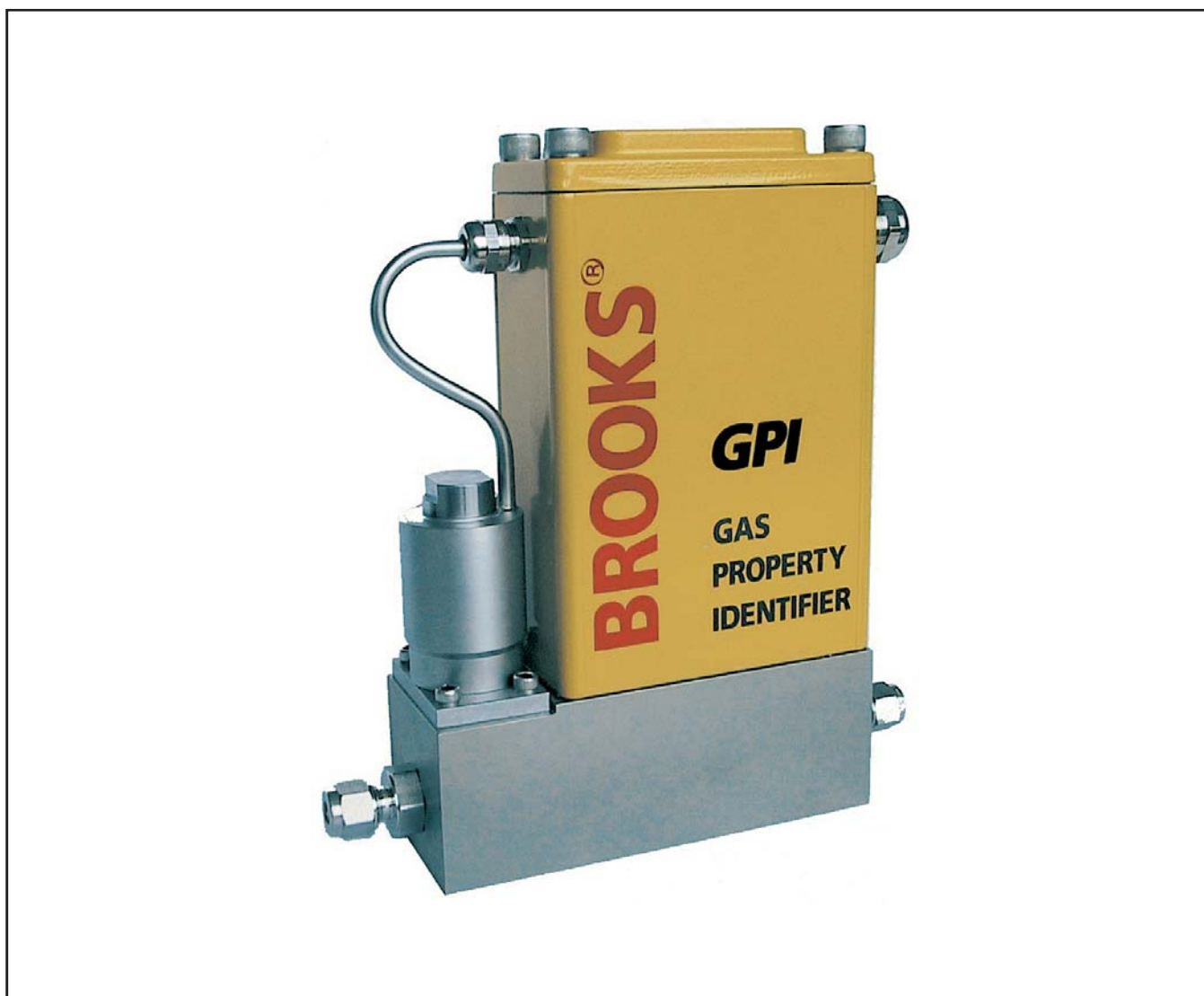


# A Precision Monitor for Natural Gas Applications Gas Property Identifier



*Accurate Measurement of Gross Heating Value and Wobbe Index*

## INTRODUCTION

Brooks Instrument is an integral member of the Emerson Process Management Group, a family of companies collaborating and providing integrated process solutions. This allows Brooks to use the intellectual assets of Emerson in developing new technologies and integral solutions to help our customers manage their processes more efficiently. Both Brooks Instrument and Ruhrgas partnered in a project. Geared towards critical Natural Gas applications and focussed on process efficiency improvements. Ruhrgas is a leading company with great competence in Natural Gas applications.

Combustion Properties of Natural Gas greatly determine the performance of the process. The properties influence the specifications of the end product, its reproducibility, yield, efficiency, and consistency in quality. These variables depend on the composition of the Natural Gas. The Brooks GPI (Gas Property Identifier), measures these critical process variables precisely and REAL TIME. This allows the user to monitor and control their valuable processes better.

## APPLICATIONS

The Brooks GPI is suitable for industrial applications using Natural Gas as an energy carrier and have great influence. These processes are particularly sensitive to changes in Gross heating value or Wobbe index. Examples of applications can be found in the Glass and Porcelain industry. Fuel cells and fibre optics industries use Natural Gas in critical processes. Other applications include gas mix monitoring, burner feed in furnaces or gas turbines for electrical power generators. The Brooks GPI (Gas Property Identifier), compensates for property change of the Natural Gas, enabling energy measurement. The response time of the Brooks GPI is typically 10 seconds and therefore allows for **real time** monitoring and optimization of the process.

If you are concerned about your process yield, consistency of your product quality and reduction of energy costs then its time you consider the Brooks GPI (Gas Property Identifier).

## MEASURING PRINCIPLE

The Brooks GPI is based on core technologies developed by Emerson Process Management and Brooks Instrument. Thermal Mass Flow, Temperature measurement and Pressure sensing technologies are all applied on the MF-series digital platform. These technologies are applied to the wide range of gas flow controllers at Brooks.

This patented design operates within the various pressure ranges that are typical to those used in the Natural Gas supply Industry. The primary output signals of the Brooks GPI are factory calibrated for Wobbe Index and Gross heating value. The product is compact, lightweight and easy to install and commission.

Compared to temperature controlled furnaces, the Brooks GPI measures any change in gas composition rapidly, allowing the user to feed a precisely controlled amount of heat to the process. This ensures that the specifications of critical processes are consistent in quality and reproducible, achieving JIT delivery obligations of products to customers.

Measurement is repeatable time after time, ensuring that process yield is improved, gas consumption cost may be reduced and emission is controlled better.

## OTHER BROOKS PRODUCTS APPLIED IN NATURAL GAS APPLICATIONS:

- Brooks TMF and Variable Area (VA) meters to measure air/fuel ratio at burners
- Brooks Smart Mass Flow Controllers to effectively control gas flows
- Brooks QUANTIM®, a Miniature Multivariable Mass Flow Controller, based on Coriolis Technology to precisely control odorant and corrosion inhibitor into Natural Gas

## Data Sheet

DS-GP-eng  
August, 2005

## Brooks® Gas Property Identifier

DESIGN FEATURES	CUSTOMER BENEFITS
<ul style="list-style-type: none"><li>Patented design, accurate and affordable measurement of Gross heating value and Wobbe Index</li></ul>	<ul style="list-style-type: none"><li>Enables on-line monitoring and control of burner applications, using Natural Gas</li></ul>
<ul style="list-style-type: none"><li>Wide range</li></ul>	<ul style="list-style-type: none"><li>Ensures that the specifications of your product are consistent in quality</li></ul>
<ul style="list-style-type: none"><li>Highly repeatable measurement</li></ul>	<ul style="list-style-type: none"><li>Improved yield, reduced cost</li></ul>
<ul style="list-style-type: none"><li>Extremely fast response</li></ul>	<ul style="list-style-type: none"><li>Ensures that the process is monitored real-time</li></ul>
<ul style="list-style-type: none"><li>Compact and lightweight design</li></ul>	<ul style="list-style-type: none"><li>Installation and start up is easy</li></ul>

### PERFORMANCE SPECIFICATIONS

Gas types

Gross heating value ( $H_{s,n}$ )

Wobbe index ( $W_{s,n}$ )

Accuracy

Repeatability

Response time

Temperature range

Temperature effect

Operating pressure

Natural gases: Including Nordsee-H, Gescher-L, G231 and G21.

0 - 100% / 8 - 16 kWh/m<sup>3</sup> (28.8-57.6MJ/m<sup>3</sup>).

0 - 100% / 10 - 20 kWh/m<sup>3</sup> (36-72MJ/m<sup>3</sup>).

\* Gross heating value better than 1% of rate under calibrated conditions.

\* Wobbe Index better than 2% of rate, under calibrated conditions.

Better than +/- 0.5% of rate.

Less than 15 seconds to within +/- 2% of final steady state value.

0°C to 60°C / 32°F to 140°F.

0.015%/°C over 20 to 60°C range (70 to 140°F range).

0.090%/°C over 0 to 20°C range (32 to 70°F range).

Inlet: 20 to 150 mbar gage, referenced to outlet pressure.

Outlet: Atmospheric to 50 mbar gage.

### PHYSICAL SPECIFICATIONS

Materials of construction

Housing

Weight

Dimensions (l x w x h)

Process connections

Electrical connections

Wetted parts: Stainless Steel 316L, 17-7PH, sandvik 1802, Silicon, Glass filled Nylon, Alumina Ceramic.

Process seals: Viton, Buna-N, PTFE/Kalrez or EPDM.

Polyurethane Painted Aluminum.

3 kg. (6.5 pnds)

190 x 50 x 260 mm. (7.4 x 1.95 x 10 Inch)

Reference Model Code

Terminal strip, accessible via conduit entry M20 or ½"NPT.

### FUNCTIONAL SPECIFICATIONS

Output signal(s)

Supply voltage requirement

Supply current consumption

Inrush current consumption

Primary 4 - 20 mA, representing Gross Heating Value

Secondary 4 - 20 mA, representing Wobbe Index.

+13.5 volts DC to +28 volts DC

300 mA @ 24 V supply and 20 °C (valve fully open) typical.

500 mA @ 15 V supply and 20 °C (valve fully open) typical.

1600 mA for 10 ms @ 15 V supply and 20 °C.

## Data Sheet

DS-GP-eng  
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## Brooks® Gas Property Identifier

### ENVIRONMENTAL EFFECTS

EMC effects

Meets the requirements of the EMC Directive (89/336/EEC)

EN 61326-1: 1997

PED

Sound Engineering Practice (SEP)

### AREA CLASSIFICATION AND CERTIFICATION

ATEX

Certified for use in hazardous areas in Europe

 II 3 GD T85 °C

EEx nA II T4 / IP65

KEMA 03ATEX 1520X

UL/cUL

UL/cUL certification pending

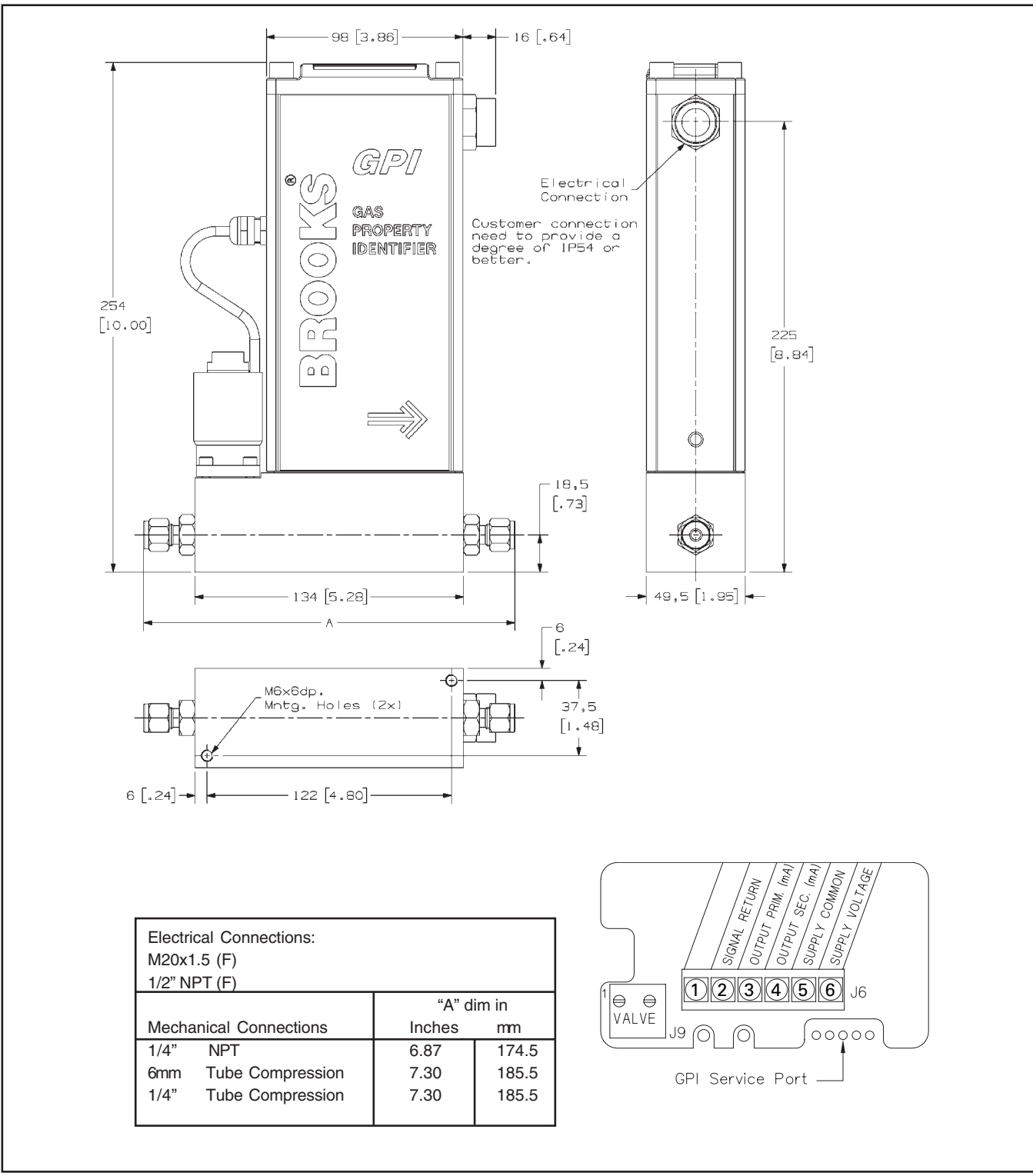
Protection degree

IP 65 and NEMA 4X

### Model Selection

<b>Base Modelnumber</b>		
GP/A		Gas Property Identifier
		<b>Packaging</b>
	10	NEMA 4x / IP65 Outdoor Application
		<b>Materials and Pressure Rating</b>
	A	Stainless Steel, 200 mbar / 2,9 psig
		<b>Process Connections</b>
	1C	1/4" Tube Compression
	1E	6 mm Tube Compression
	1L	1/4" NPT
		<b>Digital I/O Communications</b>
	A	None (see analog I/O)
		<b>Analog I/O Communications</b>
	H	4-20 mA I/O - 1/2"NPT (F) Conduit
	J	4-20 mA I/O - M20x1,5 (F) Conduit
		<b>Seal / Valve Seat Material</b>
	A	Viton
	B	Buna
	C	Kalrez
	D	PTFE / Kalrez (Kalrez vlv seat)
		<b>Certification</b>
	1	Not applicable
	2	ATEX Zone II

**Brooks® Gas Property Identifier**



Dimensional Drawing for Brooks GPI Series

## **BROOKS LOCAL AND WORLDWIDE SUPPORT**

Brooks Instrument provides sales and service facilities around the world, ensuring quick delivery from local stock, timely repairs and local based sales and service facilities.

Our dedicated flow experts provide consultation and support, assuring successful applications of the Brooks flow measurement and control products.

Calibration facilities are available in local sales and service offices. The primary standard calibration equipment to calibrate the mass flow products is certified by our local Weights and Measures Authorities and traceable to the relevant international standards.

## **START-UP SERVICE AND IN-SITU CALIBRATION**

Brooks Instrument can provide start-up service prior to operation when required.

For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the mass flow products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

## **CUSTOMER SEMINARS AND TRAINING**

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance persons. Please contact your nearest sales representative for more details.

## **HELP DESK**

In case you need technical assistance:



## ***SERV' INSTRUMENTATION***

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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.