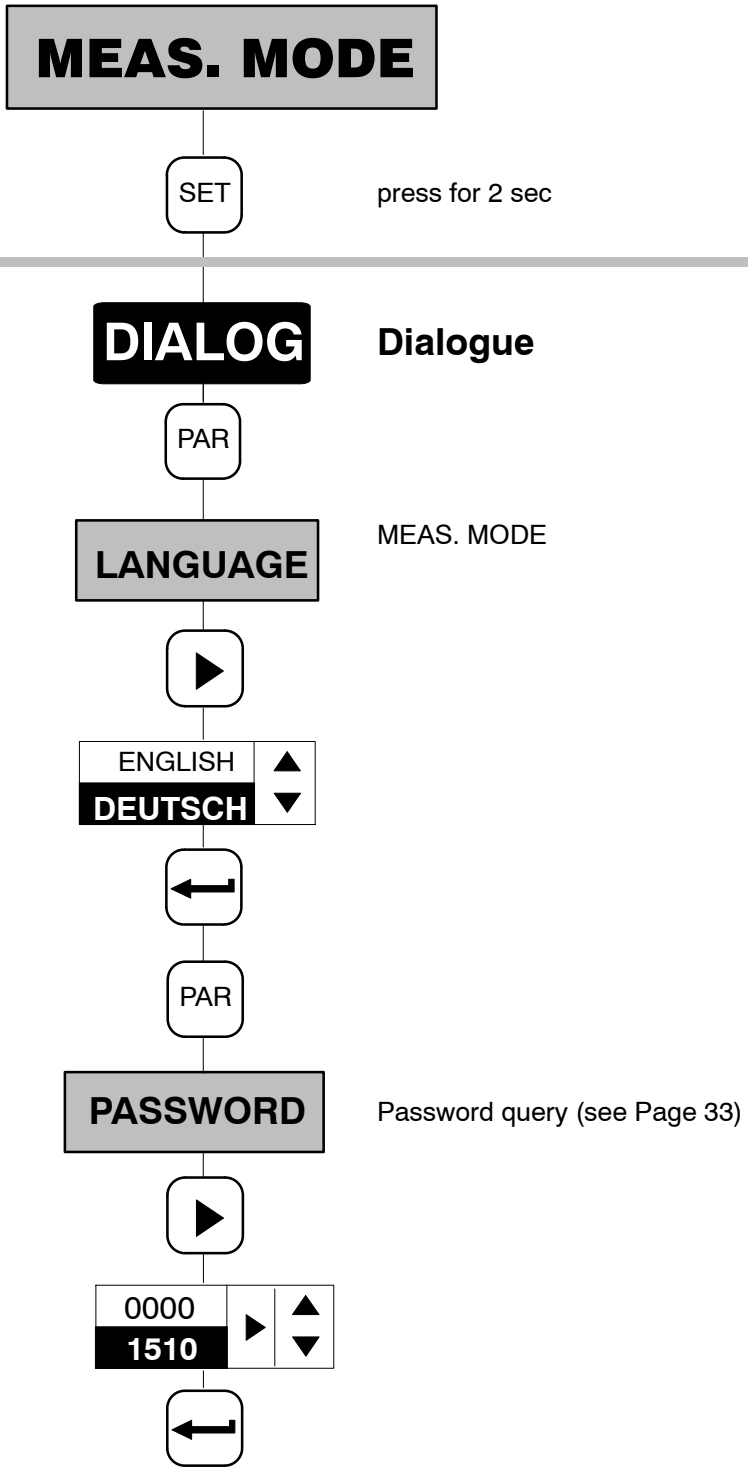
Limit2 Checks whether the upper force limit has been reached. The input signal is the output of the peak value store (maximum value). If limit LV2 is exceeded, a Low signal is generated. A positive switch direction must be set with positive output logic.

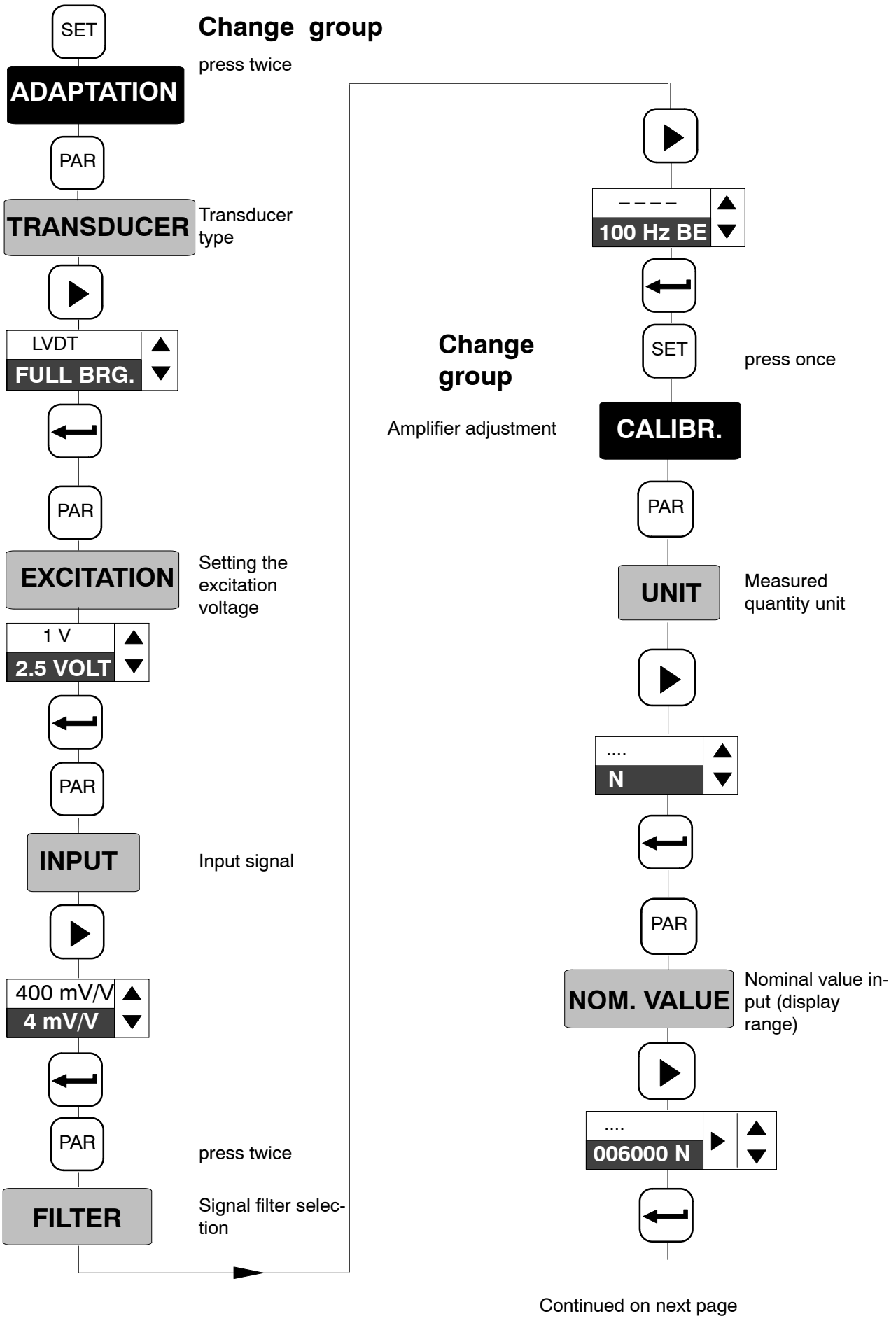
LV3 Checks whether the maximum load limit of the machine is exceeded (emergency shutdown function). The input signal is the gross measured value. If limit LV3 is exceeded, a High signal is generated. A positive switch direction must be set with positive output logic.

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. **Remote control must be activated.**

Key to symbols





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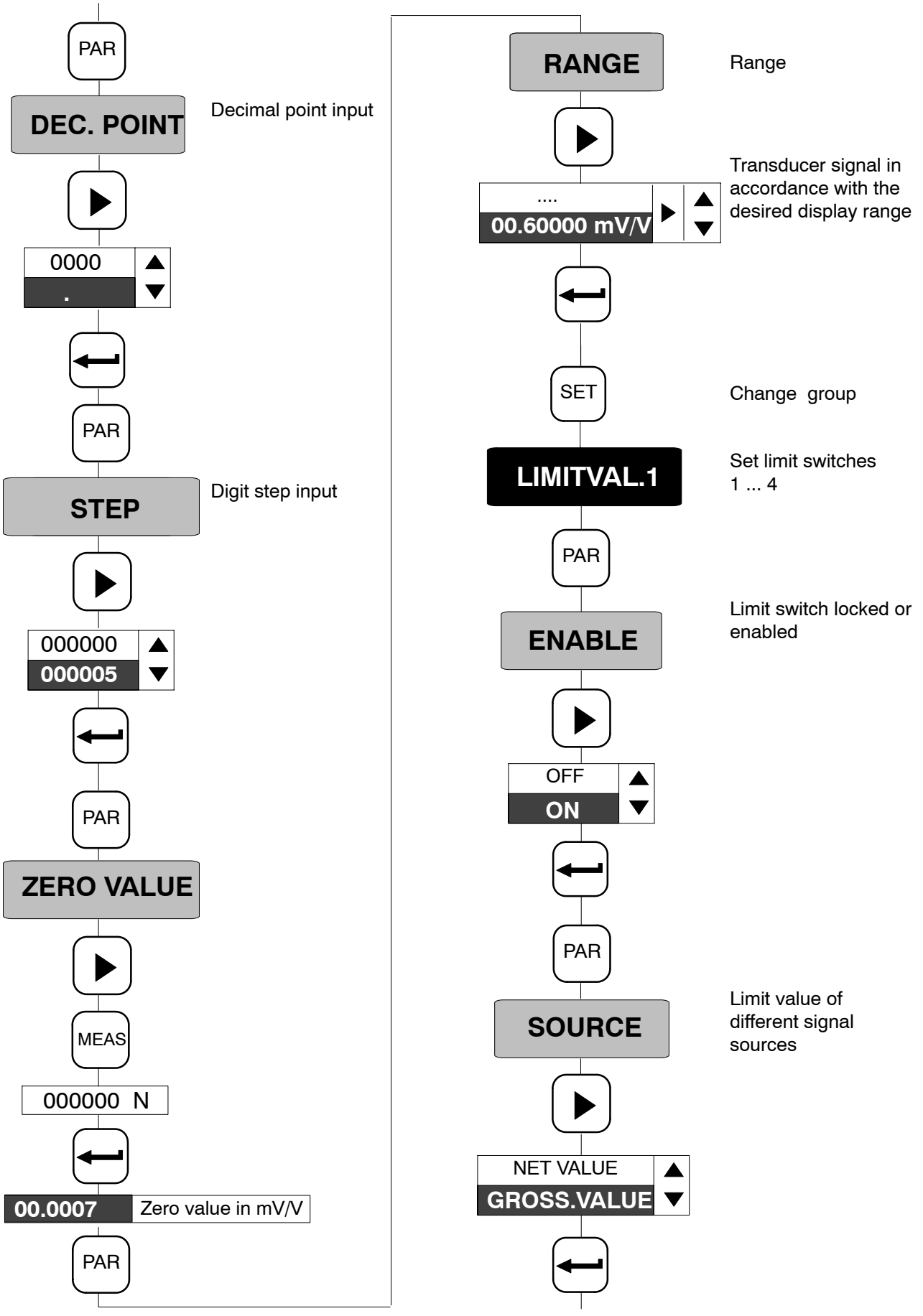
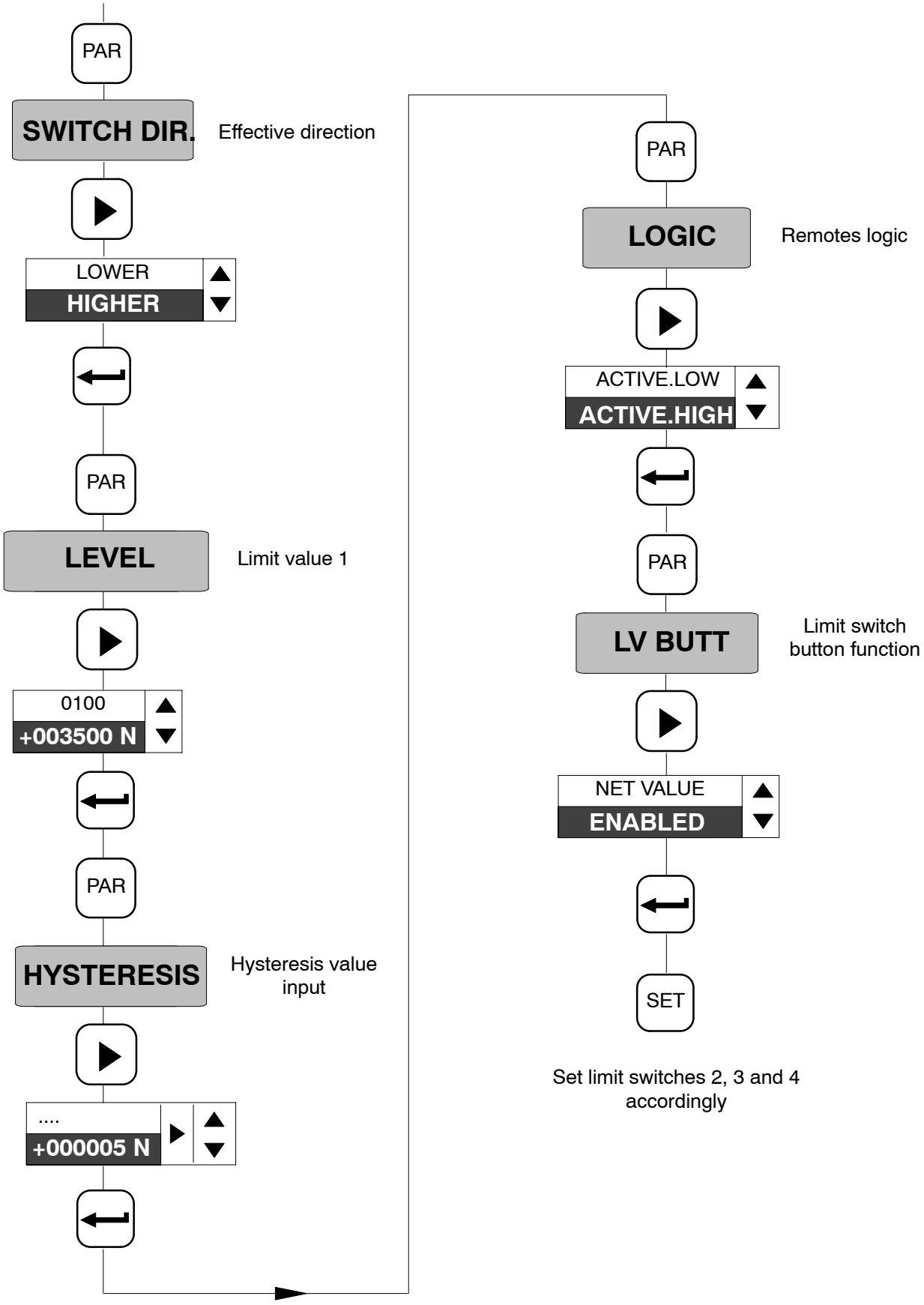
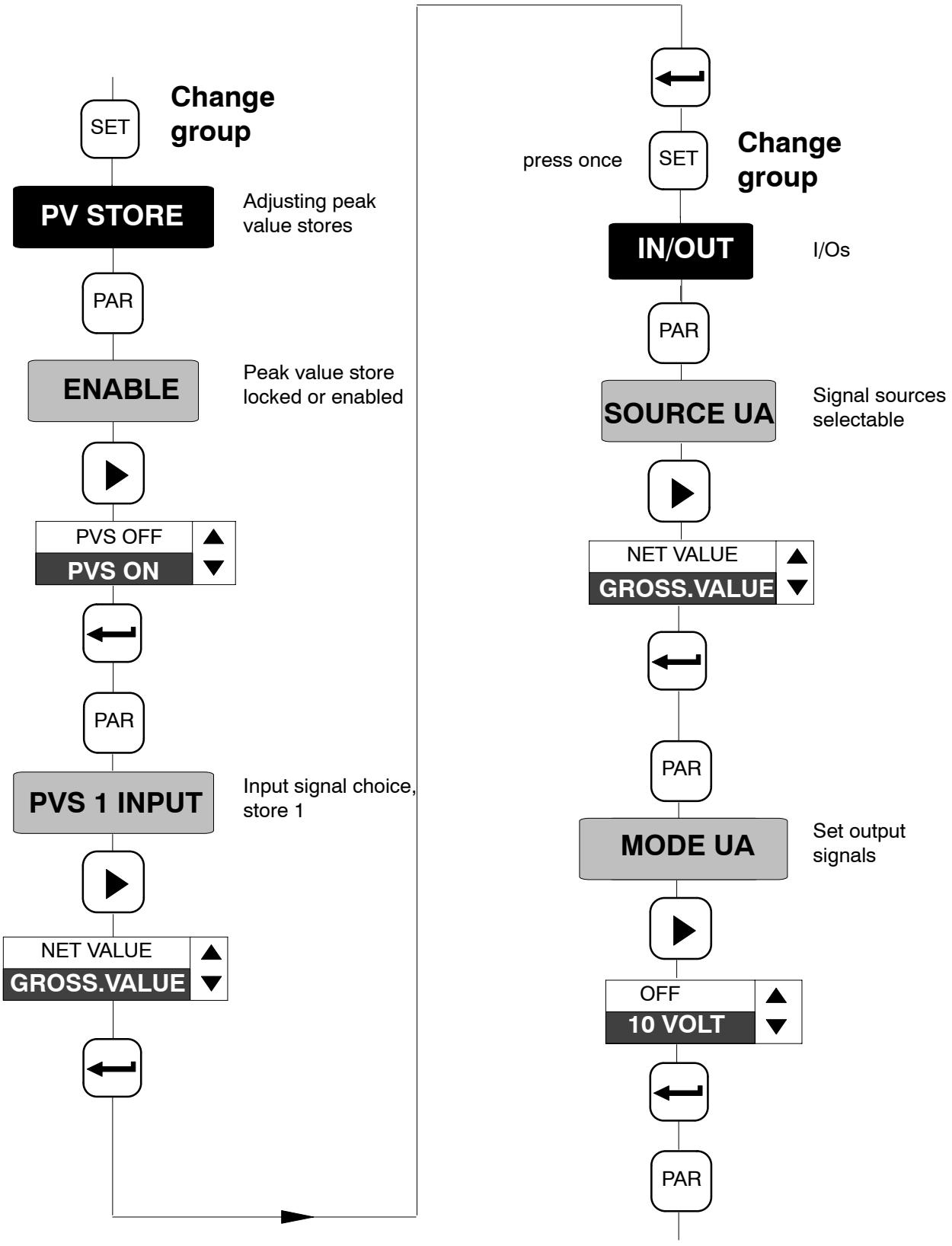
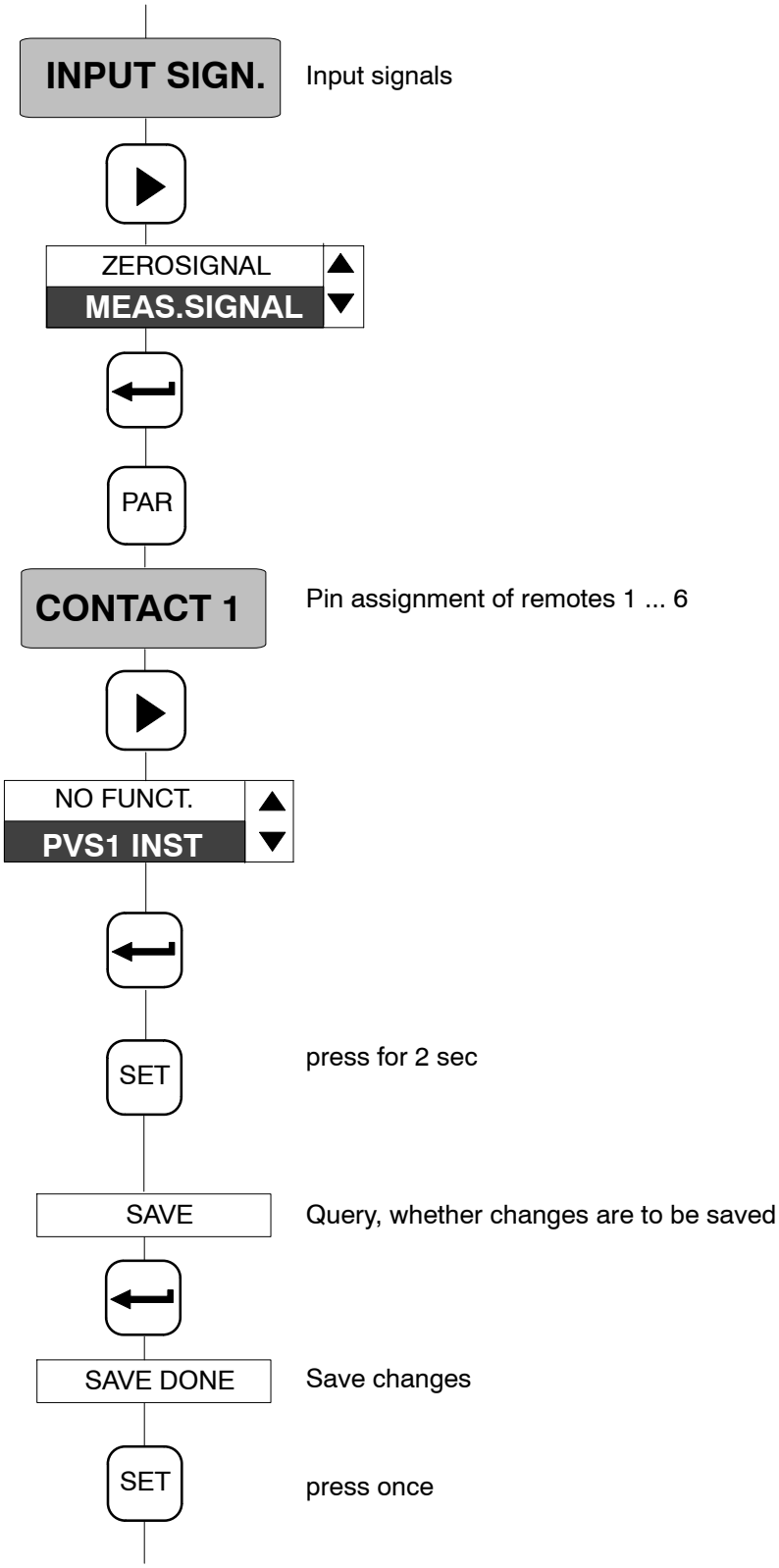

PAR
DEC. POINT
Decimal point input
0000
.
PAR
STEP
Digit step input
000000
000005
PAR
ZERO VALUE
MEAS
000000 N
00.0007
Zero value in mV/V
PAR
RANGE
Range
....
00.60000 mV/V
Transducer signal in accordance with the desired display range
SET
Change group
LIMITVAL.1
Set limit switches 1 ... 4
PAR
ENABLE
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


SET
Change group
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
10 VOLT
PAR



Measuring mode

7 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.
HIGHER	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	

8 Index

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S

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U

V

Z

Subject to modifications.
All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability.

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