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# LPG Sensor Technology

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| Temperature | Pressure | Level | Flow | Density |









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# Knowledge & Expertise

*“With a heritage dating back to the 1840s, Rototherm Group today is a strong and dedicated partner providing process instrumentation solutions and services to a range of industries”*

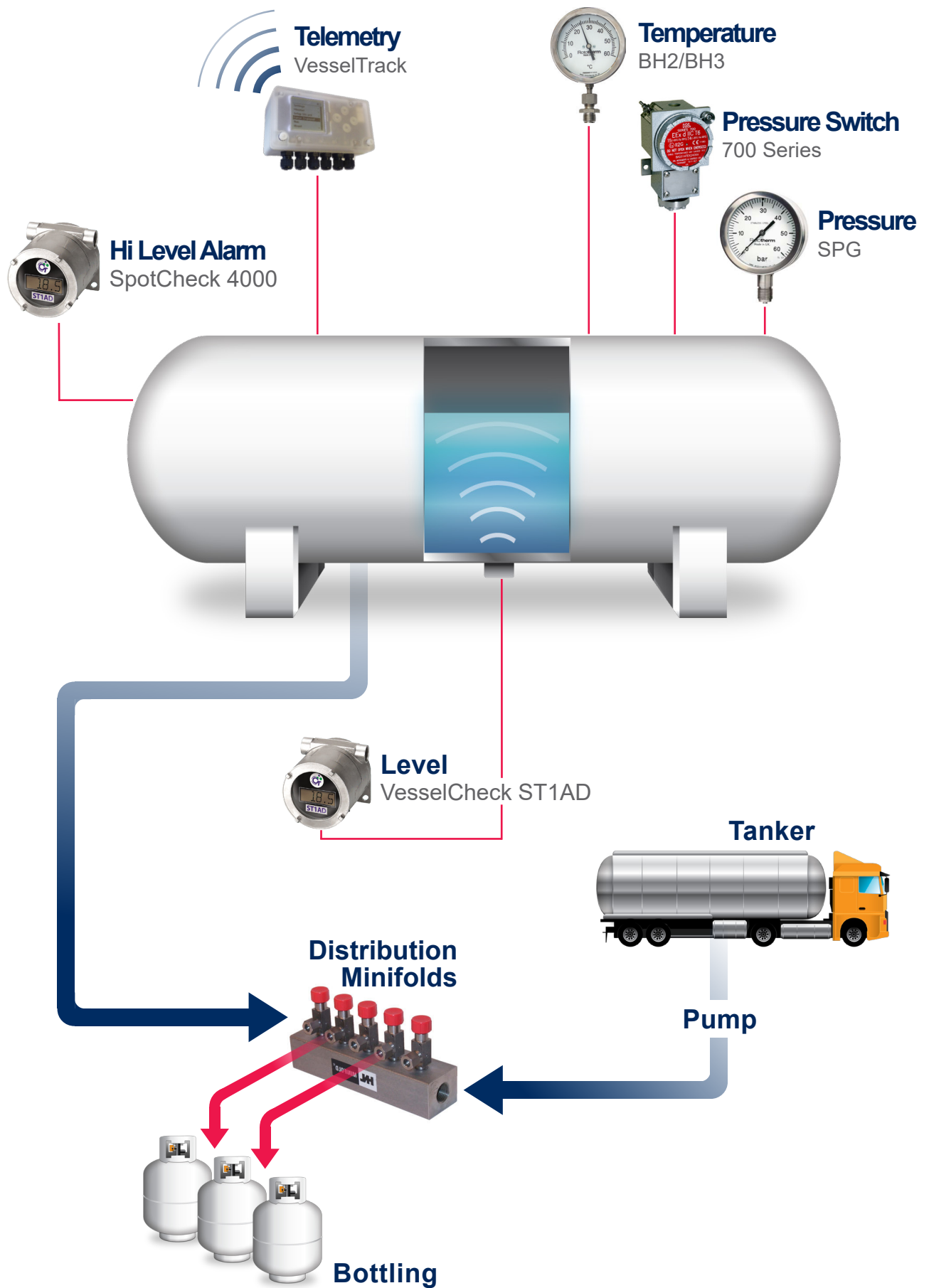
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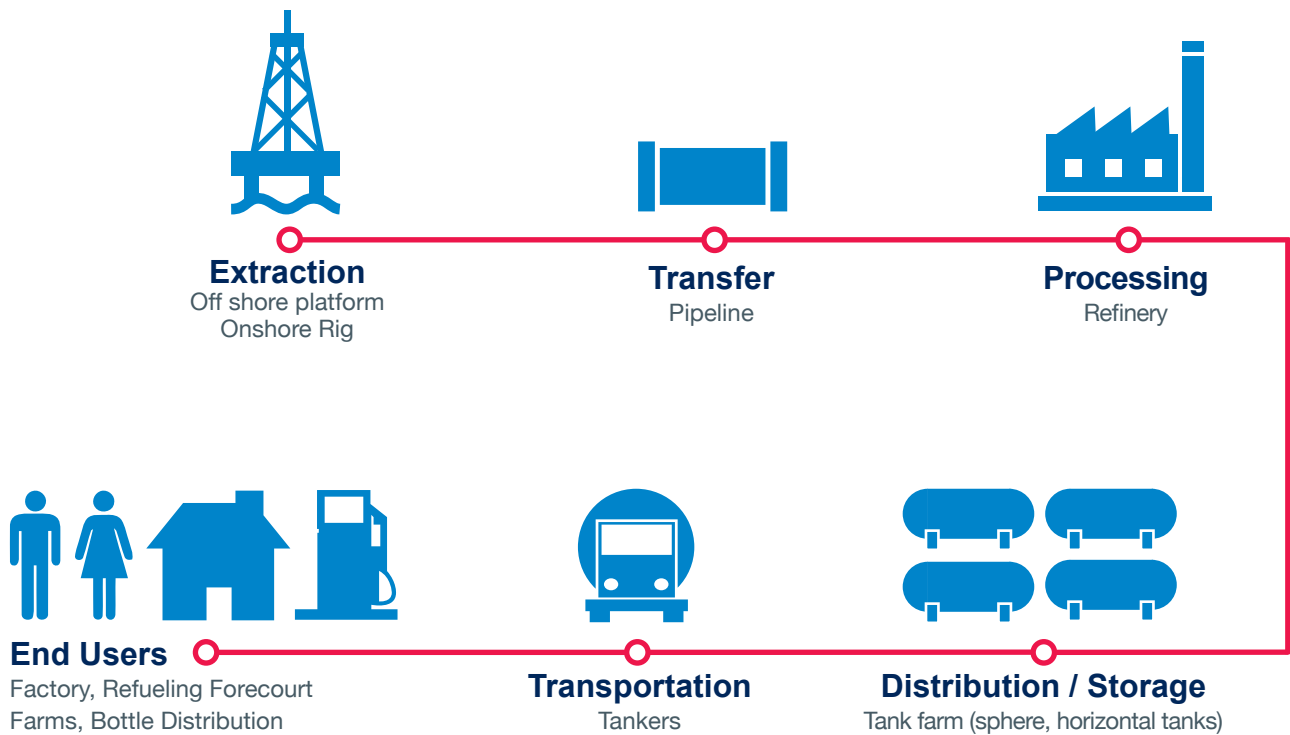
The Rototherm Group provides Temperature, Pressure, Liquid Concentration, Level & Flow Instrumentation and Services throughout the world and to a diverse range of markets.

One of those is the LPG market. Rototherm has grown its reputation in this area by providing customer dedicated solutions. We enjoy working with our customers to find the right solutions for their specific process enquiries.

At Rototherm we have a strong customer service focus and work closely with our customers to ensure their processes work efficiently, reliably and safely.







## Rototherm & the LPG Industry

Every industry places very specific demands and requirements on the measurement technology it utilises. Rototherm Group is a long standing partner within the LPG industry. We continue to build on our internal knowledge and experience by continuously developing and improving our products to enable our customers' LPG process needs to be met.

The LPG industry's critical safety requirements mean quality, reliability and approvals are principle requirements for any products applied in this environment. Rototherm Group's history within the petrochemical sector means its manufacturing and service quality have been founded on industry standards. As well as satisfying approval requirements, our quality focus ensures Rototherm Group instruments work reliably and effectively to the specifications of our customers.

Today Rototherm Group product is present in leading LPG organisation plants, depots and their worldwide distribution networks.



# Pressure Measurement

Rototherm Group created the first ever steam gauge in 1847. We have continued to build on this innovation and for the LPG sector, Rototherm's Pressure Measurement Range includes Process Gauges and Switches.

The range has been designed and developed with the critical safety, quality and operating environment in mind. Their proven reliability, accuracy, performance and durability has ensured Rototherm Group's reputation as a key supplier.

## Pressure Switches

### Heavy Duty, Hazardous Area

Series 700 Pneumatic/Electrical Switch

Application: High and low pressure safety alarm on storage vessels



- Exd, ExnC, ExtD, Exia, I.S. available
- Ranges from 16 mbar to 600 bar
- High overload ratings
- Simple maintenance and calibration
- Safety vent ring
- Innovative composite sealing ring technology for metallic diaphragm models

Used as both pneumatic and electrical switch for triggering site relief valves and evacuation alarms in case of emergency.

### Compact Switch

Series 100 Pneumatic Switch

Application: Pressure regulation on gas grid supply network



- Non-bleed in either switched state
- Configurable for N.O. or N.C. output
- Scale range: 0.1 to 100 bar
- Aluminium or stainless steel construction
- Accuracy class:  $\pm 0.1\%$

A Pneumatic Output pressure switch with Non-Bleed Two-Port Output Switching. These switches are designed for use on monitoring systems associated with natural gas transmission. Typically the switch can be used to protect a system or pipeline from an abnormally high or low pressure which might result in the discharge of gas.



## Process Gauges

### Safety Pattern Process Gauge

SPG (Full Stainless Steel)



- Nominal size 100-150mm
- Stainless steel, full safety pattern
- Class 1 accuracy to EN837
- Low range capsule sensors option
- Scale range: -1 to 1000 bar
- Available with NACE compliant wetted parts
- Solid front / Blow-out back
- Liquid fillable

### Heavy Duty DP Gauge

HDPG



- Nominal size: 100mm & 150mm
- Class 1 accuracy to EN837
- Scale range: 0 to 160 mbar; 0 to 25 bar
- Switching options
- Full safety pattern option available: Solid front / Blow-out back
- Multiple process connections
- Available with NACE compliant wetted parts

## Digital Pressure Gauges

### Digital Pressure Gauge

DG1

- Nominal size: 100mm
- High accuracy +/- 0.2% f.s.d.
- Stainless steel IP67 case
- Long battery life – 1 year continuous operation
- Scale range -1 to 400 bar
- 4 to 20mA output option available
- Supplied with calibration certificate traceable to national standards
- Available with MAX and MIN pressure readings
- Transmitter version available (DG1-TX)

High accuracy pressure indication with digital 4 digit screen, with approvals for use in hazardous area. Ideal for refinery applications or on processing lines. Supplied with ISO17025 calibration certification as standard.

### ATEX Digital Pressure Gauge

DG1 - I.S.

- Approved to EEx ia IIC T4 (-20°C<Ta<60°C) certification
- Suitable for use in zoned areas including on refining process lines and LPG vessels



# Temperature Measurement

In 1924 we developed the world's first bi-metallic thermometer. Today, through our temperature measurement solutions, we are ensuring process temperatures are monitored correctly in the LPG industry.

We work with our customers closely and are able to design and manufacture process specific solutions, whenever necessary. We work to provide the best solution to our customers' needs and our in-house engineering and manufacturing teams allow this to be possible.

We use only the highest quality, fully traceable raw materials for production, we test equipment in-house and then supply all our temperature assemblies with a documentation package that details the above.

## Temperature Assemblies with Thermowells

Application: Temperature Measurement within downstream LPG processing

### Standard Assembly

3AFR, 3AFT, 3ASR, 3AST



- Standard assemblies fitted with available MI probes and temperature transmitters
- Transmitters available with HART, Profibus, Foundation Fieldbus, and Modbus communication protocols
- Custom engineered designs, using exotic materials, PTC 19.3 wake frequency calculations
- Numerous connection head, extension, thread configurations
- Options for explosion proof and flameproof rating for hazardous areas
- RTD or Thermocouple assemblies. PT100 class A, AA, 1/5, 1/10 DIN
- Thermocouple inputs type K, J, T, and N selection: -200°C to +1200°C

### High Temperature Ceramic

3AHC



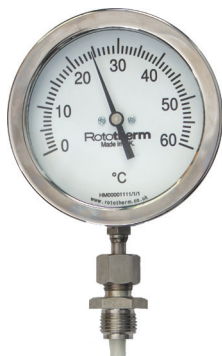
- High temperature ceramic assemblies
- Measuring range up to +1700°C

Rototherm has a wealth of experience supplying RTDs and thermocouples across the Oil and Gas industry. From off-shore wells and refineries, to LPG storage tanks and commercial applications.

## BH Heavy Duty Bi-Metallic Thermometers

### Heavy Duty Fixed Stem Thermometers

BH2



- Nominal size: 63mm, 100mm & 160mm
- Stainless steel construction – case and stem
- Scale range -70...+70 to 0 to 600°C
- External zero adjustment
- No contaminants – safe for food and chemical applications
- Can be supplied with a wide range of Rototherm thermowells
- Can be fitted with electrical contact heads (100mm & 160mm sizes only)
- Available with maximum or minimum value and index pointers

### Heavy Duty Any Angle Thermometers

BH3



- Nominal size: 100mm, 130mm & 160 mm
- Stainless steel construction
- Scale range -70 to 0 to 600°C
- External zero adjustment
- Silicone filling available
- No contaminants – safe for food and chemical applications
- Can be supplied with a wide range of Rototherm thermowells





# Level Measurement

## Active Level

Rototherm Group offers truly non-invasive level measurement, meaning it can be installed and commissioned while the tank is filled, with no interruption to production and site operations. Our range is available with ATEX/IECEx rating, and comprises the VesselCheck and SpotCheck family of products. With a new generation of customer demand for higher accuracy and low maintenance products, the VesselCheck is ideally suited to LPG applications

The VesselCheck offers accuracy levels better than 1% and requires virtually no maintenance or calibration. This means we are highly competitive against mechanical, radar, or top-down ultrasonic alternatives.

Tank Types: Vertical/Horizontal Cylinders; Spheres; Truck Tankers;  
Vehicle Fuel Tanks

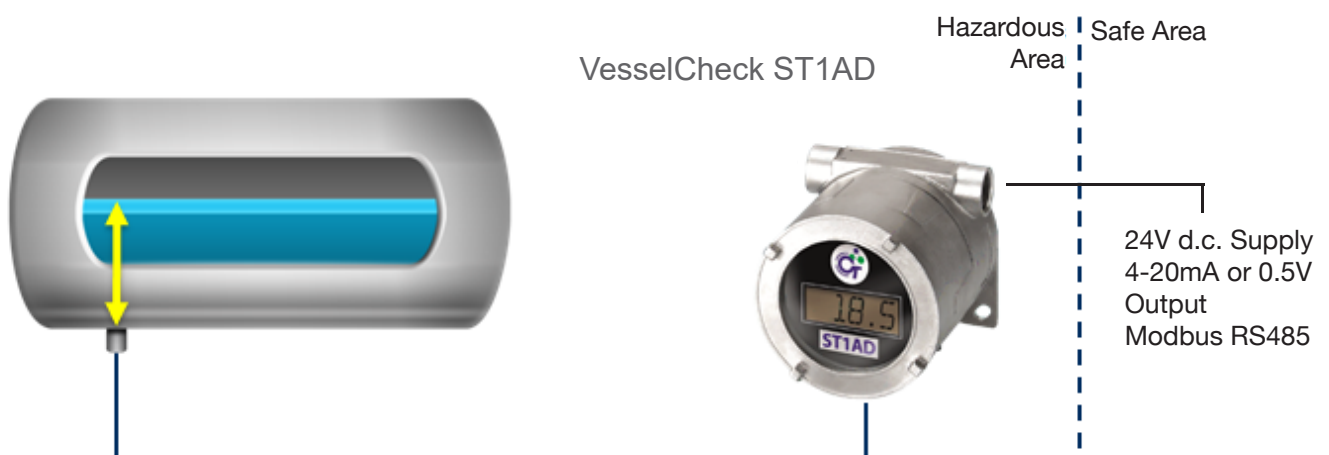
Sizes: 1000 to 50,000+ gallon

Product Type: Propane/Butane, Diesel, Petrol

## Non-Contact Tank Level Gauge

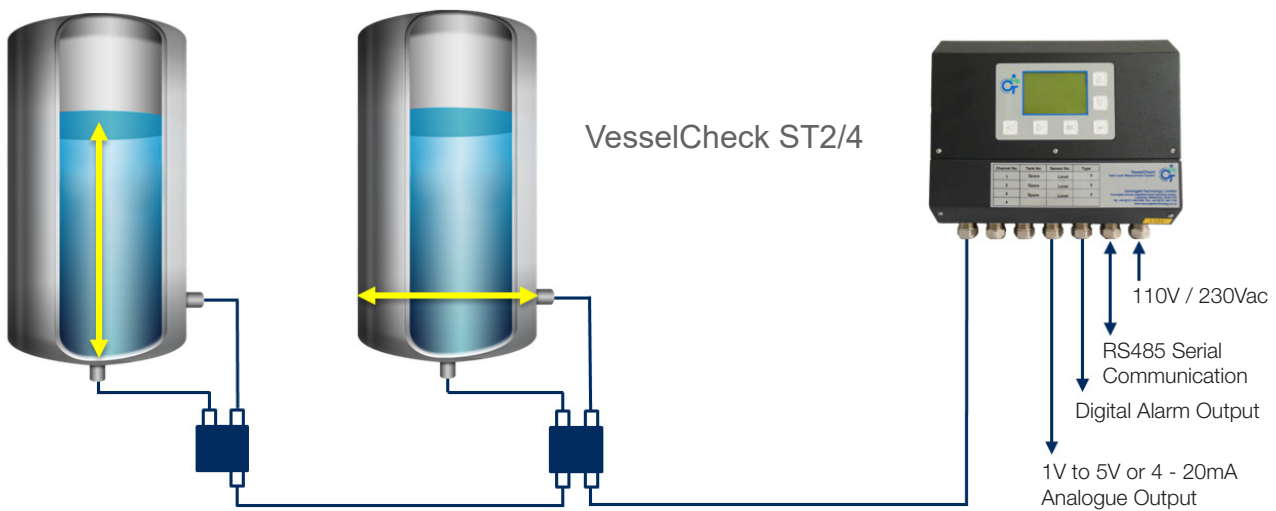
VesselCheck

- 100% non-invasive
- Sensors bonded to outside of tank
- Fits tank of most shapes and sizes
- Output to Telemetry system – various options
- Low cost, reliable & accurate tank gauging
- Not affected by pressure
- Easy installation – no tank break-in
- Simple retrofit to existing tanks
- No down-time during installation
- No moving parts – no maintenance
- Temperature integrated sensors available



## Non-Contact Tank Level Gauge

VesselCheck



## Spot Level

SpotCheck is a 100% non-invasive point-level monitoring/switch solution. The SpotCheck series is ideally suited as a high/low level alarm which can be used in conjunction with the VesselCheck series or as standalone high/low level monitoring. Our latest range rating was designed and developed specifically for LPG applications.

Application: Tank farm distribution depots real time high / low level alarm  
 Product: Propane, Butane, Diesel, Petrol, Oils / Lubricants

## Point Level, Pump Protector, Pig Detection

SpotCheck 1000

- Non-invasive liquid level switch for use in applications where avoiding contact is vital
- 1 second response time, volt-free relay for use as active alarm
- Echo-mode in pipes can be utilised as a pump protector (pipe run dry), pig detection or solid detection



## Point Level, ATEX Applications

SpotCheck 4000

- Fully ATEX/IECEx rated design
- SIL rating for safety critical applications
- Separate sensor design, so display can be mounted up to 100m from the process



# Flow Solutions

Rototherm's proven expertise in designing and manufacturing primary flow solutions in a wide range of material types, together with our ability to provide market leading delivery times has cemented our position as a leading and reliable flow partner.

Our understanding of the stringent quality standards and requirements within industries such as Oil and Gas is an important foundation in our continued development.

Rototherm's customer experience ensures: fully documented and approved manufacturing and weld procedures, fully traceable raw materials and certifications, highly skilled and competent machinists and welders brought together by an experienced project management team.

## Application:

- Mechanical flow measurement in pipelines
- Maintaining flow in blow-down or venting lines
- Distribution manifolds

With a world-class flow project department, we can help in the conceptual design, through to manufacture for any customised flow requirement.

## Aluminium Air Manifolds

Series 900 Manifolds



- Replaces complex assemblies of valves and fittings
- 5, 10 or 20 outlets
- Corrosion resistant
- Available for distribution of gaseous and liquid media also
- Ideal for use in panels and confined spaces

## SS Distribution Manifolds

Series 900 Manifolds



- Replaces complex assemblies of valves and fittings
- 5, 10 or 20 outlets
- Reduction in space / costs
- Available for distribution of gaseous and liquid media
- Ideal for use in panels and confined spaces



## Orifice Plate

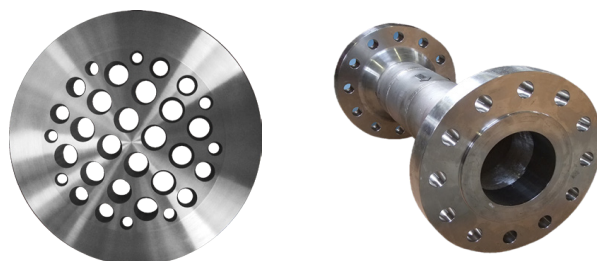
### Orifice Plate



- Most common and widely used differential pressure producer
- Suitable for a wide range of flow measurement applications in line sizes of 50mm and above
- Wide range of materials including exotics such as monel, hastelloy, as well as ceramic
- Orifice sizing on request
- Proven technology
- Range of orifice designs

## MultiStage Orifice Assemblies

### Multistage Restriction Orifice Plates



Flanged assembly consisting of a series of orifice plates to produce a specified reduction in line pressure or to create a critical flow, giving controlled flow rate regardless of changes in downstream conditions. In-house expertise covers all aspects of design and manufacture associated with restriction of pressure for control purposes.

Used for control of:

- Pressure drop
- Preventing cavitation and flashing in liquid flows
- Choked flow in gases
- Avoiding excessive noise or vibration

## Venturi

### Classical Venturi Tubes

- Classical Venturi Tubes - used on applications where a low permanent pressure loss is required
- Can be used on clean and dirty fluid in line sizes from 1" to 60"
- Calculation, design and manufacture to BS EN ISO 5167:1
- Fabricated from plate or machined from bar/forgings
- Flanged or weld-in construction
- Wide range of material grades
- Calibration service on request



# Data Displays, Recorders & Telemetry

We take the time to work with our customers to understand their process and data needs. There are many different options for data display and recording and we help customers select the right one, whether that be a complex customised human machine interface (HMI), or a mechanical paper chart recorder. Our comprehensive software design and field service engineering team can take your requirement from idea, to design, manufacture and finally on-site commissioning.

## Digital Recorder & Controller

iTrak Series, Indicator, Controller, Recorder



- Secure data recording
- Full colour, high resolution, touch screen display
- Up to 18 universal input channels
- Batch functionality
- Remote viewing and configuration
- Full audit trail
- USB "Plug & Play" & Local printing
- Access via LAN, intranet or internet
- Portable version available
- Crystal clear touchscreen displays
- Ethernet and serial communications
- Email / SMS notification

## Customised HMI and Alarm Panels

Graphic Colour Operator Interface



- 5 button keypad
- Resistive analogue touchscreen
- RS232/422/485 comms port
- Integrated ethernet & web server
- USB port
- Configured to your application

In partnership with:

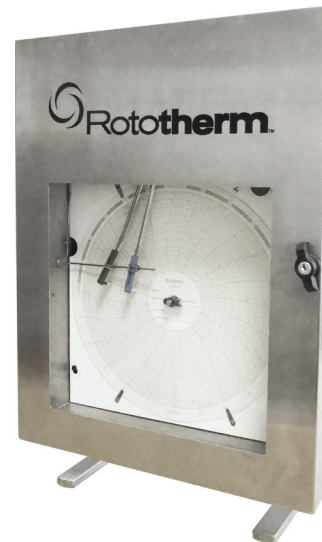
# Eurotherm®

**by Schneider Electric**

## Circular Chart Recorder (12")

Clearscan

- 1 to 3 pens
- Any combination of Temperature, Pressure and Flow: 1, 2 or 3 pen
- 1% measurement accuracy
- 12 inch chart sizes
- Panel, wall, pipe mounting or portable options available
- Battery or mechanical chart drive
- Very robust and proven design
- Light weight construction (<10kg)
- Stainless steel casing for harsh environments



## Telemetry

The 21st century has seen the evolution of mobile technologies, if your needs require data to be accessed on your computer and mobile device, Rototherm can offer solutions to match your needs.





# Services

The configuration and operation of equipment, particularly complex electronic control systems, can sometimes be a daunting task, hence why Rototherm Group offers multiple services to our customers (on-site and in-house) ensuring that all our products work in compliance with our customers' specifications.

Our services include:

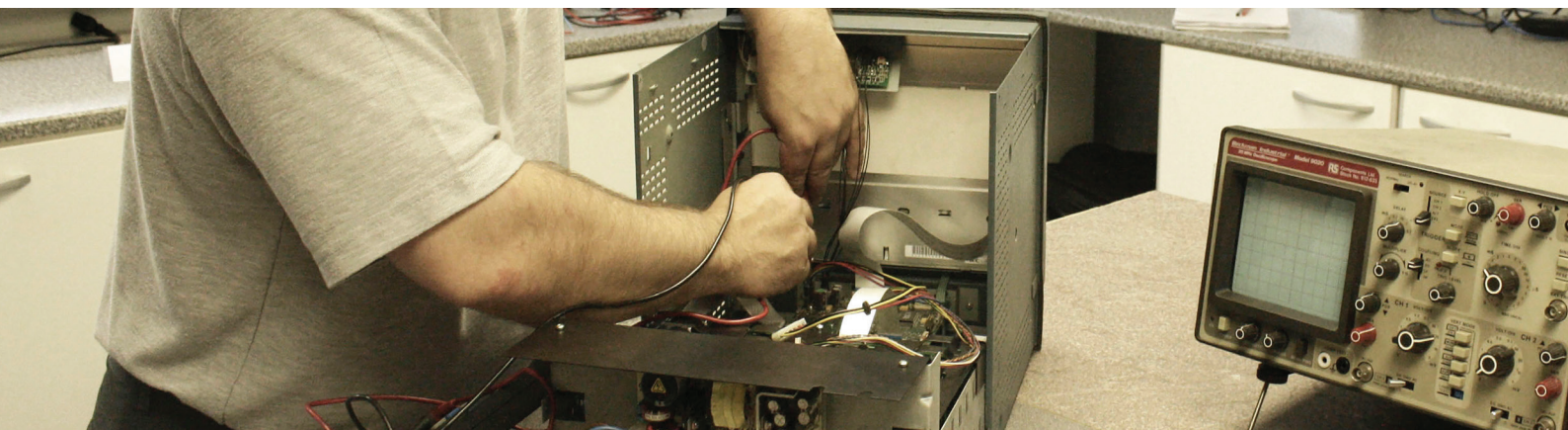
- Instrument Repairs & Modifications
- Calibration & Commissioning
- Training

We offer the services above for all products manufactured by Rototherm Group, including the portfolio of our partnerships, such as Eurotherm and Loma Systems/Lock Inspection.

Prior to performing our services, we conduct an initial site inspection to determine which equipment will be required and the time frame of the service, allowing clear and transparent communication with our customers. We provide quick delivery of associated site reports and certification which is followed by a post service report.

## Instrument Repairs and Modification

Rototherm's repair division, with its own dedicated workshop, ensures rapid customer solutions, which include not only current products, but also obsolete instruments. We keep large stocks and spares for our own manufactured products and also for our Rototherm Partners where we have agency agreements. All repairs, undertaken either on-site or workshop based, are controlled under our BS EN ISO 9001:2000 accredited Quality Procedures.



## Calibration & Commissioning

Rototherm Group offers an extensive list of calibration and commissioning services (in-house and on-site) and it is available to all our customers throughout the UK. We can also offer these services for third party products. Our calibration and commissioning services cover the following areas:

- Eurotherm products
- Loma Systems/Lock Inspection products
- Temperature
- Pressure
- Humidity
- Flow
- Level
- Density
- Liquid/CO<sub>2</sub>/O<sub>2</sub> concentration
- Density

Our services range from one off calibrations to complete customer solutions and commissioning. Our UKAS traceable calibration certificates show before and after adjustment readings, which are issued for each instrument or sensor tested. These certificates can be customised to suit the customer's specific requirements.

## Training Courses

Our courses, aimed at maintenance teams and engineers, are tailored to suit the individual client requirements and are carried out at the customer's premises to minimise disruption. Alternatively, we can arrange for the training to be carried out at one of the Rototherm Group's facilities.

Our courses typically cover:

- Safety procedures
- Routine maintenance
- Basic fault finding
- Basic product operation

Benefits:

- Long term product performance through correct operation
- Improved safety
- Reduced downtime

Training sessions are limited to a maximum of 6 persons and vary in time, according to the required syllabus. All training literature is supplied by Rototherm.

For Services, please contact: [services@rototherm.co.uk](mailto:services@rototherm.co.uk)



- Rotherm offices
- Rotherm facility
- Distributor

[www.rotothermgroup.com](http://www.rotothermgroup.com)

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