Special Documentation
Proline Promass 300 and 500

HART, MODBUS and PROFINET
Gas Fraction Handler

Endress+Hauser [EH]

People for Process Automation

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1   About this document

1.1   Target audience

This Special Documentation is aimed at specialists who use the device to measure under two phase flow conditions.

1.2   Document function

This Special Documentation is designed to support the user when configuring the Gas Fraction Handler.

This Special Documentation supplements the relevant device documentation for the Proline Promass 300 and Proline Promass 500 Coriolis flowmeters. It does not replace the associated Operating Instructions or other device documentation (Technical Information, Brief Operating Instructions, Description of Device Parameters, Ex Documentation etc.).

1.3   Associated device documentation

The associated device documentation can be downloaded from the Endress+Hauser website.

1. Call up the website www.endress.com and select the Downloads section.

2. Under Downloads, select "Manuals and Datasheets" as the documentation type.

3. Enter the documentation code (e.g. GP01057D) in the Text Search field and click Search to confirm.

This Special Documentation must be used in conjunction with the following device documentation:

Device	Communication protocol	Documentation	Documentation code
Proline Promass 300	HART	Description of Device Parameters	GP01057D
Proline Promass 500	HART	Description of Device Parameters	GP01060D
Proline Promass 300	Modbus RS485	Description of Device Parameters	GP01059D
Proline Promass 500	Modbus RS485	Description of Device Parameters	GP01062D
Proline Promass 300	PROFINET	Description of Device Parameters	GP01115D
Proline Promass 500	PROFINET	Description of Device Parameters	GP01121D

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

1.4   Symbols used

1.4.1   Safety symbols

Symbol	Meaning
⚠ DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
⚠ WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
⚠ CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE	**NOTE!** This symbol contains information on procedures and other facts which do not result in personal injury.

1.4.2   Symbols for certain types of information

Symbol	Meaning
ⓘ	**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

2 Basic safety instructions

It is absolutely essential to observe the safety information in the Operating Instructions for the specific device and in the associated device documentation.

All requirements relating to personnel, workplace safety, operational safety and IT security contained in the associated Operating Instructions must be observed.

3 Validity of Special Documentation and device documentation

The device is equipped with the Gas Fraction Handler feature used for optimizing measurement in two phase flow conditions.

The procedures for installation, configuration, etc. that are described in this Special Documentation may differ from the descriptions in the device documentation. When using the Gas Fraction Handler functions, the procedures described in this Special Documentation must be used.

4 Parameter Gas Fraction Handler in the "Measurement mode" submenu

Navigation   🔲🔳 Expert → Sensor → Measurement mode

▶ Measurement mode		
	Gas Frac Handler (6377)	→ 🗎 8
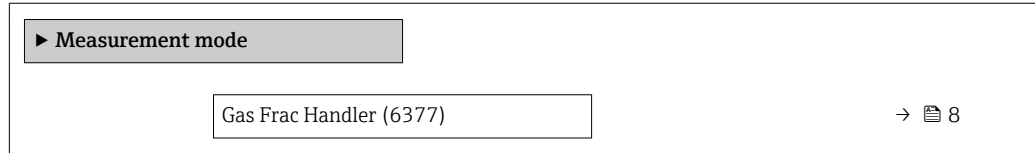
Gas Frac Handler   🔏

Navigation   🔲🔳 Expert → Sensor → Measurement mode → Gas Frac Handler (6377)

Description   Activates the Gas Fraction Handler function for two phase media.

Selection   • Off
                     • Moderate
                     • Powerful

Factory setting Off

4.1 Additional description Gas Fraction Handler

- Gas Fraction Handler is a Promass software feature that improves measurement stability and repeatability as well as provides valuable process diagnostic information in the event of two phase flow conditions (e.g. gas entrainment).
- The function continuously tests for the presence of disturbances in single-phase flow, i.e. for gas bubbles in liquids or for droplets in gas.
- In the presence of the second phase, flow and density will become increasingly unstable. The Gas Fraction Handler function improves measurement stability with respect to the severity of the disturbances, with no effect under the condition of a single-phase flow. The following parameters and settings comprise the Gas Fraction Handler function for Promass.
- The diagnostic Index Inhomogeneous Medium indicates the severity of the second phase.

Parameter	Selection / User entry	Additional description
Gas Frac Handler	• Off • Moderate • Powerful	• By default, this parameter is set to off. When a second phase is detected, large fluctuations of flow and density will occur. • Gas Fraction Handler stabilizes the output value and enables a better readability for operators and an easier interpretation by process control system. • The level of smoothing is adjusted according to the severity of disturbances introduced by the second phase. The influence of the disturbances can be configured with this switch in two steps: • When set to off Gas Fraction Handler is not active. • Powerful is used for applications with very significant levels of second phase. • Moderate should be used for applications with low level or intermittent levels of second phase. Gas Fraction Handler is cumulative to any fixed damping constants applied to flow and density set elsewhere in the instrument parameterization.

5 Additional information in the "Medium index" submenu

Navigation   �🔲   Expert → Application → Medium index

▶ Medium index		
Index inh.medium (6368)	→ 🔖	10
Cut off inh. gas (6375)	→ 🔖	10
Cut off liquid (6374)	→ 🔖	11
Index sus.bubble (6376)	→ 🔖	11
Cut off bubbles (6370)	→ 🔖	11

Index inh.medium

Navigation	�🔲 Expert → Application → Medium index → Index inh.medium (6368)
Description	Shows the degree of inhomogeneity of the medium.
User interface	Signed floating-point number
Factory setting	2

Cut off inh. gas   🔒

Navigation	�🔲 Expert → Application → Medium index → Cut off inh. gas (6375)
Description	Enter cut off value for wet gas applications. Below this value the Index inhomogeneous medium is set to 0.
User entry	Positive floating-point number
Factory setting	0.25

Cut off liquid   🔒

Navigation	🔘▣ Expert → Application → Medium index → Cut off liquid (6374)
Description	Enter cut off value for liquid applications. Below this value the Index inhomogeneous medium is set to 0.
User entry	Positive floating-point number
Factory setting	0.05

Index sus.bubble

Navigation	🔘▣ Expert → Application → Medium index → Index sus.bubble (6376)
Description	Shows the relative amount of suspended bubbles in the medium.
User interface	Signed floating-point number
Factory setting	0

Cut off bubbles   🔒

Navigation	🔘▣ Expert → Application → Medium index → Cut off bubbles (6370)
Description	Enter cut off value for suspended bubbles. Below this value the Index suspended bubbles is set to 0.
User entry	Positive floating-point number
Factory setting	0.05

5.1   Additional description

Parameter	User entry / User interface	Additional description
Index inh. medium	Positive floating-point number	• The Index Inhomogeneous Medium diagnostic indicates the overall severity of the second phase associated with free bubbles. • When there is no entrained gas in a liquid, the value is 0 and for very high levels of gas volume fractions (associated with severe slug flow, for example), the value exceeds 10. • The diagnostic value becomes greater with increasing gas volume fraction. It will not saturate with excessive second phase. • Although the index gives a qualitative correlation to the severity of gas entrainment, it should not be understood 1 to 1 as gas volume fraction. • The Index Inhomogeneous Medium diagnostic is repeatable under the same entrained gas condition, and thus can be used to better understand process conditions and the level of gas entrainment on a relative basis. • Also note that the Index Inhomogeneous Medium diagnostic can also be used to similarly describe the relative level of solids in a liquid application or the relative level of liquid phase in a wet gas application.
Cut off inh. gas	Positive floating-point number	This parameter is used for wet gas applications. If the Index Inhomogeneous Medium falls below this value, the Index Inhomogeneous Medium is reported as zero.
Cut off liquid	Signed floating-point number	This parameter is used for entrained gas in liquid applications or for solids in liquid applications. If the Index Inhomogeneous Medium falls below this value, the Index Inhomogeneous Medium is reported as zero.

5.1.1   Additional information for Promass Q

The following additional parameters and settings comprise the Gas Fraction Handler function for Promass Q. Promass Q, due to its use of two operating frequencies (Multi-frequency Technology) is also able to provide additional diagnostic information about gas entrainment that is suspended in the process fluid, typically in the form of microbubbles or small bubbles suspended in viscous fluids.

Parameter	User entry / User interface	Additional description
Index sus. bubble	Positive floating-point number	• This diagnostic value index describes the relative amount of microbubbles or small suspended bubbles in a process fluid. • When there is no entrained gas in the form of suspended bubbles in a liquid the value is 0 or nearly 0 and for very high levels of suspended gas volumes the value exceeds 10. • The diagnostic generally increases with increasing gas volumes, but the scaling is not linear with gas volume fraction percentage. • The index will not saturate with excessive second phase. • The Index Suspended Bubbles can be used to better understand process conditions and the level of gas entrainment on a relative basis, but Index values cannot be interpreted on an absolute basis.
Cut off bubbles	Signed floating-point number	This parameter is used for suspended entrained gas in liquid applications. If the Index Suspended Bubbles falls below this value, the Index Suspended Bubbles is reported as zero.

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