# Reliable measurement and control

## Perfect interaction between all components

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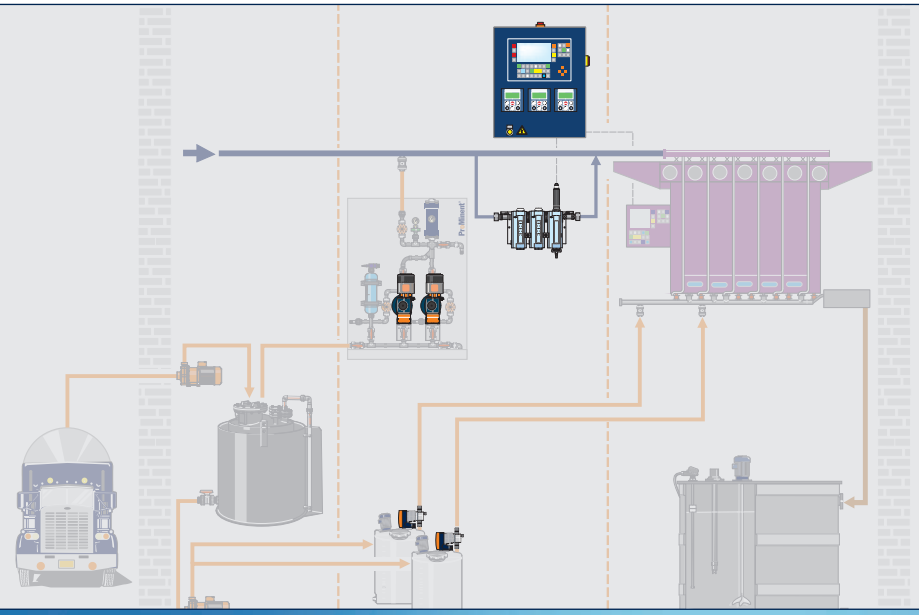
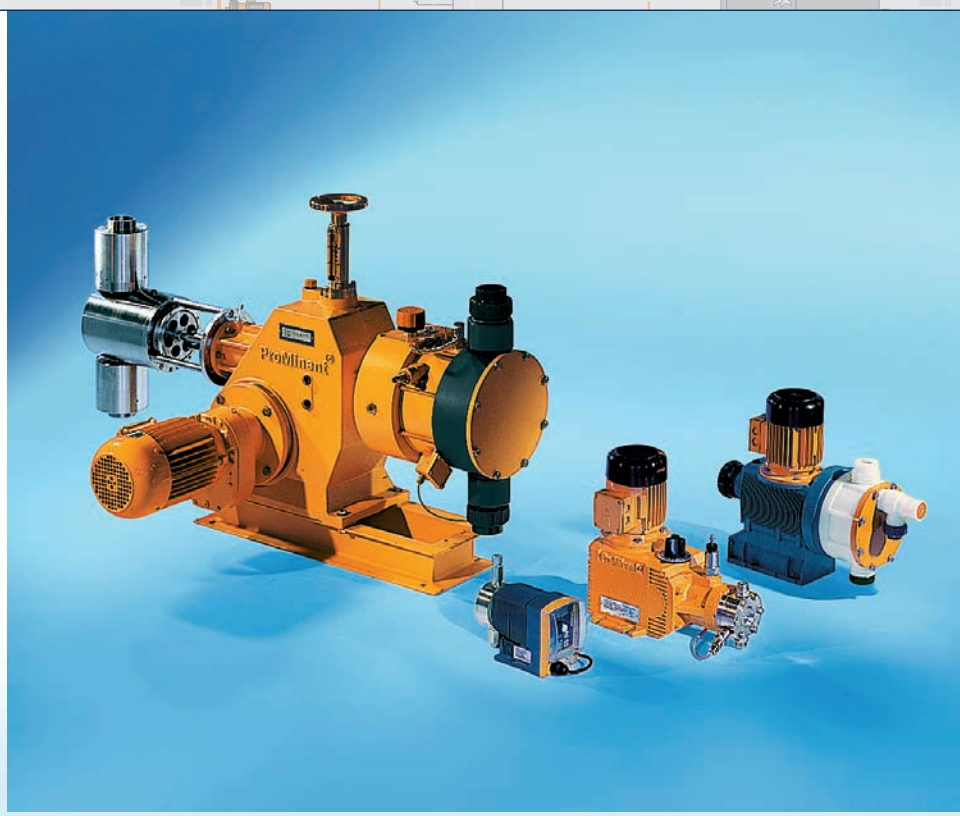
# The heart of an optimum solution

The precise interplay of metering pump, controller and sensor is a guarantee of optimum metering. Components from ProMinent are perfectly interacting and together they form a perfect control loop.



**Metering pumps**
Metering chemicals – the core task of a metering pump. And ProMinent offers metering pumps in every performance class and profile. The world market leader in solenoid-driven diaphragm metering pumps is equally convincing when it comes to medium- and high-pressure pumps.

- Solenoid-driven diaphragm pumps: up to 30 l/h
- Motor-driven diaphragm pumps: up to 4,000 l/h
- Hydraulically actuated diaphragm pumps: up to 40,000 l/h
- Plunger pumps: up to 38,000 l/h
- Custom metering pumps




Further information:
***www.prominent.com/metering_pumps***

**Measurement and control systems**
Our measurement and control instrumentation is adjusted to each specific application: Finely graduated performance classes offer the right technology for every metering task. ProMinent offers full product lines from the simple transformation of measured signals for transmission to a central control unit via user-calibrated instruments with measured variable display, to controllers for complex control tasks. We offer PROFIBUS® DP and CANopen-BUS components to enable integration of the control loop into a bus system.

- 1-channel controller D1C
- 2-channel controller D2C
- Multi-channel controller DULCOMARIN® II
- Various measurement transducers/transmitters
- Handheld measurement units

**Sensors**
The DULCOTEST® sensors deliver exact, reliable and application-adjusted measured values in real time – for the monitoring or control of processes. The sensors can be optimally integrated into the ProMinent control loop together with controllers and metering pumps. Numerous probe housings are available for individual integration into the process.

- pH
- Redox/ORP
- Conductivity
- Chlorine
- Chlorine dioxide
- Chlorite
- Bromine
- Ozone
- Dissolved oxygen
- Hydrogen peroxide
- Peracetic acid
- Fluoride
- Temperature

Further information:
***www.prominent.com/metering_pumps***

**Online process measurement station**

# Matched components at a measurement station


Online process measurement stations are suitable for efficient determination of the chemical condition of process water, or for determining the quality – in real time – round the clock. They are a central component of a control loop for chemical dosing.
ProMinent process measurement stations are reliable: they are almost exclusively our own design and manufacture – this guarantees compatibility and an optimal performance/price ratio. ProMinent® measuring stations can be ordered for adaptation by the customer to and can also be configured by our engineers to meet specific customer requirements. Panel-mounted measuring stations are available for immediate delivery and are simple to commission thanks to Plug and Play technology.

- Reliable and accurate measurements
- Simple and flexible installation
- Cost-effective operation thanks to low expenditure on maintenance
- Long service life through the use of high-grade materials and rugged construction
- Precise workmanship

**Process measurement stations are available for the following parameters:**

- pH
- Redox/ORP
- Conductive/inductive conductivity
- Free chlorine
- Total chlorine
- Bromine
- Chlorine dioxide
- Chlorite
- Ozone
- Hydrogen peroxide
- Peracetic acid
- Fluoride
- Dissolved oxygen
- Temperature

Further information:
***www.prominent.com/mcs***

Controllers DULCOMETER® D1C/D2C

# The brain of the control loop

The DULCOMETER® D1C/D2C controllers make up the core of the extensive range of controllers and transmitters available from ProMinent. They are reliable, universally usable and can control a wide range of parameters.

## DULCOMETER® D1C

- Universally usable for 14 different measured variables
- Optimised process sequences through special functions such as disturbance signal activation, pH compensation for chlorine, base load dosing and numerous limit value functions
- Menu-controlled operation in 15 languages
- Special “Cool control”, ProMcon and MultiFLEX controllers tailored to the specific needs of cooling tower conditioning

## DULCOMETER® D2C

- The efficient solution for simultaneous control/measurement of: pH/redox, pH/chlorine, pH/pH, chlorine/chlorine
- Optimised process sequences through special functions such as base load dosing and numerous limit value functions

**DULCOMETER® D1C**

| Measured Variable | Measurement and control range |
|---|---|
| pH | 0 - 14 |
| Redox/ORP | -1,000 mV ... 1,000 mV |
| Chlorine | in 7 graduated measuring ranges between 0.00 and 100.0 ppm |
| Bromine | in 2 graduated ranges between 0.02 and 10.0 ppm |
| Conductive conductivity | in 4 graduated ranges between 0 µS/cm and 200 mS/cm |
| Inductive conductivity | in 4 graduated ranges between 0 µS/cm and 2,000 mS/cm |
| Chlorine dioxide | in 4 graduated ranges between 0.00 and 20.0 ppm |
| Chlorite | in 2 graduated ranges between 0.02 and 2.00 ppm |
| Ozone | 0.00 - 2.00 ppm |
| Fluoride | 0.05 - 10 mg/l |
| Hydrogen peroxide | in 4 graduated ranges between 1 - 20,000 ppm |
| Peracetic acid | in 3 graduated ranges between 1 and 2,000 ppm |
| Dissolved oxygen | in 2 graduated ranges between 0.1 and 20 ppm |
| Temperature | 0 - 100 °C |
| Analogue signal | 0/4 ... 20 mA |

**DULCOMETER® D2C**

| Measured Variable | Measurement and control range |
|---|---|
| pH (Measured variable 1,2) | 0 - 14 |
| Redox/ORP (Measured variable 2) | 0 - 1,000 mV |
| Chlorine (Measured variable 1,2) | in 7 graduated ranges between 0.00 and 100.0 ppm |
| Chlorine dioxide (Measured variable 2) | in 4 graduated ranges between 0.00 and 20.0 ppm |

Further information:
***www.prominent.com/mcs***

**Transmitters DULCOMETER® DMTa**

# The link to the process control system


DULCOMETER® Type DMTa transmitters are compact 2-wire transmitters for pH, redox, chlorine, conductive conductivity and temperature parameters.
They convert the primary sensor signal to a standard 4-20 mA signal, and act as an interference-proof link between the sensor and other control systems (e.g. PLCs) or DULCOMETER® controllers positioned some distance away.

**Parameters for transmitters DULCOMETER® DMTa**

| Parameter | Measurement and control range |
|---|---|
| pH | -1 ... 15 |
| Redox/ORP | -1,200 ... +1,200 mV |
| Chlorine | 0.01 - 5 ppm<br>0.10 - 50 ppm |
| Temperature | -20 ... +150 °C |
| Conductive conductivity | 1 µS/cm - 200 mS/cm<br>(auto-ranging) |

**Transmitter DULCOMETER® DMTa**

- With display of the parameter so that it can be controlled locally at the sensor location
- With calibration function of the sensor in its immediate vicinity
- Version available for linking to PROFIBUS® DP

**Tubular housing transmitters**
**DULCOTEST® PHV1, RH V1, Pt 100 V1**

- For pH, redox/ORP and temperature
- Space-saving mounting on the sensor
- Cost-effective transmission without display or calibration function

Further information:
***www.prominent.com/mcs***

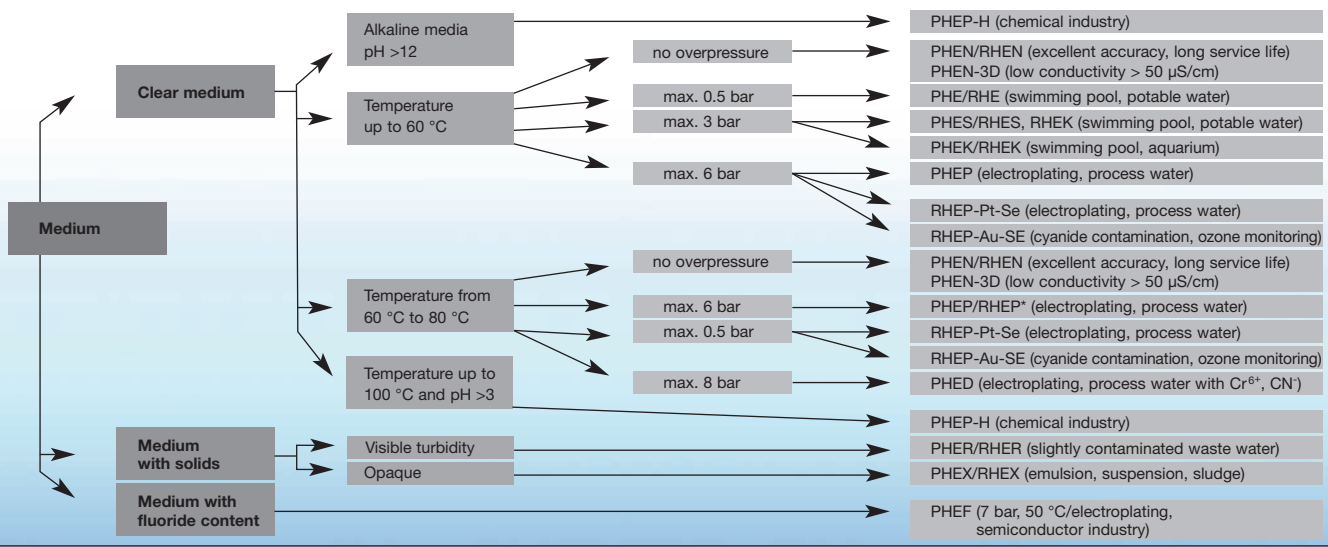
Sensors DULCOTEST®

# Reliable pH and redox sensor technology

The DULCOTEST® range of pH and redox electrodes provides a broad programme of electrodes to solve all measurement problems. Fluoride is offered as a parameter as an ion-selective electrode in two measuring ranges. Applications range from simple water treatment applications to industrial process applications with more exacting requirements with regard to temperature, pressure, contamination compatibility and chemical resistance.

- Long service life achieved through use of the finest quality glass and an optimal combination of automated and manual manufacture
- Highly accurate and reliable measurement for efficient processes and a high level of process safety
- Tailor-made process connections possible through special versions with individual installation lengths, cable lengths and connectors
- Optimal utilisation of service life of the electrodes through short delivery and storage periods

**Selection aid for DULCOTEST® pH elcktrodes**




Further information:
***www.prominent.com/ph_sensors***

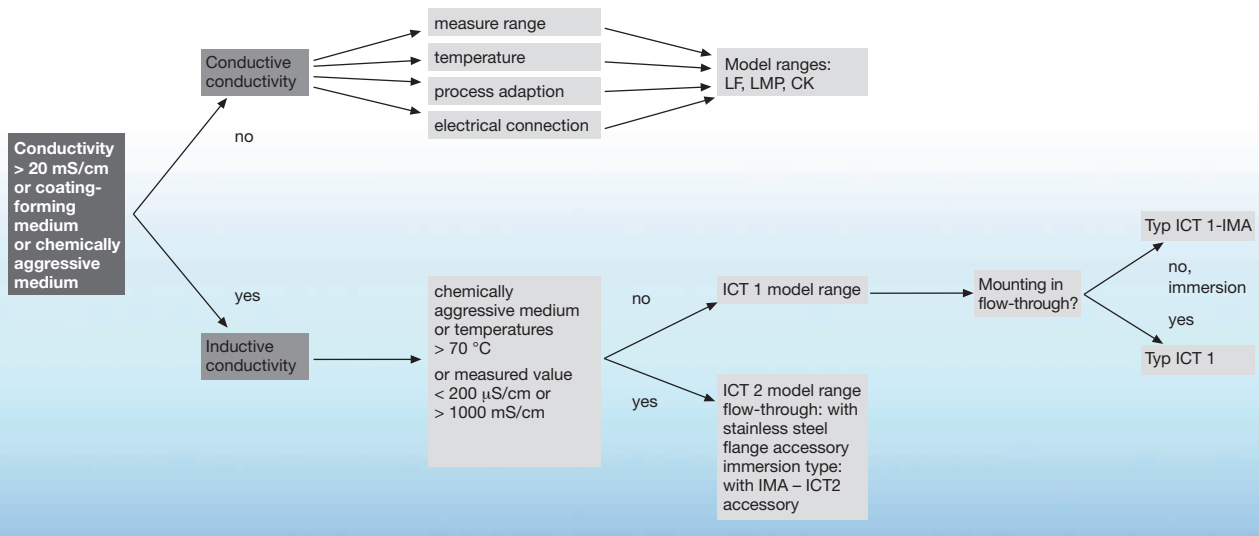
Sensors DULCOTEST®

# Versatile conductivity sensor technology

The wide product range of the DULCOTEST® conductivity sensors enables the correct choice of sensor for applications ranging from simple water treatment, up to problematic industrial process water and offers optimal performance/price ratio.

- 27 different sensor types tailor-made for the different requirements: measuring range, temperature, chemical resistance, contamination compatibility and process connection
- From simple conductometric 2-electrode sensors to inductive high-end sensors
- From simple conductometric 2-electrode sensors, through 4-electrode sensors, up to inductive high-end sensors
- Highly accurate and reliable measurement for efficient processes and a high level of process safety
- Long service life and long maintenance intervals reduce downtimes and increase availability of the measurement values
- Complete, pre-assembled sets of housing and sensor for the simplest possible, fast and trouble-free installation

**Selection aid for DULCOTEST® conductivity sensors**




Further information:
***www.prominent.com/cond_sensors***

Sensors DULCOTEST®

# Innovative amperometric sensor technology

Amperometric sensors in the DULCOTEST® product range supply measured values for the most widely different disinfectants, such as, for example, chlorine, bromine, chlorine dioxide, ozone, and the by-products arising from them. The selective and precise measured values ensure the highest level of process safety and are available for monitoring or control in real time, round the clock.

ProMinent sets the standard with its sensor technology: innovative sensors, such as those for chlorite, total chlorine, peracetic acid, fluoride or hydrogen peroxide complete the extensive product range. The sensors are available with different measuring ranges, with various connection variants for DULCOMETER® measuring and control equipment and as special versions for specific applications.

**Selection aid for amperometric sensors**

| Parameters | Application | Graduated measuring ranges | Connection to DULCOMETER® | Type |
|---|---|---|---|---|
| Free chlorine | Drinking water, swimming pool water | 0.01 - 100 ppm | D1C, D2C, DULCOMARIN® | CLE 3 (.1)-mA-xppm |
| | process and utility water (surfactant-free) | 0.01 - 50 ppm | DMT | CLE 3 (.1)-DMT-xppm |
| | | 0.01 - 10 ppm | DULCOMARIN® II | CLE 3 (.1)-CAN-xppm |
| | | 010 - 20.0 ppm | | CLE 2.2-4P |
| | Hot water circuit up to 70°C, up to 8 bar | 0.02 - 10 ppm | | CLO |
| Total available chlorine | Swimming pool water with chlororganic disinfectants | 0.02 - 10 ppm | D1C, D2C, DULCOMARIN®, DULCOMARIN® II | CGE 2-mA-xppm |
| | | 0.01 - 10 ppm | | CGE 2-CAN-xppm |
| Total chlorine | Drinking water, utility water, process water and | 0.01 - 10 ppm | D1C, D2C, DULCOMARIN® | CTE 1-mA-xppm |
| | cooling water In swimming pools combined with | 0.01 - 10 ppm | DMT | CTE 1-DMT-xppm |
| | CLE 3.1 to detect bound chlorine | 0.01 - 10 ppm | DULCOMARIN® II | CLE 1-CAN-xppm |
| Combined chlorine | Swimming pool water | 0.02 - 2 ppm | D2C | CTE 1-mA-2ppm & CLE3.1-mA-2ppm |
| | | 0.01 - 10 ppm | DULCOMARIN® II | CLE 1-CAN-xppm & CLE3.1-CAN-xppm & CGE2-CAN-xppm |
| | | 0.02 - 10.0 ppm | D1C, D2C, DULCOMARIN® | CGE 2-xppm |
| | | 0.1 - 10 ppm | D_4a (metering pump with integral controller) | CGE 2-4P-xppm |
| | | | | CGE 2-CAN-xppm |
| Bromine | Cooling water, swimming pool water, spa pool water | 0.02 - 10 ppm | D1C | BRE 1-mA-xppm |
| | | 0.02 - 10 ppm | D1C | BRE 2-mA-xppm |
| | | 0.02 - 10 ppm | DULCOMARIN® II | BRE 3-mA-CAN xppm |
| Chlorine dioxide | Uncontaminated drinking water (surfactant-free) | 0.01 - 10 ppm | D1C | CDE 2-mA-xppm |
| | ClO2 treatment of uncontaminated | 0.01 - 0.5 | D1C | CDE 3-mA-xppm |
| | warm water to combat legionella cooling water; | | | |
| | waste water, agriculture, process water | 0.01 - 10.0 ppm | D1C | CDR 1-mA-xppm |
| | containing surfactants, | 0.02 - 2 ppm | D1C with automat. temp. correction | CDP 1-mA-xppm |
| | bottle-washing plants | | | |
| Chlorite | Drinking water, washing water | 0.01 - 2 ppm | D1C | CLT 1-mA-xppm |
| Ozone | Swimming pool water, drinking water, utility water, | 0.02 - 2 ppm | D1C | OZE 1-mA-xppm |
| | process water (surfactant-free) | | | |
| Dissolved oxygen | Drinking water, surface water, water in large aquaria, | 0.02 - 20 ppm | D1C | DO 1-mA-xppm |
| | clarification plant activated sludge | 0.01 - 10 ppm | D1C | DO 2-mA-xppm |
| Peracetic acid | CIP (Cleaning in Place), | 1 - 2.000 mg/l | D1C | PAA 1-mA-xppm |
| | aseptic food filling | | | |
| Hydrogen-peroxide | Clear water, fast control, process water, | 1 - 2.000 mg/l | PEROX controller, D1Ca – H1 | H2.10 P |
| | swimming pool water | 0.50 - 2.000 mg/l | D1Ca – H7 | PER 1-mA-xppm |

Further information:
***www.prominent.com/mcs***

Housings

# For all applications

The correct housings facilitate the best measurement position and hence the optimal deployment of sensors in the process. ProMinent offers the right housings for all applications: for direct mounting in the main process flow pipework – with and without flange – immersion housings for tanks and channels or by-pass housings for use in a secondary flow.

- Fast, simple fitting and removal of the sensors and space-saving housing construction
- Full compatibility with all current process interfaces
- Fast response time of the measuring system through low volume
- Robust against electrical interference through equipotential bonding lug

**By-pass housing DGMa**

| Properties | Advantages and benefits |
|---|---|
| ■ Modular construction housing for up to **seven** sensors of any type<br>■ Pre-assembled on plate<br>■ Integrated sampling cock | ■ Cost-effective, simple installation and retrofitting through flexible modules<br>■ High level of measuring/process safety thanks to flow monitoring module<br>■ Simple and fast commissioning and safe on-line calibration<br>■ Fast recording of readings due to minimal volume of sample water |

**By-pass housing DLG III + DLG IV**

| Properties DLG III | Advantages and benefits |
|---|---|
| ■ Multi-position housing for **two** sensors (pH, redox, conductivity, temperature, fluoride) plus<br>■ **One** sensor (chlorine, bromine, chlorine dioxide, ozone) | ■ Simple cleaning of housing and sensor through removable cup<br>■ Cup can be used as a container for a calibration solution |

**Properties DLG IV**

- Multi-position housing for **four** sensors (pH, redox, conductivity, temperature)

**Immersion housing IPHa1 + IPHa3**

| Properties IPHa1 | Advantages and benefits |
|---|---|
| ■ For **one** sensor (pH, redox, conductivity, temperature, PG 13.5 thread)<br>■ Immersion depth: 1 m, 2 m | ■ Space for a transmitter next to the sensor<br>■ Simple withdrawal of the tube and length adjustment by customer, as no coupling point<br>■ Extremely flexible thanks to extensive range of accessories<br>■ Flange mounting possible |

**Properties IPHa3**

- For up to **three** sensors (pH, redox, conductivity, temperature, fluoride)
- Immersion depth: 1 m, 2 m

**Immersion housings TA-LM(P) + IMA ICT 1(2)**

| Properties TA-LM(P) | Advantages and benefits |
|---|---|
| ■ For **one** conductivity sensor, M28 thread (LM(P) types)<br>■ Immersion depth: 1 m | ■ Flexible mounting on the tank possible, from the side or from above<br>■ 1 m extension tube available as accessory, also for subsequent adaptation<br>■ Also available fully pre-assembled complete with sensor for fast, safe installation |

**Properties of IMA ICT 1(2)**

- For one conductivity sensor type ICT 1, housing: PP; seals: FPM, zero-pressure installation; for sensor type ICT 2: housing: stainless steel 1.4404; seal: FPM

Further information:
***www.prominent.com/mcs***

**Accessories for measurement and control equipment**

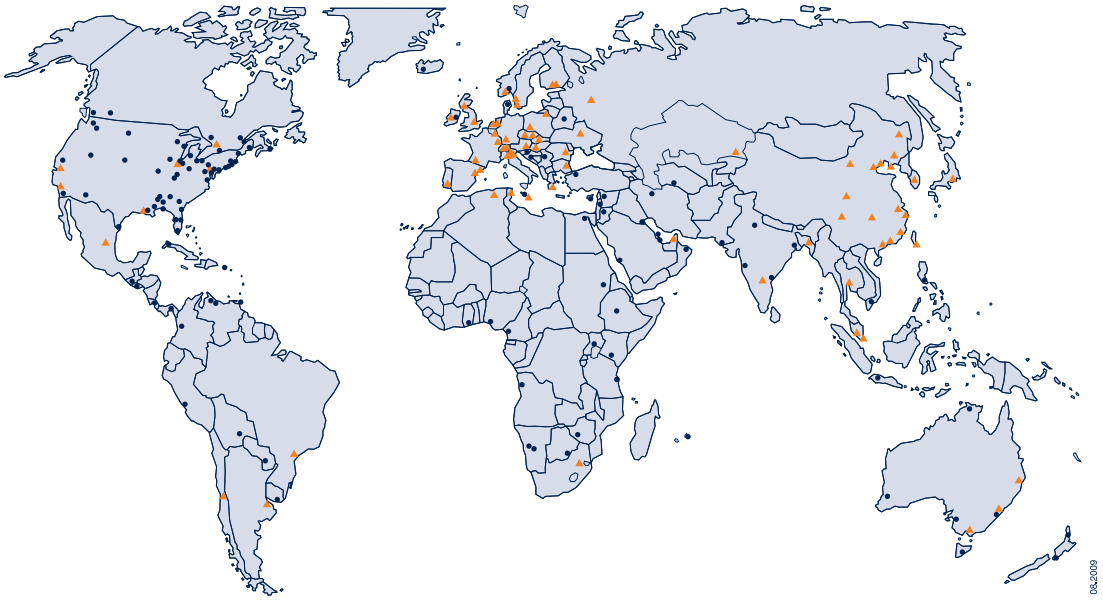
# A complete programme

ProMinent offers a complete accessory programme for operation and maintenance of process measurement stations. All parts and consumables can be obtained quickly and conveniently from a single address. This makes day-to-day process analysis work much easier.

- Portable instruments for calibration of process measurement stations
- Comparison solutions and reagents for calibration
- Test leads, connectors and electrical adaptors
- Recorders
- Accessories for housings, such as adaptors and flanges
- Consumable materials for sensors

Further information:
***www.prominent.com/mcs***

# World-wide contact




ProMinent is at home in more than 100 countries of the world. This guarantees world-wide availability of the products and short distances to the customer. We offer you the same high quality standard in products and services worldwide. For you at your location: experience and know-how in water treatment and chemical fluid handling are available world-wide.

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