

Special Documentation

Proline Promass 300 and 500

HART, MODBUS, MODBUS TCP and PROFINET,
PROFINET over Ethernet-APL
Gas Fraction Handler



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1 About this document

1.1 Target group

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

1.2 Document function

This Special Documentation will help the user to configure the Gas Fraction Handler function.

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 www.endress.com and select the Downloads option.
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
Proline Promass 300	Modbus TCP	Description of Device Parameters	GP01235D
Proline Promass 500	Modbus TCP	Description of Device Parameters	GP01236D
Proline Promass 300	PROFINET over Ethernet-APL	Description of Device Parameters	GP01168D
Proline Promass 500	PROFINET over Ethernet-APL	Description of Device Parameters	GP01173D

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

1.4 Symbols

1.4.1 Safety symbols

DANGER

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

WARNING

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








CAUTION

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

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

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
	Series of steps
	Result of an individual 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


This device features the Gas Fraction Handler function for optimized measurement under two-phase flow conditions.

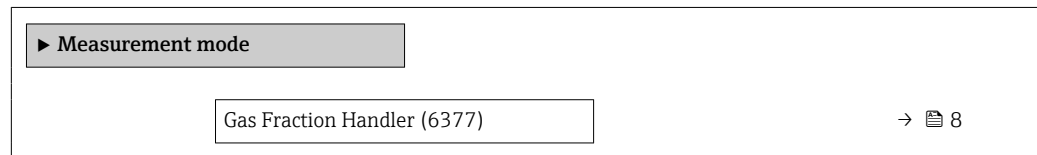
The procedures for installation, configuration, etc. that are described in this Special Documentation may differ from the descriptions in the device documentation. The procedures described in this Special Documentation must be followed if the Gas Fraction Handler function is used.

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

- The Gas Fraction Handler is a Promass software function that improves measurement stability and repeatability, and provides valuable diagnostic information on the process in the event of two-phase flow conditions (e.g. entrained gas).
- The function continuously checks for the presence of disturbances in single-phase flow, i.e. gas bubbles in liquids.
- In the presence of the second phase, flow and density become increasingly unstable. The Gas Fraction Handler function improves measurement stability with respect to the severity of the disturbances, without any effect under single-phase flow conditions. The Gas Fraction Handler function for Promass includes the following parameters and settings.
- The inhomogeneous medium diagnostic index indicates the extent of the second phase.

Navigation

 Expert → Sensor → Measurement mode



Gas Fraction 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

Additional information

- When a second phase is detected, large fluctuations in the flow and density will occur.
- The Gas Fraction Handler stabilizes the output values and enables better readability for operators and easier interpretation by the distributed control system.
- The level of smoothing is adjusted according to the severity of the disturbances introduced by the second phase.


The influence of the disturbances can be configured in two steps via this switch:


- **Off** option: Deactivates the Gas Fraction Handler. When a second phase is present, large fluctuations of flow and density will occur.
- **Moderate** option: Use for applications with low level or intermittent levels of second phase.
- **Powerful** option: Use for applications with very significant levels of second phase.






The Gas Fraction Handler is cumulative to any fixed damping constants applied to flow and density that are set elsewhere in the instrument parameterization.

Additional information in the **Medium index** submenu (→  9)

5 Additional information in the "Medium index" submenu

 Because of its two operating frequencies (multi-frequency technology), Promass Q can also provide additional diagnostic information about entrained gas that is bound in the process fluid and typically occurs in viscous liquids in the form of microbubbles or small bubbles.

Navigation  Expert → Application → Medium index

► Medium index	
Index inhomogeneous medium (6368)	→  9
Cut off inhomogeneous wet gas (6375)	→  10
Cut off inhomogeneous liquid (6374)	→  10
Index suspended bubbles (6376)	→  10
Cut off suspended bubbles (6370)	→  11

Index inhomogeneous 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

Additional information

- The 'Index inhomogeneous medium' diagnostic indicates the overall scale of two-phase flow associated with free bubbles.
- If the liquid does not contain entrained gas, the value is 0. For very high levels of gas content (e.g. associated with slug flow), the value is over 10.
- The diagnostic index generally increases with an increasing gas volume content. The index will not saturate with an excessive second phase.
- Although the index shows a qualitative correlation to the severity of gas entrainment, it should not be understood on a one-to-one basis as the gas volume content.
- The 'Index inhomogeneous medium' is reproducible under the same entrained gas conditions and can help to better understand the process conditions and the level of gas entrainment in relative terms.
- Similarly, the diagnostic index can also be used to describe the relative share of solids in a liquid application or the relative share of a liquid phase in a wet gas application.

Cut off inhomogeneous wet 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
Additional information	This parameter is used for wet gas applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is $< 400 \text{ kg/m}^3$, the 'Index inhomogeneous medium' is reported as zero.

Cut off inhomogeneous 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
Additional information	This parameter is used for entrained gas in liquid applications or for solids in liquid applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is $< 400 \text{ kg/m}^3$, the 'Index inhomogeneous medium' is reported as zero.

Index suspended bubbles

Navigation	Expert → Application → Medium index → Index sus.bubble (6376)
Prerequisite	The diagnostic index is only available for Promass Q.
Description	Shows the relative amount of suspended bubbles in the medium.
User interface	Signed floating-point number
Additional information	<ul style="list-style-type: none"> ■ This diagnostic index value describes the relative amount of microbubbles or small suspended bubbles in a process medium. ■ If 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 the value exceeds 10. ■ The diagnostic index generally increases with increasing gas volumes, but the scaling is not linear in relation to the percentage gas content. ■ The index will not saturate with an excessive second phase. ■ The 'Index inh. medium' can help to better understand the process conditions and the level of gas entrainment in relative terms, but the index values cannot be interpreted on an absolute basis.

Cut off suspended bubbles



Navigation	Expert → Application → Medium index → Cut off bubbles (6370)
Prerequisite	The parameter is only available for Promass Q.
Description	Enter the cut off value for suspended bubbles. Below this value the 'Index for suspended bubbles' is set to 0.
User entry	Positive floating-point number
Additional information	This parameter is used for gas entrained in liquid applications in the form of suspended bubbles. If the 'Index inhomogeneous medium' drops below this value, the 'Index inhomogeneous medium' is reported as zero.



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