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Description of Device Parameters
Gammapilot FMG50

Radiometric measurement

HART COMMUNICATION PROTOCOL

Endress+Hauser
People for Process Automation

1 About this document

1.1 Document function

The document is part of the Operating Instructions and serves as a reference for parameters, providing a detailed explanation of each individual parameter of the operating menu.

1.2 Symbols used

1.2.1 Safety symbols

⚠ CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

⚠ DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

⚠ WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

1.2.2 Symbols for certain types of information and graphics

Warns against radioactive substances or ionizing radiation

Permitted
Procedures, processes or actions that are permitted

Preferred
Procedures, processes or actions that are preferred

Forbidden
Procedures, processes or actions that are forbidden

Tip
Indicates additional information

Reference to documentation

Reference to page

Reference to graphic

Notice or individual step to be observed

1., 2., 3.
Series of steps

Result of a step

Operation via local display

Operation via operating tool

Write-protected parameter

1, 2, 3, ...
Item numbers

A, B, C, ...
Views

⚠ →
Safety instructions
Observe the safety instructions contained in the associated Operating Instructions

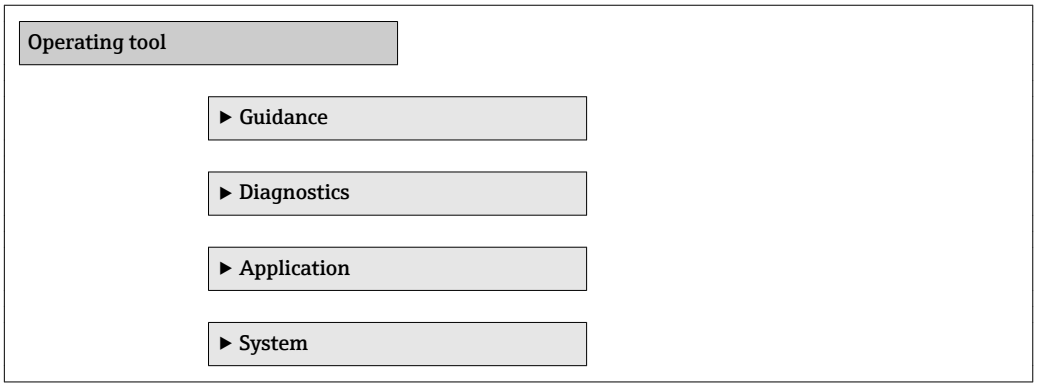
1.3 Documentation

Available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

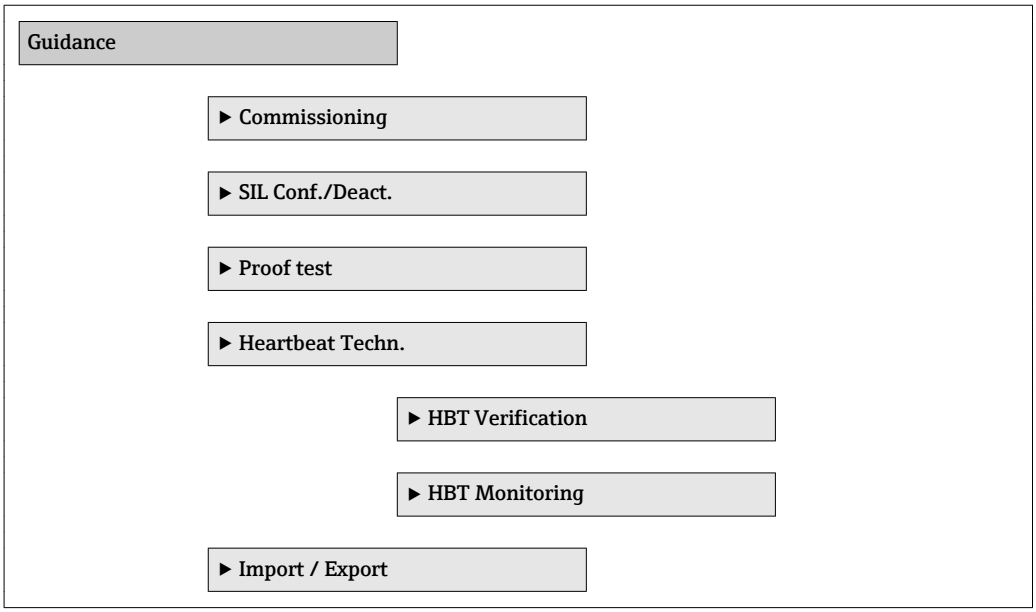
2 Structure of the "Operating tool" menu

Navigation Operating tool



3 "Guidance" menu

Navigation Operating tool → Guidance



3.1 "Commissioning" wizard

See operating instructions
BA01966F

3.2 "SIL mode activation/deactivation" wizard

see Functional Safety Manual
FY01007F

3.3 "Proof test" wizard

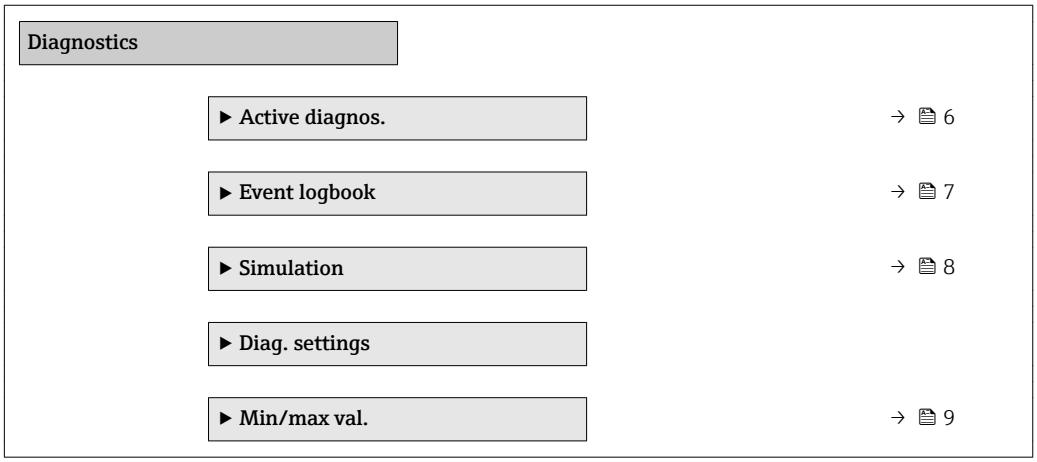
see Functional Safety Manual
FY01007F

3.4 "Heartbeat Technology" submenu

see Special Documentation for Heartbeat Verification + Monitoring
SD02414F

4 "Diagnostics" menu

Navigation Operating tool → Diagnostics



4.1 "Active diagnos." submenu, description of parameters

Navigation Operating tool → Diagnostics → Active diagnos.

Current diagnostics

Navigation Diagnostics → Active diagnos. → Actual diagnos. (0691)

Description Shows the current occured diagnostic event along with its diagnostic information.

User interface Positive integer

Factory setting 0

Timestamp

Navigation Diagnostics → Active diagnos. → Timestamp (0667)

Description Displays the timestamp for the currently active diagnostic message.

User interface Days (d), hours (h), minutes (m), seconds (s)

Factory setting

Prev.diagnostics

Navigation Diagnostics → Active diagnos. → Prev.diagnostics (0690)

Description Shows the diagnostic event that occurred prior to the current diagnostic event along with its diagnostic information.

User interface Positive integer

Factory setting 0

Timestamp

Navigation Diagnostics → Active diagnos. → Timestamp (0672)

Description Shows the timestamp of the previous diagnostic message.

User interface Days (d), hours (h), minutes (m), seconds (s)

Factory setting

4.2 "Event logbook" submenu, description of parameters

Navigation Operating tool → Diagnostics → Event logbook

Clear event list

Navigation Diagnostics → Event logbook → Clear event list (0706)

Description Delete all entries of the event list.

Selection
- Cancel
- Clear data

Factory setting Cancel

4.3 "Simulation" submenu, description of parameters

Navigation Operating tool → Diagnostics → Simulation

Simulation

Navigation Diagnostics → Simulation → Simulation (0635)

Selection
- Off
- Curr.output
- Level *
- Level distance *
- Level Volume *
- Density *
- Concentration *
- Conc. self radi. *
- Limit detection *
- Interface *
- Sim. pulse
- Diag. event sim.

Factory setting Off

Additional information Explanation of abbreviations:
-
-
-
-
-

Value current output

Navigation Diagnostics → Simulation → Value curr.out (16406)

Description Defines the value of the simulated output current.

User entry 3.5 to 22.5 mA

Factory setting 3.5 mA

* Visibility depends on order options or device settings

Diagnostic event simulation

Navigation Diagnostics → Simulation → Diag. event sim. (0737)

Description Select the diagnostic event to be simulated. Note: To terminate the simulation, select 'Off'.

Selection Off

Factory setting Off

Simulate value

Navigation Diagnostics → Simulation → Simulate value (16254)

User entry 0 to 110 %

Factory setting 0 %

Pulse output simulation

Navigation Diagnostics → Simulation → Puls.outp.sim. (15715)

Description The simulated pulse rate corresponds to the output value of the sensor. This value is therefore the value before the decay is calculated and is in cnt/s.

User entry 0 to 65 535 cnt/s

Factory setting 0 cnt/s

4.4 "Min/max val." submenu, description of parameters

Navigation Operating tool → Diagnostics → Min/max val.

Minimum terminal voltage

Navigation Diagnostics → Min/max val. → Min.term.volt. (0689)

Description Peakhold indicator of minimum terminal voltage measured

User interface 0.0 to 50.0 V

Maximum terminal voltage

Navigation Diagnostics → Min/max val. → Max.term.voltage (0663)

Description Peakhold indicator of maximum terminal voltage measured

User interface 0.0 to 50.0 V

Minimum electronics temperature

Navigation Diagnostics → Min/max val. → Min.electr.temp. (0688)

Description Peakhold indicator of minimum sensor electronics temperature measured. The measurement takes place in the vicinity of the photomultiplier.

User interface Signed floating-point number

Maximum electronics temperature

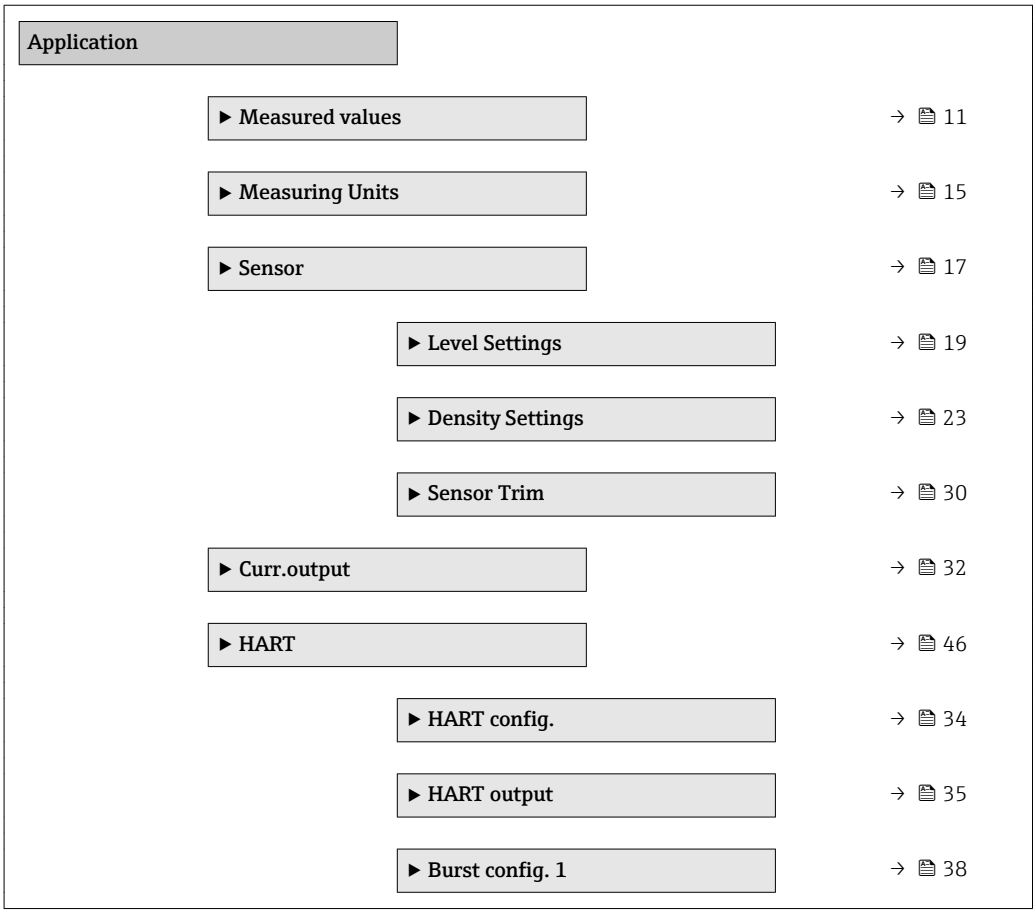
Navigation Diagnostics → Min/max val. → Max.electr.temp. (0665)

Description Peakhold indicator of maximum sensor electronics temperature measured. The measurement takes place in the vicinity of the photomultiplier.

User interface Signed floating-point number

5 "Application" menu

Navigation Operating tool → Application



5.1 "Measured values" submenu, description of parameters

Navigation Operating tool → Application → Measured values

Level linearized

Navigation Application → Measured values → Level linearized (16255)

User interface 0 to 100 %

Factory setting 0 %

Level

Navigation Application → Measured values → Level (16217)

User interface 0 to 100 %

Factory setting 0 %

Level linearized

Navigation Application → Measured values → Level linearized (16260)

Description Level linearized according to unit of length:
- mm
- cm
- dm
- ft
- in

User interface Signed floating-point number

Factory setting 0 m

Level linearized

Navigation Application → Measured values → Level linearized (16258)

Description Level linearized according to unit of volume:
- l
- cl
- cm^3
- dm^3
- m^3
- ft^3
- in^3
- gal (US)

User interface Signed floating-point number

Factory setting 0 l

Density

Navigation Application → Measured values → Density (16218)

Description **Density parameter**
Output when the "Commissioning wizard" is executed. The following units can be selected:
- g/cm³
- g/m³
- g/ml
- g/l
- kg/l
- kg/dm³
- kg/m³
- t/m³
- SG20°C
- lb/ft³
- lb/gal (us)
- lb/in³
- °API

User interface Signed floating-point number

Factory setting 0 kg/m³

Interface

Navigation Application → Measured values → Interface (16256)

User interface 0 to 100 %

Factory setting 0 %

Concentration

Navigation Application → Measured values → Concentration (16257)

User interface 0 to 100 %

Factory setting 0 %

Concentration self radiating material

Navigation Application → Measured values → Conc. self radi. (16259)

Description Displays the concentration of self-radiating material as %

User interface Signed floating-point number

Factory setting 0 %

Terminal voltage

Navigation Application → Measured values → Terminal volt. 1 (0662)

Description Displays the current terminal voltage applied at the output

User interface 0.0 to 50.0 V

Factory setting 0 V

Terminal curr.

Navigation Application → Measured values → Terminal curr. (16403)

Description Displays the current measured current value of the current output

User interface 0 to 30 mA

Factory setting 0 mA

Temperature

Navigation Application → Measured values → Temperature (0785)

Description Displays the current temperature of the main electronics

User interface Signed floating-point number

Factory setting 0 °C

Pulse

Navigation Application → Measured values → Pulse (15712)

Description **Raw pulse rate:** Displays the current raw pulses in cnt/125ms.

User interface 0 to 8 191 cnt/125 ms

Factory setting 0 cnt/s

Pulse

Navigation Application → Measured values → Pulse (15719)

Description **Pulse rate:** Displays the current pulses in cnt/s

User interface 0 to 65 535 cnt/s

Factory setting 0 cnt/s

Sensor temperature

Navigation Application → Measured values → Sensor temp. (15709)

Description Displays the current temperature of the sensor electronics

User interface −40.15 to 79.85 °C

Factory setting 0 °C

5.2 "Measuring Units" submenu, description of parameters

Navigation Operating tool → Application → Measuring Units

Distance unit

Navigation Application → Measuring Units → Distance unit (0551)

Description Length units to enter distances, e.g. beam path length.

Selection

SI units
- mm
- dm
- cm
- m

US units
- ft
- in

Factory setting m

Percent Unit

Navigation Application → Measuring Units → Percent Unit (0620)

User interface
Other units
%

Factory setting %

Volume unit

Navigation Application → Measuring Units → Volume unit (0563)

Description Select volume unit.

Selection

SI units	*US units*
▪ cl	▪ ft^3
▪ l	▪ in^3
▪ cm^3	▪ gal (us)
▪ dm^3	
▪ m^3	

Factory setting l

Temp. unit

Navigation Application → Measuring Units → Temperature unit (0557)

Description Select temperature unit.

Selection

SI units	*US units*
▪ °C	▪ °F
▪ K	▪ °R

Factory setting °C

Density unit

Navigation Application → Measuring Units → Density unit (0555)

Description Measurement unit to display and transmit the density value.

Selection

SI units
- g/cm³
- g/m³
- g/ml
- g/l
- kg/l
- kg/dm³
- kg/m³
- t/m³
- SG20°C

US units
- lb/ft³
- lb/gal (us)
- lb/in³

Other units
°API

Factory setting kg/m³

5.3 "Sensor" submenu, description of parameters

Navigation Operating tool → Application → Sensor

Diagnostic behavior

Navigation Application → Sensor → Diag. behavior (15710)

Description Available in the "Diagnostics" submenu. This function is used to switch gammagraphy detection on and off.

Selection
- Off
- Alarm
- Warning

Factory setting Off

Status signal

Navigation Application → Sensor → Status signal (15718)

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Funct. check (C)

Gammagraphy hold time

Navigation Application → Sensor → Gammagr.holdt (15711)

Description This function is used to define how long the measurement is suspended for if the Gammapilot detects interference gamma radiation. During this time, the output assumes the value defined in the "Gammagraphy" function. The hold time should be slightly longer than the maximum duration of a gammagraphy measurement. An alarm is signaled if the maximum (or minimum) pulse rate is still exceeded (or undershot) following the hold time.

User entry 1 to 1 200 s

Factory setting 10 s

Gammagraphy limit

Navigation Application → Sensor → Gammagraphy lim. (15716)

Description The calibration values and the gammagraphy sensitivity setting are used to calculate the gammagraphy limit. Interference gamma radiation is detected above this pulse rate.

User interface Signed floating-point number

Sensitivity of gammagraphy detection

Navigation Application → Sensor → Sens.gammagrh. (15717)

Description This function is used to determine the sensitivity of gammagraphy detection when the maximum pulse rate is exceeded. The values entered can be between "1" sigma (maximum sensitivity) and "7" sigma (minimum sensitivity).

User entry 1 to 7

Factory setting 3

5.3.1 "Level settings" submenu, description of parameters

Navigation Operating tool → Application → Sensor → Level settings

Calibration or linearization type

Navigation Application → Sensor → Level settings → Cal. or Lin.type (16211)

Selection
- Linear
- Standard
- Customized table
- One point calibration
- Multipoint calibration

Factory setting Standard

Background radiation

Navigation Application → Sensor → Level settings → Background rad. (15701)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Empty calibr.

Navigation Application → Sensor → Level settings → Empty calibr. (16201)

User entry 0 to 60 000 cnt/s

Factory setting 8 000 cnt/s

Level at empty calibration

Navigation Application → Sensor → Level settings → Empty calib.lev. (16207)

User entry 0 to 100 %

Factory setting 0 %

Empty calibration date

Navigation Application → Sensor → Level settings → Empty cal.date (16204)

Factory setting

Full calibr.

Navigation Application → Sensor → Level settings → Full calibr. (16202)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Level at full calibration

Navigation Application → Sensor → Level settings → Full calib.level (16206)

User entry 0 to 100 %

Factory setting 100 %

Full calibration date

Navigation Application → Sensor → Level settings → Full cal.date (16205)

Factory setting

Continuous level unit type

Navigation Application → Sensor → Level settings → Level Unit Type (16216)

Selection
- Distance unit
- Volume unit
- %

Factory setting %

Percent Unit

Navigation Application → Sensor → Level settings → Percent Unit (0620)

User interface

Other units
%

Factory setting %

Distance unit

Navigation Application → Sensor → Level settings → Distance unit (0551)

Description Length units to enter distances, e.g. beam path length.

Selection

SI units
- mm
- dm
- cm
- m

US units
- ft
- in

Factory setting m

Volume unit

Navigation Application → Sensor → Level settings → Volume unit (0563)

Description Select volume unit.

Selection

SI units
- cl
- l
- cm^3
- dm^3
- m^3

US units
- ft^3
- in^3
- gal (us)

Factory setting l

Activate table

Navigation Application → Sensor → Level settings → Activate table (16220)

Selection
- Disable
- Enable

Factory setting Disable

Table mode

Navigation Application → Sensor → Level settings → Table mode (16219)

Selection
- Normalized pulse rate
- Semiautomatic *
- Clear table
- Sort table

Factory setting Normalized pulse rate

Edit table

Navigation Application → Sensor → Level settings → Edit table (16223)

User entry 1 to 32

Factory setting 1

Customer Input Value

Navigation Application → Sensor → Level settings → Customer Input (16221)

User entry Positive floating-point number

Factory setting 0 cnt/s

Customer Input Value

Navigation Application → Sensor → Level settings → Customer Input (16224)

User interface Signed floating-point number

Factory setting 0 cnt/s

* Visibility depends on order options or device settings

Pulse

Navigation Application → Sensor → Level settings → Pulse (15719)

Description **Pulse rate:** Displays the current pulses in cnt/s

User interface 0 to 65 535 cnt/s

Factory setting 0 cnt/s

Customer value

Navigation Application → Sensor → Level settings → Customer value (16222)

User entry 0.0 to 110.0 %

Factory setting 0 %

5.3.2 "Density Settings" submenu, description of parameters

Navigation Operating tool → Application → Sensor → Density Settings

Calibration or linearization type

Navigation Application → Sensor → Density Settings → Cal. or Lin.type (16211)

Selection
- Linear
- Standard
- Customized table
- One point calibration
- Multipoint calibration

Factory setting Standard

Background radiation

Navigation Application → Sensor → Density Settings → Background rad. (15701)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Density unit

Navigation Application → Sensor → Density Settings → Density unit (0555)

Description Measurement unit to display and transmit the density value.

Selection

SI units
- g/cm³
- g/m³
- g/ml
- g/l
- kg/l
- kg/dm³
- kg/m³
- t/m³
- SG20°C

US units
- lb/ft³
- lb/gal (us)
- lb/in³

Other units
- °API

Factory setting kg/m³

Distance unit

Navigation Application → Sensor → Density Settings → Distance unit (0551)

Description Length units to enter distances, e.g. beam path length.

Selection

SI units
- mm
- dm
- cm
- m

US units
- ft
- in

Factory setting m

Beam path length

Navigation Application → Sensor → Density Settings → Beam path length (16208)

User entry 0.01 to 10 m

Factory setting 0.1 m

Use the applicator settings

Navigation Application → Sensor → Density Settings → Use applicator (16236)

Selection
- No
- Yes

Factory setting No

Absorption coefficient

Navigation Application → Sensor → Density Settings → Absorp.coeff. (16215)

Description The mass attenuation coefficient is a measure of the reduction in intensity of electromagnetic radiation as it passes through a given material.

User entry 0.1 to 100 mm^2/g

Factory setting 7.7 mm^2/g

Additional information Visible depending on device settings.

Pulse rate 1. density calibration point

Navigation Application → Sensor → Density Settings → Pulse dens.cal1 (16225)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Additional information Visible depending on device settings.

The same parameters are valid for density calibration 1 to 4 (extension 1 to 4)

Density value of 1. calibration point

Navigation Application → Sensor → Density Settings → Density cal1 (16212)

User entry 0.1 to 10 000 kg/m^3

Factory setting 0.1 kg/m^3

Density calibration date 1. point

Navigation Application → Sensor → Density Settings → Dens.cal.date1 (16246)

Factory setting

Additional information Visible depending on device settings.
The same parameters are valid for density calibration 1 to 4 (extension 1 to 4)

Enable 1. density calibration point

Navigation Application → Sensor → Density Settings → Enable.dens1 (16232)

Selection
- Disable
- Enable

Factory setting Disable

Additional information Visible depending on device settings.
The same parameters are valid for density calibration 1 to 4 (extension 1 to 4)

Pulse dens.cal2

Navigation Application → Sensor → Density Settings → Pulse dens.cal2 (16229)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Density cal2

Navigation Application → Sensor → Density Settings → Density cal2 (16226)

User entry 0.1 to 10 000 kg/m³

Factory setting 0.1 kg/m³

Dens.cal.date2

Navigation Application → Sensor → Density Settings → Dens.cal.date2 (16247)

Factory setting

Enable dens2

Navigation Application → Sensor → Density Settings → Enable dens2 (16233)

Selection
- Disable
- Enable

Factory setting Disable

Pulse dens.cal3

Navigation Application → Sensor → Density Settings → Pulse dens.cal3 (16230)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Density cal3

Navigation Application → Sensor → Density Settings → Density cal3 (16227)

User entry 0.1 to 10 000 kg/m³

Factory setting 0.1 kg/m³

Dens.cal.date3

Navigation Application → Sensor → Density Settings → Dens.cal.date3 (16248)

Factory setting

Enable dens3

Navigation Application → Sensor → Density Settings → Enable dens3 (16234)

Selection
- Disable
- Enable

Factory setting Disable

Pulse dens.cal4

Navigation Application → Sensor → Density Settings → Pulse dens.cal4 (16231)

User entry 0 to 60 000 cnt/s

Factory setting 0 cnt/s

Density cal4

Navigation Application → Sensor → Density Settings → Density cal4 (16228)

User entry 0.1 to 10 000 kg/m³

Factory setting 0.1 kg/m³

Dens.cal.date4

Navigation Application → Sensor → Density Settings → Dens.cal.date4 (16249)

Factory setting

Enable dens4

Navigation Application → Sensor → Density Settings → Enable dens4 (16235)

Selection
- Disable
- Enable

Factory setting Disable

Activate table

Navigation Application → Sensor → Density Settings → Activate table (16220)

Selection
- Disable
- Enable

Factory setting Disable

Table mode

Navigation Application → Sensor → Density Settings → Table mode (16219)

Selection
- Normalized pulse rate
- Semiautomatic *
- Clear table
- Sort table

Factory setting Normalized pulse rate

Edit table

Navigation Application → Sensor → Density Settings → Edit table (16223)

User entry 1 to 32

Factory setting 1

Customer Input

Navigation Application → Sensor → Density Settings → Customer Input (16221)

User entry Positive floating-point number

Factory setting 0 cnt/s

* Visibility depends on order options or device settings

Customer value

Navigation Application → Sensor → Density Settings → Customer value (16222)

User entry 0.0 to 110.0 %

Factory setting 0 %

5.3.3 "Sensor Trim" submenu, description of parameters

Navigation Operating tool → Application → Sensor → Sensor Trim

Year

Navigation Application → Sensor → Sensor Trim → Year (15704)

User entry 1 to 99

Factory setting 1

Month

Navigation Application → Sensor → Sensor Trim → Month (15723)

User entry 1 to 12

Factory setting 1

Day

Navigation Application → Sensor → Sensor Trim → Day (15724)

User entry 1 to 31

Factory setting 1

Hour

Navigation Application → Sensor → Sensor Trim → Hour (15702)

User entry 0 to 23

Factory setting 0

Minute

Navigation Application → Sensor → Sensor Trim → Minute (15703)

User entry 0 to 59

Factory setting 0

HV output value

Navigation Application → Sensor → Sensor Trim → HV output value (15732)

User interface 0 to 65 535 V

Factory setting 0 V

HV Start Value

Navigation Application → Sensor → Sensor Trim → HV Start Value (15733)

User interface 0 to 65 535 V

Factory setting 0 V

Pulse

Navigation Application → Sensor → Sensor Trim → Pulse (15712)

Description **Raw pulse rate:** Displays the current raw pulses in cnt/125ms.

User interface 0 to 8 191 cnt/125 ms

Factory setting 0 cnt/s

5.4 "Curr.output" submenu, description of parameters

Navigation Operating tool → Application → Curr.output

Output current

Navigation Application → Curr.output → Output curr. (16401)

Description Shows the actual calculated value of the output current.

User interface 3.5 to 22.5 mA

Terminal current

Navigation Application → Curr.output → Terminal curr. (16403)

Description Shows the current value of the current output which is currently measured.

User interface 0 to 30 mA

Lower range value output

Navigation Application → Curr.output → Lo.range.outp. (16414)

Description This measured value is assigned to the output value 4 mA.

Additional information The display depends on the measured variable selected.

Upper range value output

Navigation Application → Curr.output → Up.rangval.out (16409)

Description This measured value is assigned to the output value 20 mA.

Additional information The display depends on the measured variable selected.

Measuring mode current output

Navigation Application → Curr.output → Measmode c.out (16404)

Description Select measuring mode for output.

Selection
- Standard
- Inverse
- Bi-directional

Factory setting Standard

Additional information Enables a reversal of the current output behavior in relation to the measured value (inverse) or a bidirectional behavior in which the target range upper value is set to 12 mA.

Current range output

Navigation Application → Curr.output → Cur.range outp (16405)

Description Define the current range used to transmit the measured or calculated value. In brackets are indicated the “low saturation value” and the “high saturation value”. If Measured value <= “low saturation”, the output current is set to “low saturation”. If Measured value >= “high saturation”, the output current is set to “”high saturation”. Note: Currents below 3.6 mA or above 21.5 mA can be used to signal an alarm.

Selection
- 4...20 mA
  (4 to 20.5 mA)
- 4...20 mA NE
  (3.8 to 20.5 mA)
- 4...20 mA US
  (3.9 to 20.8 mA)

Factory setting 4...20 mA NE

Additional information Defines the target range for the current during normal measuring operation.

Failure behavior current output

Navigation Application → Curr.output → Fail.behavior (16402)

Description Defines which current the output assumes in the case of an error. Min: < 3.6 mA Max: >21.5 mA.

Selection
- Min.
- Max.

Factory setting Min.

Additional information This setting is overwritten by the position of the DIP switch for alarm current (on the device).

Failure current

Navigation Application → Curr.output → Failure current (16415)

Description Enter current output value in alarm condition.

User entry 21.5 to 23 mA

Factory setting 22.5 mA

Additional information The **Failure current** parameter **Max.** option can be defined here.
This parameter is only displayed if the **Fail.behavior** parameter was set to **Max.** option

5.5 "HART" submenu, description of parameters

5.5.1 "HART config." submenu, description of parameters

Navigation Operating tool → Application → HART → HART config.

HART address

Navigation Application → HART → HART config. → HART address (0219)

Description Enter adress for the data exchange via HART protocol.

User entry 0 to 63

Factory setting 0

Additional information Defines the HART address of the device.

No. of preambles

Navigation Application → HART → HART config. → No. of preambles (0217)

Description Defines the number of preambles in the HART telegram.

User entry 5 to 20

Factory setting 5

Loop current mode

Navigation Application → HART → HART config. → Loop curr mode (16416)

Selection
- Disable
- Enable

Factory setting Enable

Additional information If the **Loop curr mode** parameter is disabled, the multi-drop communication mode is enabled. The current output constantly outputs 4 mA in Multidrop mode.

Multi-drop is a digital HART mode, in which several devices can share the same cabling for current and communication. The output current is fixed in this mode.

5.5.2 "HART output" submenu, description of parameters

Navigation Operating tool → Application → HART → HART output

Assign PV

Navigation Application → HART → HART output → Assign PV (0234)

Description Identifies the process variable linked with the primary variable. Primary variable is used in HART as current output.

User interface
- Level *
- Level distance *
- Level Volume *
- Point level detection*
- Interface *
- Density *
- Concentration *
- Concentration self-radiating material*
- Raw pulse rate *

Factory setting Depends on the operating mode selected.

* Visibility depends on order options or device settings

Primary variable (PV)

Navigation Application → HART → HART output → Primary var (PV) (0201)

Description Shows the current measured value of the primary dynamic variable (PV).

User interface Unit depends on the measured value selected.

Factory setting 0%

Assign SV

Navigation Application → HART → HART output → Assign SV (0235)

Description Assign measured variable to secondary dynamic variable (SV).

Selection
- Level *
- Level distance *
- Level Volume *
- Point level detection*
- Interface *
- Density *
- Concentration *
- Concentration self-radiating material*
- Pulse *
- Sensor temperature
- Raw pulse rate *
- Electronic temperature*
- Terminal voltage*
- HV output value *
- Measured current*
- Slave Mode *

Factory setting Measur. curr.

Secondary variable (SV)

Navigation Application → HART → HART output → Second.var(SV) (0226)

Description Shows the current measured value of the secondary dynamic variable (SV).

User interface Unit depends on the measured value selected.

Factory setting 3.5 mA

* Visibility depends on order options or device settings

Assign TV

Navigation Application → HART → HART output → Assign TV (0236)

Description Assign measured variable to tertiary (third) dynamic variable (TV).

Selection
- Level *
- Level distance *
- Level Volume *
- Point level detection*
- Interface *
- Density *
- Concentration *
- Concentration self-radiating material*
- Pulse *
- Sensor temperature*
- Raw pulse rate *
- Electronic temperature
- Terminal voltage
- HV output value *
- Measured current
- Slave Mode *

Factory setting Sensor temperature

Tertiary variable (TV)

Navigation Application → HART → HART output → Tertiary var(TV) (0228)

Description Shows the current measured value of the tertiary (third) dynamic variable (TV).

User interface Unit depends on the measured value selected.

Factory setting 0 °C

Assign QV

Navigation Application → HART → HART output → Assign QV (0237)

Description Assign measured variable to quaternary (fourth) dynamic variable (QV).

Selection
- Level *
- Level distance *
- Level Volume *
- Point level detection*
- Interface *
- Density *

* Visibility depends on order options or device settings

- Concentration *
- Concentration self-radiating material*
- Pulse *
- Sensor temperature*
- Raw pulse rate *
- Electronic temperature*
- Terminal voltage*
- HV output value *
- Measured current*
- Slave Mode *

Factory setting Terminal voltage

Quaternary variable (QV)

Navigation Application → HART → HART output → Quaterna.var(QV) (0203)

Description Shows the current measured value of the quaternary (fourth) dynamic variable (QV).

User interface Unit depends on the measured value selected.

Factory setting 0.0 Volt

5.5.3 "Burst config. 1" submenu, description of parameters

Navigation Operating tool → Application → HART → Burst config. 1

Burst mode

Navigation Application → HART → Burst config. 1 → Burst mode 1 (2032–1)

Description Switch HART burst mode for burst message on.

Selection
- Off
- On

Factory setting Off

* Visibility depends on order options or device settings

Burst command

Navigation Application → HART → Burst config. 1 → Burst command 1 (2031–1)

Description Select the HART command that is sent to the HART master.

Selection
- Primary var (PV)
- Current/%Range
- DynamicVariables
- DV with status
- Device variables
- Add.device stat

Factory setting Current/%Range

Burst variable 0

Navigation Application → HART → Burst config. 1 → Burst variable 0 (2033)

Description For HART command 9 and 33, assign a HART device variable or process variable to burst variable.

Selection
- Level *
- Level distance *
- Limit detection *
- Interface *
- Density *
- Concentration *
- Level Volume *
- Pulse *
- Conc. self radi. *
- Sensor temp.
- Raw pulse rate *
- Terminal volt. *
- Electronic temp.
- HV output value *
- Percent of range
- Measur. curr.
- Primary var (PV)
- Second.var(SV)
- Tertiary var(TV)
- Quaterna.var(QV)
- Measur. curr.
- Not used

Factory setting Not used

Additional information "Raw pulse rate" and "HV Output Value" can only be selected if the Heartbeat option is enabled.

The description applies to burst variables 0-7.

* Visibility depends on order options or device settings

Trigger mode

Navigation Application → HART → Burst config. 1 → Trigger mode (2044)

Description Select the event that triggers the burst message.

Selection
- Continuous
- Window *
- Rising *
- Falling *
- On change

Factory setting Continuous

Trigger level

Navigation Application → HART → Burst config. 1 → Trigger level (2043)

Description Enter the burst trigger value that determines together with the option selected in 'Burst trigger mode' parameter the time of burst message.

User entry Signed floating-point number

Factory setting 2.0E-38

Min. upd. per.

Navigation Application → HART → Burst config. 1 → Min. upd. per. (2042)

Description Enter the minimum time span between two burst responses of one burst message.

User entry Positive integer

Factory setting 1000 ms

Max. upd. per.

Navigation Application → HART → Burst config. 1 → Max. upd. per. (2041)

Description Enter the maximum time span between two burst responses of one burst message.

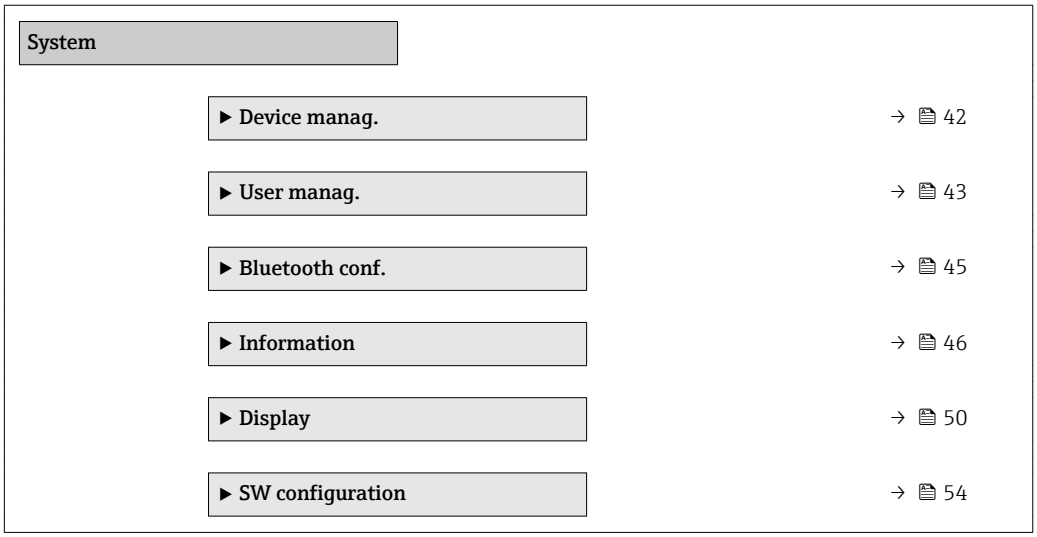
User entry Positive integer

* Visibility depends on order options or device settings

Factory setting 2 000 ms

6 "System" menu

Navigation Operating tool → System



6.1 "Device manag." submenu, description of parameters

Navigation Operating tool → System → Device manag.

Device tag

Navigation System → Device manag. → Device tag (0215)

Description Enter a unique name for the measuring point to identify the device quickly within the plant.

Factory setting **- Standard factory setting:** "EH_Gammapilot_[device serial number]"
- If a device tag was included in the order: the first 32 characters of the device tag

Device reset

Navigation System → Device manag. → Device reset (0000)

Description Reset the device configuration - either entirely or in part - to a defined state.

Selection
- Cancel
- To fieldbus default**
- To factory defaults*
- To delivery settings*
- Restart device

Factory setting Cancel

Operating time

Navigation System → Device manag. → Operating time (0652)

Description Indicates how long the device has been in operation.

User interface Days (d), hours (h), minutes (m), seconds (s)

Factory setting

6.2 "User manag." submenu, description of parameters

Navigation Operating tool → System → User manag.

Locking status

Navigation System → User manag. → Locking status (0004)

Description Indicates the write protection with the highest priority that is currently active.

User interface
- Hardware locked
- SIL locked
- Temp. locked

Additional information
- The Gammapilot FMG50 can be locked and unlocked via a switch on the main unit. Hardware locking can only be unlocked via the main unit (flip the switch). It is not possible to unlock the hardware by communication.
  The switch is identified by a key symbol
- For devices with SIL option, the "SIL locked" write protection can be enabled using the "SIL mode activation/deactivation" wizard.
  While this wizard is enabled, the "Temporarily locked" write protection is used.

For details, see the Functional Safety Manual.

Password

Navigation System → User manag. → Password (0048)

Description Enter the password for the 'Maintenance' user role to get access to the functionality of this role.

Factory setting

Additional information The user role can be changed after the password is entered.

Enter access code

Navigation System → User manag. → Ent. access code (0003)

Description Enter access code to disable write protection of parameters.

User entry 0 to 9 999

Factory setting 0

Status pw entry

Navigation System → User manag. → Status pw entry (0050)

Description Use this function to display the status of the password verification.

User interface
- --------
- Wrong password
- PW rule violated
- PW accepted
- Permiss. denied
- Conf PW mismatch
- PW reset done
- Invalid role
- Wrong sequence

Factory setting --------

New password

Navigation System → User manag. → New password (0032)

Description If the factory setting is not changed, the device works without write-protection, using userrole 'Maintenance'. The configuration data of the device can always be modified. Once the password has been defined, write-protected devices can only be set to maintenance mode if a correct password is entered in the parameter 'Password'. A new password is valid, after it has been confirmed within the parameter 'Confirm new password'. Any new password must consist of at least 4 and a maximum of 16 characters and can contain letters and numbers.

Factory setting

Confirm new password

Navigation System → User manag. → Conf. new passw. (0039)

Description Enter the new password again to confirm.

Factory setting

Old password

Navigation System → User manag. → Old password (0049)

Description Enter the current password, to subsequently change the existing password.

Factory setting

Reset password

Navigation System → User manag. → Reset password (0047)

Description Enter a code to reset (delete) the current password.
Caution: Use this function only if the current password is lost.
Contact the Endress+Hauser Sales Center.

Factory setting

6.3 "Bluetooth conf." submenu, description of parameters

Navigation Operating tool → System → Bluetooth conf.

Bluetooth activation

Navigation System → Bluetooth conf. → Bluetooth active (0136)

Description Access via Bluetooth can be disabled here. Bluetooth can then only be restarted via HART.

Selection
- Disable
- Enable

Factory setting Enable

6.4 "Information" submenu, description of parameters

Navigation Operating tool → System → Information

6.4.1 "Device" submenu, description of parameters

Navigation Operating tool → System → Information → Device

XML build number

Navigation System → Information → Device → XML build no. (0014)

User interface Positive integer

Factory setting 1850

6.4.2 "HART" submenu, description of parameters

Navigation Operating tool → System → Information → HART

Device ID

Navigation System → Information → HART → Device ID (0221)

Description Shows the device ID for identifying the device in a HART network.

User interface Positive integer

Factory setting 123456

Device type

Navigation System → Information → HART → Device type (0209)

Description Shows the device type with which the measuring device is registered with the HART Communication Foundation.

User interface 0 to 65 535

Factory setting 4 400

Device revision

Navigation System → Information → HART → Device revision (0204)

Description Shows the device revision with which the device is registered with the HART Communication Foundation.

User interface 0 to 255

Factory setting 1

6.4.3 "Sensor" submenu, description of parameters

Navigation Operating tool → System → Information → Sensor

Serial number

Navigation System → Information → Sensor → Serial number (0071)

Description Displays the serial number of the sensor electronics.

Factory setting This is read out from the sensor electronics.

Software rev.

Navigation System → Information → Sensor → Software rev. (0072)

Description Displays the firmware revision of the sensor electronics.

User interface Positive integer

Build no. Software

Navigation System → Information → Sensor → Build no. softw. (0079)

Description Displays the build number of the sensor electronics.

User interface 0 to 65 535

Hardware rev.

Navigation System → Information → Sensor → Hardware rev. (0074)

Description Displays the hardware revision of the sensor electronics.

6.4.4 "Electronics" submenu, description of parameters

Navigation Operating tool → System → Information → Electronics

Serial number

Navigation System → Information → Electronics → Serial number (0071)

Description Displays the serial number of the transmitter electronics.

Software rev.

Navigation System → Information → Electronics → Software rev. (0072)

Description Displays the firmware revision of the transmitter electronics.

User interface Positive integer

Build no. Software

Navigation System → Information → Electronics → Build no. softw. (0079)

Description Displays the build number of the display module.

User interface 0 to 65 535

Hardware rev.

Navigation System → Information → Electronics → Hardware rev. (0074)

Description Displays the hardware revision of the display module.

6.4.5 "Displ./Bluetooth" submenu, description of parameters

Navigation Operating tool → System → Information → Displ./Bluetooth

Serial number

Navigation System → Information → Displ./Bluetooth → Serial number (0071)

Description Displays the serial number of the PCB of the display electronics.

Software rev.

Navigation System → Information → Displ./Bluetooth → Software rev. (0072)

Description Displays the firmware revision of the display module.

User interface Positive integer

Build no. Software

Navigation System → Information → Displ./Bluetooth → Build no. softw. (0079)

Description Displays the build number of the display module.

User interface 0 to 65 535

Hardware rev.

Navigation System → Information → Displ./Bluetooth → Hardware rev. (0074)

Description Displays the hardware revision of the display module.

6.5 "Display" submenu, description of parameters

Navigation Operating tool → System → Display

Format display

Navigation System → Display → Format display (0098)

Description Select how measured values are shown on the display.

Selection
- 1 value, max.
- Bargr. + 1 value
- 2 values
- Val. large+2val.
- 4 values

Factory setting 1 value, max.

Value 1 display

Navigation System → Display → Value 1 display (0107)

Description Select the measured value that is shown on the local display.

Selection
- Pulse [1)]
- Raw pulse rate
- Level *
- Limit detection *
- Interface *
- Density *
- Concentration *
- Conc. self radi. *

1) The average pulse rate is calculated based on the raw pulse rate in cnt/125ms with the output damping and then multiplied by a factor of 8 to give a pulse rate in cnt/s. In the case of low damping values, the pulse rate shown fluctuates more widely.

* Visibility depends on order options or device settings

- Curr.output
- Level distance
- Level Volume

Factory setting Level

Decimal places 1

Navigation System → Display → Decimal places 1 (0095)

Description This selection does not affect the measurement and calculation accuracy of the device.

Selection
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

Factory setting x.xx

Value 2 display

Navigation System → Display → Value 2 display (0108)

Description Select the measured value that is shown on the local display.

Selection
- None
- Curr.output
- Pulse
- Raw pulse rate
- Level *
- Limit detection *
- Interface *
- Density *
- Concentration *
- Conc. self radi. *
- Level distance *
- Level Volume *

Factory setting None

* Visibility depends on order options or device settings

Decimal places 2

Navigation System → Display → Decimal places 2 (0117)

Description This selection does not affect the measurement and calculation accuracy of the device.

Selection
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

Factory setting x.xx

Value 3 display

Navigation System → Display → Value 3 display (0110)

Description Select the measured value that is shown on the local display.

Selection
- None
- Curr.output
- Pulse
- Raw pulse rate
- Level *
- Limit detection *
- Interface *
- Density *
- Concentration *
- Conc. self radi. *
- Level distance *
- Level Volume *

Factory setting None

Decimal places 3

Navigation System → Display → Decimal places 3 (0118)

Description This selection does not affect the measurement and calculation accuracy of the device.

Selection
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

* Visibility depends on order options or device settings

Factory setting x.xx

Value 4 display

Navigation System → Display → Value 4 display (0109)

Description Select the measured value that is shown on the local display.

Selection
- None
- Curr.output
- Pulse
- Raw pulse rate
- Level *
- Limit detection *
- Interface *
- Density *
- Concentration *
- Conc. self radi. *
- Level distance *
- Level Volume *

Factory setting None

Decimal places 4

Navigation System → Display → Decimal places 4 (0119)

Description This selection does not affect the measurement and calculation accuracy of the device.

Selection
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

Factory setting x.xx

Contrast display

Navigation System → Display → Contrast display (0105)

Description Adjust local display contrast setting to ambient conditions (e.g. lighting or reading angle).

User entry 20 to 80 %

* Visibility depends on order options or device settings

Factory setting 30 %

6.6 "SW configuration" submenu, description of parameters

Navigation System → SW configuration

Activate SW option

Navigation System → SW configuration → Activate SW opt. (0029)

Description Enter the application package code or code of another re-ordered functionality to enable it.

User entry Positive integer

Factory setting 0

Additional information Please contact the Service Department for the activation code.

7 "Diagnostic list" menu

7.1 "Diagnostic list" menu, description of parameters

Navigation Local display → Diagnostic list

Diagnostics 1

Navigation Diagnostic list → Diagnostics 1 (0692)

Description Displays the currently active diagnostic message with the highest priority.

User interface Positive integer

Diagnostics 2

Navigation Diagnostic list → Diagnostics 2 (0693)

Description Displays the currently active diagnostic message with the second highest priority.

User interface Positive integer

Diagnostics 3

Navigation Diagnostic list → Diagnostics 3 (0694)

Description Shows the currently active diagnostic message with the third highest priority.

User interface Positive integer

Diagnostics 4

Navigation Diagnostic list → Diagnostics 4 (0695)

Description Shows the currently active diagnostic message with the fourth highest priority.

User interface Positive integer

Diagnostics 5

Navigation Diagnostic list → Diagnostics 5 (0696)

Description Shows the currently active diagnostic message with the fifth-highest priority.

User interface Positive integer

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