Honeywell

INFORMATION
FOR GENERAL USE

GAS QUALITY ANALYZER GASLAB Q2

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We reserve the right to make changes to the device series and documentation in the course of further development. They are incorporated without prior notice.

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1. About this document

1.1. Aim / Scope

This document informs about the worldwide applicable Honeywell ® **GasLab Q2** hereinafter called short **Q2.** It is a real-time natural gas analyzer from the enCore instrument series and measures the superior calorific value, Wobbe index and other parameters in natural gas and is designed for operation in many potentially explosive atmospheres. **GasLab Q2** covers a wide operating temperature range, this allows the analyzer to be placed close to the process to obtain a short response time.

Common applications are control and regulation of gas tubins, fiscal energy measurement and analysis of gas mixtures. To do so the **Q2** uses the configuration and analysis software **enSuite**. (Software details see chapter 8 Configuration and analysis software enSuite).

	Please note that only the software and hardware versions mentioned on the cover page are described here.

This document is intended for trained personnel in the gas industry or process measuring sector.

It explains the basic instrument functions and describes the installation, commissioning, operation, use and maintenance. In addition to the general specialist knowledge, this document enables safe and efficient use of the **GasLab Q2**. To do so, you must have a good command of the documentation language or use another translation of this manual.

The safety and warning instructions on the device are in English or French.

	**Depending on the area of activity, trained personnel are assumed to have various basic skills; the pertinent details are contained in the relevant sections.** **Selon le domaine d'activité, diverses compétences de base sont nécessaires. Les informations correspondantes se trouvent dans les chapitres respectifs.** **Definitions used in this document; Définitions utilisées dans ce document;** ⇨ **1.3 Symbols, abbreviations and definitions**

Compliance with all the safety information and instructions set out in this information is a requirement for safe working practice and correct handling of the device and for correct measurement and calculation results.

Furthermore, the directives, standards, local accident prevention regulations and general safety regulations which apply to the field of application of the device, must be obeyed.

If you have any questions, any points in this information for gereral use are unclear or you require repair work, Honeywell will be delighted to help. The contact details are provided at the start of this document.

1.2. How to use this document

Honeywell recommends that all technical documentation is always kept to hand in the system. For a comprehensive overall understanding of the measuring system, it is essential to read the manual before starting work!

	**Safety and warning information (generally shown as in this example) must be read and obeyed in all circumstances.** **A lack of warning signs or information does not release you from your personal responsibility for safety.** **Les consignes de sécurité et les avertissements (habituellement représentés comme dans cet exemple) doivent être lus et respectés dans tous les cas!** **En cas de défaut de symbole d'avertissement ou de consigne, vous restez responsable de votre propre sécurité!**

The modular, standard design of our devices allows you to skip some sections of this document. To gain knowledge in the various fields, for example, operation, it is also enough simply to read the appropriate chapters after the safety instructions.

The first chapters of this document deals with the **hardware**. It contains the explosion-relevant information as well as a summary of relevant safety and warning notices. In addition to general expertise, it enables the **Q2** to be handled safely and efficiently.

The chapters 7 and 8 **(software)** are addressed to measurement operator's and explains the basic functions of the measuring instrument and how to operate the **Q2** in detail.

The chapters 9, 10 and 11 gives information for keeping Q2 permanent in measuring capability and a summary of the technical data.

	The illustrations and figures are designed to provide a visual depiction of the topics covered. They may differ slightly from the actual design.

1.3. Symbols, abbreviations and definitions

Essentially the same symbols are used both on the device and in the documents to ensure clarity. A comparison with other Honeywell documentation will highlight the alternative symbol (if there is one). **Texts which are preceded by a sign of this type must be followed to the letter.**

To ensure greater differentiation between gas and electrical lines, the term **"cable"** is always used in this documentation for electrical lines.

General safety rules and expertise for how to act in plants and in dealing with gas are assumed to be known and are therefore not reproduced here in full.

Symbol (Alternative)	Meaning
 Attention	**Attention denotes information which is relevant to safety and important for the functioning of the device. If this information is ignored, the result may be health impairment, environmental or property damage, as well as injuries up to and including death. These instructions must be followed in all circumstances.** **«Attention» indique des informations pertinentes pour la sécurité et importantes pour le fonctionnement. Leur non-respect peut entraîner des atteintes à la santé ou à l'environnement, des dommages matériels, des blessures et même la mort. Les indications données doivent être respectées en toutes circonstances.**
 ATTENTION  NOTE	
  WARNING Explosion or danger of explosion	**This danger means that death and/or injuries may be suffered by several people and, in addition, the plant, equipment and environment may suffer significant damage if the appropriate precautions are not taken.** **Ce symbole de danger signifie un danger de mort et/ou de blessures pour plusieurs personnes ainsi qu'un risque d'endommagement important de l'installation, de l'équipement et de l'environnement si les mesures de précaution appropriées ne sont pas prises.**
  WARNING Very serious health impairment	**This danger means that serious physical injury, health impairment and, as a result, death may occur if the appropriate precautions are not taken.** **Ce symbole de danger signifie un danger de blessures graves et d'atteinte à la santé pouvant entraîner la mort si les mesures de précaution appropriées ne sont pas prises.**
 Prohibited action	means that you must not complete the action described unless the specified conditions and requirements are satisfied and you are qualified for this work. signifie que vous ne pouvez pas exécuter ce qui suit, à moins que les conditions mentionnées soient réunies et que vous soyez qualifié(e) pour le faire.
 Device symbol	The symbol on the device is a reminder to comply with all the instructions and important information here in this document. The appropriate parts are marked with the other symbols in this table. Le symbole figurant sur l'appareil rappelle que toutes les indications et informations importantes contenues dans le manuel d'utilisation (dans ce document) doivent être respectées. Les endroits correspondants sont signalés par les autres symboles de ce tableau.
 Device symbol	In the interest of our environment, it is not permitted to dispose of the device with household waste within the EU! The symbol is a reminder. in accordance with the European WEEE directive. Dans l'intérêt de notre environnement, il n'est pas permis de jeter l'appareil avec les déchets ménagers au sein de l'UE ! Le symbole est un rappel, conformément à la directive européenne DEEE.
 Device symbol	This symbol or the information on the device means that the power supply is 24 V DC. Le symbole et/ou l'information sur l'appareil signifient que ce dernier fonctionne avec une tension d'alimentation électrique de 24 volts en courant continu.

Symbol (Alternative)	Meaning
 Devices with engraving	The engraved symbol  with the description GROUND means that this is the equipotential bond connection point (PA) for the electrical connection to the equipotential bonding system and ground. Le symbole  gravé portant la description GROUND signifie qu'ici, la borne de compensation de potentiel (PA) est prévue pour le raccordement électrique au système de compensation de potentiel et à la terre.
 Device symbol	The symbol on the device denotes the connection for the functional earth (FE). Le symbole sur l'appareil désigne le raccord pour la terre fonctionnelle (FE).
  	Denotes tips and recommendations which are interesting and useful for a certain topic, but which have no bearing on safety. Indiquent les conseils et les recommandations intéressants et utiles mais non liés à la sécurité.
ASTM 3588	Links (hyperlinks) can be used to navigate through various displays. In this example, the system is switched to a different calculation standard. See chapter 7 for more information. Liens (hyperliens): par les hyperliens, vous pouvez naviguer vers différents affichages. Dans cet exemple, le lien renvoie à une norme de calcul différente, voir le chapitre 7 pour plus d'informations.
	Message and signal identification (Alarm/Warning/Note) in enSuite (the online help system will generally provide assistance with these). Sigle d'indication de message ou de signal (alarme/avertissement/avis) dans enSuite (dans la majeure partie des cas, vous pouvez utiliser l'aide en ligne)
	If the SSW is locked, (fiscal) parameters marked with this symbol in enSuite cannot be edited. Si l'interrupteur d'étalonnage est fermé, les paramètres (officiels) marqués de ce symbole dans enSuite ne peuvent pas être modifiés.
	Parameters marked with this symbol in enSuite can be edited even if the SSW is locked as long as the change logbook is not full. Les paramètres marqués de ce symbole dans enSuite sont modifiables même si l'interrupteur d'étalonnage est fermé, tant que le journal des modifications n'est pas plein.

Short form	Description
°C	Temperature (Celsius) = $T_C = T_K - 273{,}15 = {}^5/_9 (T_F - 32)$
°F	Temperature (Fahrenheit) = $T_F = 1{,}8\ T_C + 32 = 1{,}8\ T_K - 459{,}67$
AFB	Application function block (enSuite)
AMR	Advanced meter reading
ATEX	Atmosphère explosible (French for explosive atmospheres)
AWG	American Wire Gauge
bar	Pressure (Europ. unit) 1 bar = 0.1 MPa = 14.504 psi
BTU	British thermal unit 1 BTU = 0.0010543503 MJ
C_2+	Results summary (ethane + all higher hydrocarbons)
C_2H_6	Ethane
C_3H_8	Propane
C_6H_{14}	Hexane
C_7H_{16}	Total heptane
C_8H_{18}	Total octane
CAL	Calibration gas inlet
CEC	Canadian Electrical Code
CH	Total of all hydrocarbons
CH_4	Methane
cm	Length 1 cm = 10 mm = 0.3937 in = 0.3937”
CO_2	Carbon dioxide
CPU	Central processing unit
CSA	(Canadian Standards Association) independent standards organization
CVDD	Calorific value determining device
d / rd	Relative density (density ratio of fuel and air)
DBB	Double block-and-bleed (valve block technology)
DC	Direct current
DHCP	Dynamic Host Configuration Protocol (Network setting)
DIN	Deutsches Institut für Normung e. V. (German Institute for Standardization)
DNS	Domain Name System (Network setting)
DST	daylight saving time
EMC / EMV	Electromagnetic compatibility (germ. term EMC)
EN	European standard

Short form	Description
EN/IEC 60079-14	Standard on explosive atmospheres
F	Farad = 1/ Daraf = S-1 (electrotechnical units)
FE	Functional earth / functional ground
ft · lb / ftlb	Pound-foot 1 ft · lb = 1 ftlb = 1.355817948 Nm
GF	Gas family
gr	Grains 1gr = 64.79891 mg
Hi/HiM/HiV	Net heating value/Lower heating value/Inferior calorific value (molar/based on mass/based on volume)
Hs/HsM/HsV	Gross heating value/Higher heating value/Superior calorific value (molar/based on mass/based on volume)
Hz	Frequency
iC_4H_{10}	Isobutane (i-butane)
iC_5H_{12}	Isopentane (i-pentane)
ID	Identification number (enSuite), for example gas cylinder number
IECEx:	(IECEx SYSTEM) International explosion-protection (Ex) rating
in or ″	length in inch (1 ″) 1 in = 1 ″ = 0.0254 m = 25.4 mm
IP	Internet protocol / Protection class
IR	Infrared
ISO	International Organization for Standardization
K	Temperature (Kelvin) = $T_K = 5/9\ (T_F + 459.67) = T_C + 273.15$ (Δ 1K = Δ 1°C)
KFM Live	Internal coefficients and filters
kg	Kilogram 1kg = 2.204623lb.
l	Liter 1l = 0.001m³ = 0.0353 cft= 0.0353 cu ft
lb	Pound 1lb = 0.4535923kg
LED	Light emitting diode
log	Logbook
m	Mass
M (Mm)	Molar mass (of the mixture)
m or mm	Length in SI unit (meter) 1 m = 1000 mm = 3.280840 ft = 39.37008 in (or ″)
m³	Cubic meter 1m³= 1000 l = 35.3147 cft = 35.3147 cu ft
mg	Milligram 1 mg = 0.0154323584 gr
MJ	Megajoule 1MJ = 948.45138280892 BTU

Short form	Description
MMS	Manufacturing Messaging Specification
MPa	Megapascal (pressure) 1 MPa = 10 bar = 145.04 psi
MPag	Gauge pressure in megapascals
MZ (MN)	Methane number
N	Newton Force (SI unit) 1N=1kg·m·s^{-2} = 0.224809 lbf
N_2	Nitrogen (gas component)
NC	Switch/output which is closed when de-energized (NC contact)
nC_4H_{10}	n-butane
nC_5H_{12}	n-pentane
NEC	National Electrical Code (USA)
NIST	US National Institute of Standards and Technology
Nm	Torque 1 Nm = 0.7375621494575465 ft lb
NO	Switch/output which is open when de-energized (NO contact)
NPT	National Pipe Thread (self-sealing (pipe) thread)
NTP	Network Time Protocol (Standard for clock synchronization in computers)
O_2	Oxygen
PA	Equipotential bonding connection
PC	Personal computer
PELV	Protective extra-low voltage
PG	Process gas/Measuring gas
PI	Internal pressure (internal monitoring)
ppm	Parts per million
Pressure (g)	Overpressure (g = gauge)
psi	Pressure (pound per square inch) 1psi = 0.068948 bar = 0.0068948 MPa
PU	Ambient pressure (internal monitoring)
PW1/PW2	Internal calculations
Rho	Density at base conditions
RS485	Interface standard for cable-based differential serial data transfer
S	Daraf = 1/ Farad = F−1
SAV	Safety shut-off valve
SELV	Safety extra-low voltage
SFB	System function block (enSuite)

Short form	Description
sft^3/scft	Standard cubic foot 1cft = 0.028317 m^3 = 28.317 l
SI	International unit system SI (Le Système International d'Unités)
SSW	Security switch
TB1/TB2	Internal calculations
TCD / WLD	Thermal conductivity detector (germ. Wärmeleitfähigkeitsdetektor)
TCP	Transmission Control Protocol (Internet)
TH1	Housing temperature
TLS	Transport Layer Security transmission protocol
TM1/TM2	Internal calculations
TP	Circuit board temperature (internal monitoring)
TSB	Temperature of sensor block
VDE	German Association for Electrical, Electronic & Information Technologies
VPN	Virtual Private Network
WEEE	Waste of Electrical and Electronic Equipment (directive of the EU)
Wi	Inferior Wobbe index / Net Wobbe index
Ws	Superior Wobbe index (Wobbe index superior) / Gross Wobbe index
YOC	Year of construction
Z	Compressibility factor

Term	Explanation/Definition
Administrator	Administrator is a person with unrestricted access to the device and responsible for setting and transferring user management to the device. The Administrator should therefore have the appropriate equipment knowledge e.g. by participating in a training course. The station operator usually takes on this task.
Alarm	Error which jeopardizes the correctness of the results. Generated, for example, if a measurement is outside the defined measuring range. The start and end of an alarm are registered with time stamps in the associated logbook / error list.
Analysis	is the operating mode in which the device undertakes systematic analyses and is therefore the normal operating state.
Approval file	is an enSuite file which automatically defines which parameters should be especially protected. It contains approvals for specific countries or standardized settings and relates to all relevant AFBs. An approval file must be used for fiscal purposes, otherwise its use is optional.
Audit trail	is a two-part log archive (parameter audit trail) which enables the user to conduct changes relevant to billing without opening the SSW. These changes are monitored and documented in the fiscal section. If the SSW is opened, data are only included in the general section.
Base calibration	is a factory adjustment of the device using multiple gases before delivery. It may be repeated by Honeywell if necessary in adjustment procedures.
Breathing device	The breathing device (short breather), also known as venting device or flame arrester, is designed to equalize the pressure on explosion-proof housings. This pressure equalization device is required during operation and must not be sealed.
C_2+	means that all higher hydrocarbons are added to the ethane component.
Cable	To ensure greater differentiation between gas and electrical lines, electrical lines are always referred to as “cables” in the following.
Calibration gas	See **Operational calibration gas**.
Carbon dioxide (CO_2)	An acidic, non-flammable, colorless and odorless gas comprising a chemical compound of carbon and oxygen. The gas is also known as carbonic anhydride or colloquially carbonic acid.
Checksum	is a method to identify, display and check the software version. It is calculated by the device itself. Further information about this checking method used by enCore devices is provided in the manual entitled “enCore ZM1, MC1, FC1 – basic system with SFBs”.

Term	Explanation/Definition
Compressibility factor Z	The quotient from the actual (real) volume of a specified mass of gas at a specified pressure and temperature and its volume as calculated from the Ideal Gas Law (for the same pressure and temperature). The compressibility factor Z is generally dependent on the temperature, pressure and gas composition.
CSA mark	The mark shows that the product has been certified by an accredited third-party lab (independent standards organization) and have met applicable standards as required by American law.
DBB technology	is a valve technology to seal gas streams. The connection of 2 solenoid valves in series, between which there is a vent, ensures that the system is safe even if the valves leak.
Density/Density at base conditions	is the quotient of the mass of a gas sample and its volume in specified pressure and temperature conditions or at base conditions, e.g. in kg/m³. The density or density at base conditions is used to monitor the gas composition and energy content of fuel gases.
Display	is the generic term for all depictions and views on the computer and the optional screen.
enCore devices	enCore is the name of the product platform for representatives of a range of measuring devices based on similar modular hardware and software. Their configuration is variable. In addition to the GasLab Q2, these include the volume conversion device enCore ZM1, the signaling and monitoring unit enCore MC1 and the flow computer enCore FC1.
enSuite	The configuration and analysis PC software for current Honeywell Elster devices in the field of flow computer, data storage, gas quality analyzer and ultrasonic gas meter. The software supports all activities that are required for commissioning and maintenance of these devices.
Error list	is used by the user to identify errors and reproduce the history of the error. The start and end of a message is entered into the error list with a time stamp and recorded in the logbook.
Event	or note is generated if a measurement violates a state defined by the user. The start is entered in the error list with a time stamp and logged in the logbook. Notes cannot be accepted and are automatically deleted from the error list after the cause of the note has ended.
Export value (enSuite)	The function blocks in the software supply results which can be processed by other function blocks. These results are known as export values.
Firmware	Firmware is software that is functionally fixed to device hardware components. It is embedded or stored in the device and cannot be replaced by the user.
Fiscal parameters	are marked with this symbol  . They provide information about whether items can be edited when the SSW is locked.

Term	Explanation/Definition
Gas family	Classification of fuel gas types into groups based on their physical and combustion properties (families, abbreviated to GF) A distinction is made between 4 gas families. Gas families are classified in Germany in DVGW Code of Practice G 260; natural gas and gas similar to natural gas are members of the second gas family in this system.
Gas Quality Analyzers	are devices which automatically measure the superior calorific value of gases. The superior calorific value, density at base conditions and carbon dioxide content are calculated using the values from the sensors.
Gas saturation	Reflects the influence of water vapor on calorific value/heat value. Values for wet (saturated) gas or partly wet (partially saturated) gas are lower than those for dry (unsaturated) gas because the total volume consists of the components of hydrocarbons and water vapor. The instrument do not analyze water vapor. The determination of the actual water vapor content must, for example, be obtained from moisture or dew point measurements. The results are therefore calculated for three assumed standards (dry/wet /partly wet) of water vapor.
Ground loop	Grounding the devices may create ground loops since the cable screens create additional connections if they are connected to both sides. A ground loop is electric cabling closed to create a loop. In the event of low-frequency error currents, an undesirable voltage drop occurs in the signal path and an interference signal is added to the signal as a result of the impedance of the loop.
Grounding	Grounding is the general term used for the highly conductive connection to a reference potential, for example, to the earth which is also conductive. This device connection is used, among other things, to prevent incoming and outgoing interference as described in the EMC directives and allows various electrical devices and equipment to be operated with a joint reference potential.
Inferior calorific value	also called net heating value or **Lower heating value Hi** (colloquially known as energy content or energy value) is a heat variable. In contrast to the Superior calorific value, the calorific value, all the combustion products are in gaseous which is why this value is lower than the superior calorific value. The value can refer to mole, mass or volume, for example in kWh/m³.
Location of use	See **Place of Use**.
Logbook	also known as the standard audit trail, is a log archive which can be used by all software parts and records every extraordinary situation, for example, errors in the measuring equipment.

Term	Explanation/Definition
Main display	is the name of the summary display of the main results. The device starts using this display set at the factory, which may contain additional subordinate displays.
Manufacturing Messaging Specification	MMS (pursuant to ISO 9506) allows communication between enSuite and enCore devices.
Message	is an event which applies to multiple evaluation cycles of the device. It may be reset by a user with the appropriate user rights.
Modbus protocol	Modbus TCP protocol for data exchange by user-defined registers between AMR and enCore devices using a standard TCP/IP network.
Network Time Protocol.	NTP for the high-precision time synchronization of enCore devices with an NTP time server.
Note	Generated if a measurement violates a state defined by the user. The start is logged in the logbook.
Operating mode	Different working states of the device during operation are known as operating modes.
Operational calibration gas	also known as just calibration gas, is kept in a cylinder permanently connected to the GasLab Q2 and is an integral part of the measurement device. This is a mixture of methane and carbon dioxide with officially defined properties and is required for automatic calibration.
Ordinal number	or sequence number is an automatically assigned identification number for archived data. This is formed so that the very first archive entry has the number 1. The number is incremented by one for each subsequent entry.
PELV	PELV protective extra-low voltage systems which comply with DIN EN 60079-14: the power supply to generate PELVs must ensure that no short-circuit is possible between the primary voltage and the extra-low voltage and its connections. It has a safe electrical isolation point (safety isolation transformer) and complies with IEC 61558-2-6. The circuits are grounded. All bodies of electrical equipment must be connected to a common grounding (and equipotential bonding) system.
Pipeline	Pipeline is the 0.5 to >2 m diameter steel pipe. The instrument uses much smaller diameters. The production and installation of tubing is entirely different from pipelines.
Place of use	or installation site is the room or position at which the measurement device is located. It must satisfy the requirements defined by the manufacturers, authorities and operators.

Term	Explanation/Definition
Power-limited circuit	A power-limited circuit is a circuit separated from other circuits by at least BASIC INSULATION in which the direct voltage (U) is no greater than 60 V. The current which can occur in the circuit is limited by certain measures to a value of less than 200/U. These measures must interrupt the circuit within 120 seconds if this value is exceeded.
Process gas.	is the gas which is to be analyzed or measured. It is supplied to the measuring equipment in normal operation and is also known as the operating sample gas
Reference potential	is a potential to which all other voltages are referred. The potential of a grounded point (ground potential) is used for this purpose and gives it a value of zero volts. Since ground connections, like all connections, have different resistances, voltage differences or potential differences may occur between grounded points and system parts. A correctly designed low resistance equipotential bonding cable between the system parts or devices can eliminate these ground potential differences.
Security switch (SSW)	(also known as the CAL switch) is a possible hardware isolator and part of the concept to limit user rights. Since a change requires the housing to be opened, this may only be done by trained personnel with the authorization of the manufacturer.
SELV	SELV safety extra-low voltage systems which comply with DIN EN 60079-14: The power supply to generate SELVs must ensure that no short-circuit is possible between the primary voltage and the extra-low voltage and its connections. It has a safe electrical isolation point (safety isolation transformer) and complies with IEC 61558-2-6. Live parts of circuits must not be grounded or connected to live parts or PE wires of other circuits. All bodies of electrical equipment cannot be grounded (for example, for electromagnetic compatibility). (**GasLab Q2 must be grounded even in a SELV system**)
Signal	is an event which is only output for a short time. Acceptance by the user is not required. Signals are also entered into the logbook.
Software	also called application software, is a collective term for programs that determine the function of a device. It can be exchanged or updated by the user.
Specialist	or professional is the designation for a trained person who, as a result of their technical training, possesses skills and experience and who is familiar with the relevant standards and regulations. Trained personnel can assess their work and identify potential dangers. Hardware work on the GasLab Q2 requires, among others, the expertise described in EN/IEC 60079-14, Annex A.

Term	Explanation/Definition
Start delay	Defines how long the start is delayed after the measuring conditions are reached.
Status LED	indicates whether an error, in other words, an alarm or a warning, is active or has been active.
Super user	shortened (su...) is one of five users who can create or delete further users in the own profile, all five are included in every parameterization and cannot be deleted. The administrator determines the rights of the su and its profile.
Superior calorific value	or **Higher heating value Hs** also called Upper Calorific value is a heat variable which, for example, is used to monitor the energy content of fuel gases. The superior calorific value is higher than the inferior calorific value. Not all the combustion products are in gaseous form. This value can be specified in molar, mass or volume, for example in kWh/m³.
System time	is the combination of time and date shown on the device. Changing the system time is the generic term for both synchronizing and adjusting these values. Further information is provided in the manual entitled "**enCore ZM1, MC1, FC1 – basic system with SFBs**".
Test gas	See **Verification gas**
Time stamp	are time details which relate to an event. They contain the time in seconds since 1 January 1970, the local time zone and the local time difference (additional deviation in minutes). The format for displaying time stamps depends on the language selected on the device, for example, YYYY-MM-DD hh:mm:ss or DD.MM.YYYY hh:mm:ss.
Time zone	can only be set using an enSuite offline parameter set and enables the geographic location of the device to be identified.
Trained personnel	See **Specialist**
User	is a person who belongs to a defined user profile (including super user) and operates or parameterizes the device. The user is identified by a user name and password.
User management	Subject to changes by the administrator. If used correctly, it guarantees, by means of passwords and access rights, that unauthorized changes are suppressed and authorized changes are permitted.
User profile	is a list of access rights for a group. A super user, for example, SU3, manages the profile with up to 9 other users.

Term	Explanation/Definition
Valve block	is a gas manifold which defines a gas route using valves. The gas channels in this metal block also enable DBB technology to be used.
Vent gas	also called waste or exhaust gas, is the gas flowing out of the measuring device after the measurement. The gas from the bypass is also part of the vent gas.
Verification gas	A test gas mixture with known properties which is supplied to the measurement device instead of the process gas for verification purposes.
Virtual private network	A virtual private network (VPN for short) is a closed logical network in which the participants are physically separated from one another and connected via an IP tunnel.
Warning (message or signal)	Error messages which do not falsify the results but are important for monitoring the measurement. The calculation is continued without falsification. If the cause no longer exists, it can be accepted on the operation panel and the entry thus removed from the error list.
WEEE Directive	The Waste Electrical and Electronic Equipment Directive dated 14 August 2018 is designed to prevent and reduce waste from electrical and electronic equipment, particularly in household waste. It defines minimum standards for handling end-of-life electrical and electronic devices in the EU and relates to all electrical and electronic devices used for private and commercial purposes. To achieve this aim, end-of-life electrical and electronic devices are collected separately and recycled to obtain raw materials.
Wobbe index Ws	Used to characterize the quality of fuel gases and is a calculated variable for monitoring and regulating the heat output. A distinction is made between a superior Wobbe index (Ws) and an inferior Wobbe index (Wi). The unit is J/m³ or kWh/m³, depending on the unit used for the superior and lower heating value.

1.4. Version History Updates and File Integrity

The printed documentation enclosed with the device on delivery corresponds to the technical status and is considered correct until updates are carried out. We reserve the right to make changes to the device series and the documentation during further development. The following table gives an overview of the latest changes in the version and device history.

Revision	Date	Description
a to j	2016 to 2018	for software versions 03-03-B to 03-08 A / Test and pre-series devices 1st version (ATEX and FM) for worldwide use; extension of I/O configuration and service calibration /Adjustments to the grounding concept and pressure ranges.
K	2019-11-19	New tranalation and title to use from version. 3-34-A/enSuite 4.5.1 Change to use a concept, the appearance of displays, new document format /Extension explanation of explosion protection /Additional Software security hints / New contents of CE declaration
L		The german version L is identical with the english Version K to synchronize ther is no English version L next Version is M for both languages and possible other translations
M	2020-08-11	Software / Hardware statuses included in documentation / Update control and data security introduced / Remote control panel no longer accessible via http / Updates for connection to device, parameterization and software configuration

This document (revision M) is also available online in PDF format for the duration of its validity and can be downloaded from our Docuthek under the following link:

https://docuthek.kromschroeder.com/documents/index.php?menuid=29&topmenu=29&lang=de&selclass=&sellang=&folder=400082

The current enSuite version is available on the Elster-Instromet website. The firmware can be found in the Gas Analysis subdirectory. A modification history, which is also available there, provides information about development steps in the instrument series. You can access the page with the following link:

https://www.elster-instromet.com/en/ensuite

Make sure to keep the device up to date and use the appropriate version of the documentation. From time to time you should therefore check the above web pages to see if the hardware and software used is still up to date.

If you have obtained this documentation in PDF format, e.g. after an update, you can use the SHA-1 checksum information to test the file integrity. The SHA-1 information can be found in the comment field of the Docuthek or in brackets on the elster-Instromet page.

2. Safety and warning information

The safety and warning information in this document and on the device is designed to enable the device to be used correctly and prevent personal injury and property damage.

	**Always refer to the whole of this chapter, the safety information on the device and the technical specifications. Please contact Honeywell if you have any questions or doubts.** **A lack of warning signs does not release you from your personal responsibility for safety.** **Faites toujours référence à l'ensemble de ce chapitre, aux informations de sécurité sur l'appareil et aux spécifications techniques. Pour toute question ou en cas de doute, adressez-vous toujours à Honeywell! En cas de défaut de symbole d'avertissement, chacun reste responsable de sa propre sécurité!**

The device complies with the relevant safety standards. To avoid risks, no changes or modifications may be made unless they have been expressly approved by the manufacturer. If the product is modified or changed without authorization, its CE declaration will immediately become void. This may result in a safety risk!

	**If you discover that the measuring equipment or other parts used for measuring are damaged, shut down everything, disconnect everything from the gas and electricity supplies and secure them to prevent them being used accidentally.** **Si l'on constate que l'appareil de mesure ou d'autres parties intervenant dans la mesure sont endommagés, tout doit être mis hors service, débranché de l'alimentation en gaz et en électricité et sécurisé contre une utilisation involontaire!**

	Never operate the measurement device or other parts used for measuring if they are damaged, have a modified housing or unsuitable connections since protection from explosions will no longer be guaranteed. Il est interdit d'utiliser l'appareil de mesure ou d'autres parties intervenant dans la mesure s'ils sont endommagés, si leur boîtier a été modifié ou si leurs connecteurs ne sont pas adaptés, car la protection contre les explosions ne serait alors plus garantie.

If the device is at the limits of its operating temperature range, consider:

	**Direct contact with hot or cold surfaces can cause heat and ice burns. In the event of any doubt, the device must be controlled using the remote operation panel.** **Le contact direct avec des surfaces chaudes ou froides peut causer des brûlures ou des engelures. En cas de doute, il conviendrait de faire fonctionner l'équipement en utilisant le panneau de commande à distance.**

2.1. Intended use and Responsibilities

The device is designed and built exclusively for its intended use. This is the gas analysis of natural gas or gas like natural gas (all components gaseous) in compliance with all specifications in this this document and on the Q2.

Only these gases and gases of the 2nd gas family according to DIN DVGW 260 or approved calibration gases may be used. Everything else is considered misuse. ⇨ See section 11.4

	**The protection may be adversely affected if the device is misused. This may result in dangerous situations! La protection peut être compromise si l'appareil est mal utilisé. Cela peut conduire à des situations dangereuses!**

The operator (of the device or system) is subject to the legal obligations for occupational safety. He must consider the conditions and regulations for installation, operation and maintenance of explosion protection described in the test certificate. These and the safety, accident prevention and environmental protection regulations valid for the area of application of the device must be observed and checked by the operator.

	**The operator must ensure, e.g. by means of high-pressure reductions and safety devices, that the maximum permissible device inlet pressure in the fluidic installation upstream of the device is not exceeded even in the event of a fault. L'exploitant doit veiller, par exemple au moyen de réductions de haute pression et de dispositifs de sécurité, à ce que la pression maximale admissible à l'entrée du dispositif dans l'installation fluidique située en amont du dispositif ne soit pas dépassée, même en cas de défaillance.**

	**The operator must ensure that no dangers exist or can arise for persons or components, for example due to the electrical installation or lightning strikes at the place of use and installation of the device.** **L'exploitant doit veiller à ce qu'aucun danger n'existe ou ne puisse survenir pour les personnes ou les composants, par exemple, en raison de l'installation électrique ou de la foudre sur le lieu d'utilisation ou d'installation de l'appareil.**

	**The operator is responsible for ensuring that the device remains in technically perfect, safe condition throughout its period of operation. He must ensure that the installation and maintenance work described in this document is carried out correctly. A possibly connected vent line is also his responsibility. L'opérateur est responsable de veiller à ce que l'appareil reste dans un état techniquement parfait et sûr pendant toute sa durée de fonctionnement. Il doit veiller à ce que les travaux d'installation et de maintenance décrits dans le présent document soient effectués correctement. Il est également responsable d'un éventuel tuyau de ventilation. ⇨ 2.6 Handling explosion-protection devices**

If you wish to use the **Q2** together with devices from other manufacturers or third-party equipment, you must ensure that these are suitable components. These components will have their own operating manuals which also must be followed.

2.2. Place of use Environmental conditions and installation

	The device may only be installed and used in the potentially dangerous zones specified on it. Danger of explosion in the event of incorrect installation and connection. L'appareil ne doit être installé et utilisé que dans la zone de danger spécifiée sur l'appareil. Risque d'explosion en cas de montage et de raccordement non conformes!

	The GasLab Q2 should only be installed in the measuring plant where access control is guaranteed, i.e. where protective measures are taken to prevent unauthorized persons from gaining physical access to the device. Outdoors, the device must be protected from direct sunlight and rain, e.g. by a metal roof. Ensure that the device cannot be struck by a jet of water e.g., when cleaning the system. Le GasLab Q2 ne doit être installé dans l'installation de mesure que lorsque le contrôle d'accès est garanti, c'est-à-dire lorsque des mesures de protection sont prises pour empêcher des personnes non autorisées d'accéder physiquement à l'appareil. À l'extérieur, l'appareil doit être protégé de la lumière directe du soleil et de la pluie, par exemple par un toit métallique. Veillez à ce que l'appareil ne puisse pas être frappé par un jet d'eau, par exemple lors du nettoyage du système.

	In a windy environment with temperatures below freezing point, wind protection may be required. It must be ensured (for example, by an air-conditioned housing) that the device is not exposed to any excessive temperatures during storage or operation. The temperature range (–25°C ≙ –13°F ≙ 248 K to +55°C ≙ +131°F ≙ 328 K) is specified on the device. The device may only be used in potentially corrosive atmospheres by agreement and with the consent of Honeywell. Dans un environnement venteux avec des températures inférieures au point de congélation, une protection contre le vent peut être nécessaire. Il faut veiller à ce que l'appareil ne soit pas exposé à des températures inadmissibles lors de son stockage et de son utilisation (par exemple par une armoire climatisée). La plage de température (–25°C ≙ –13°F ≙ 248 K à +55°C ≙ +131°F ≙ 328 K) est indiquée sur l'appareil. N'utilisez l'appareil dans une zone potentiellement corrosive qu'après avoir consulté Honeywell et reçu son approbation.

	The regulations in the relevant national and international standards (for example, IEC/EN 60079-14, installation of explosion-protection equipment) must be followed to the letter. Les normes nationales et internationales pertinentes (par exemple CEI EN 60079-14, installation de l'équipement Ex) doivent être impérativement respectées!

	A functioning, effective lightning protection system must exist. There must not be any ground potential difference between the components of the measuring system distributed in the plant - this must be prevented, e.g. by a properly dimensioned equipotential bonding conductor. The device housing and mounting base must be included in the grounding system or equipotential bonding system. The grounding connection (GROUND) on the device (together with other connections if necessary) must be used for this purpose. Un système de protection contre la foudre efficace et fonctionnel doit exister. Il ne doit y avoir aucune différence de potentiel de terre entre les composants du système de mesure répartis dans l'installation - cela doit être empêché, par exemple par un conducteur de liaison équipotentielle correctement dimensionné. Le boîtier de l'appareil ainsi que la structure de montage doivent être inclus dans la mise à la terre et/ou le système de compensation de potentiel; pour ce faire (en plus d'autres raccordements éventuels), utilisez toujours le connecteur de terre (GROUND) de l'appareil.

	**This device is a Class A device. It may cause radio interference in residential areas. In this case, the operator may be requested to take suitable action at its own expense.** **L'appareil est un dispositif de catégorie A susceptible de causer des perturbations radioélectriques dans l'espace d'habitation; dans ce cas, il peut être demandé à l'exploitant de prendre les mesures adéquates et d'en assumer les frais.**

2.3. Authorized (hardware) personnel

Assembly, electrical installation, commissioning and decommissioning as well as inspection and maintenance work may only be carried out by qualified personnel. Reference is made to the appropriate technical regulations, e.g. Directive RL 99/92/EC (ATEX 137). Do not fail to comply with this Directive in territories in which it applies.

	**Suitable personnel must definitely have the ability to identify dangers and risks, assess their work and avoid potential hazards.** **La capacité à identifier les dangers et les risques, à juger ses propres travaux et à éviter les risques possibles est une condition sine qua non.**

The appropriate specialists have the expertise set out in Annex A of EN IEC 60079-14 or have comparable expertise, including the following:

- General safety rules
- Care and use of reasonable safety equipment
- Electrical safety and explosion-protection rules
- Working on electrical circuits for systems with potentially explosive atmospheres
- Working with high pressures and aggressive or hazardous media
- Safety and warning information from this document

The operator of the system should carefully select suitable personnel and have their training status, familiarity with this document and completion of their introductory briefing confirmed in writing. He is responsible for the observance of this safety measure if the specialists are not authorized by Honeywell.

2.4. Information and warnings on the device housing

	**All information on the device must be noted and obeyed in all circumstances.** **Safety instructions and warnings are given in English or French.** **You must have sufficient language skills to enable you to understand their meaning.** **Les informations sur l'appareil doivent être respectées et suivies en tout temps!** **Les consignes de sécurité et les avertissements sont donnés en anglais ou en français.** **Il est nécessaire de disposer de compétences linguistiques suffisantes pour saisir leur sens.**

The information is engraved on the device or noted on the main type plate or additional type plates and lables.

In this documentation it is also shown.

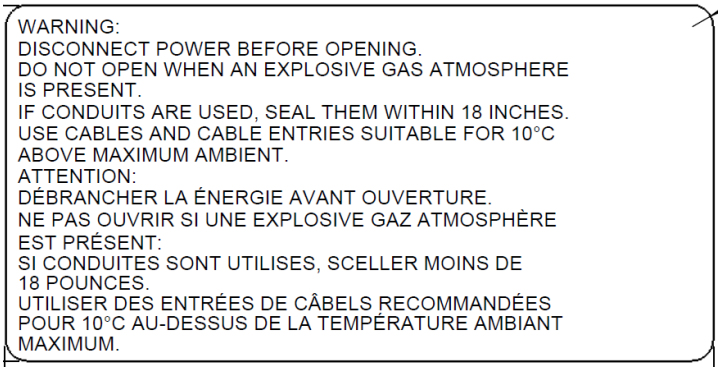


Figure 2.1: Sample warnings

2.5. Safety information about gases and pressures

The measurement device requires various gases for operation and measurement with different hazard potentials. Supply all gases into the device and out again via fixed lines. Follow the hints in ⇨ 5.3 Fluid installation of GasLab Q2.

	**When mixed with air, gases may form an explosive mixture or be toxic, harmful or pollutant. Un mélange de gaz et d'air peut se former, qui peut être explosif, toxique ou nocif et dangereux pour l'environnement.**

	**When working on the gas pipelines, always ensure there is adequate ventilation and protect yourself from gases which contain aggressive or toxic components.** **Lorsque vous travaillez sur les conduites de gaz, assurez-vous qu'il y a toujours une ventilation adéquate et que vous êtes protégé(e) contre les gaz aux composants agressifs ou toxiques.**

	Do not connect gases which are potentially flammable or explosive without the presence of oxygen (for example, C_2H_2 acetylene) to the device. Do not supply the device with any gas which contains more than 3.0 % vol. of oxygen. Il n'est pas autorisé de connecter des gaz qui sont inflammables ou explosifs sans être en contact avec l'oxygène (par exemple, l'acétylène (C_2H_2)). L'alimentation avec un gaz contenant plus de 3 % vol. d'oxygène n'est pas autorisée!

	Even in the event of an error, an inlet pressure above 0.3 MPag ≙ 3 barg ≙ 43.51psig must not be applied to the device connections. La pression amont sur les raccords de l'appareil ne doit pas dépasser 0.3 MPa(g) ≙ 43.51psi(g) ≙ 3bar(g), même en cas de défaut.

2.6. Handling explosion-protection devices

	The explosion-proof housing must not be opened in the presence of an explosive gas atmosphere. The cable inlets must not be disconnected in any circumstances in this case. Le boîtier protégé contre les explosions ne doit pas être ouvert dans une atmosphère gazeuse explosible. Dans ce cas, les dispositifs d'entrée de câble ne doivent être desserrés sous aucun prétexte.

Explosion-proof devices or housings have an element that serves to equalize pressure. This breather called element is not part of the vent (waste) gas system and is in direct contact with the ambient atmosphere. Gas will only escape from the breather element in the event of an error. If nessesary take suitable precautions to discharge it. For example, for installations in a building, this may take the form of a vent line into a safe ventilation area or appropriate ventilation of the installation site.

A vent line can be connected via the internal thread of the breather. respiratory organ. The following specifications apply to a vent line (please contact Honeywell if you are in any doubt):

- The additional pressure drop which may be caused by the pipeline depends on fittings, bends and the material used. It must not allow the pressure inside the housing to rise above 10 kPa ≙ 1.45psi ≙ 100 mbar. If a straight smooth pipe is used with a minimum internal diameter of 8 mm ≙ 0.31496 inch and a suitable inlet pressure, lengths of around 40m ≙ 131ft are possible. If you would like to use different diameters and lengths of over 40m ≙ 131ft, please contact Honeywell.
- The completely separate line must be protected from dirt, insects and rain by the system operator and ensure permanent atmospheric ventilation

	**The breather element and/or the vent line must not be closed or blocked! Permanent atmospheric ventilation must be provided, e.g. by using an insect grille made of stainless steel. If the breather must be replaced, the work may only be completed by authorized trained personnel. Le dispositif d'évent et/ou la conduite de ventilation ne doivent pas être fermés ou bloqués! Une ventilation atmosphérique permanente doit être assurée, par ex. à l'aide d'une moustiquaire en acier inox. Si le dispositif d'évent remplacé, seul du personnel autorisé est habilité à le faire.**

	DO NOT CONNECT THE PIPELINE OF BREATHER ELEMENT TO OTHER PIPELINES. Do not loosen or unscrew the breather element in a potentially explosive atmosphere. NE RELIEZ PAS LA CONDUITE DU DISPOSITIF D'ÉVENT À D'AUTRES CONDUITES! Le relâchement ou le dévissage du dispositif d'évent dans une atmosphère explosible est interdit!

	**If the device is not serviced or maintained correctly, there is a danger that it will explode.** **Contact the manufacturer for repair work which affects the explosion protection and the flameproof properties of the device.** **Risque d'explosion en cas de service ou d'entretien incorrects de l'appareil.** **Contactez le fabricant pour les réparations ayant une influence sur la protection contre les explosions et la sécurité anti-flamme.**

The operation and maintenance of explosion-proof devices may only be carried out by qualified personnel using explosion-proof, approved work equipment and measuring instruments. Work in potentially explosive atmospheres requires a license. You need a written operator's license (fire service license certificate), for example, for the following:

- Transporting and/or using a PC or laptop through or in a potentially explosive atmosphere.
- Working on the open device when the operating voltage is live.
  (e.g. needed for test the device)
- Connecting the control and parameterization device or laptop.

Follow the instructions set out below carefully and ensure that you have completed all the required safety steps before you work on the measuring unit or switch it on again. When you are working on the device, always switch it off before opening it! After opening, the voltage can be switched on again if necessary, with the operator's permission. Please observe the following sequence:

- Close all gas supplies.
- Switch off the supply voltage.
  (According the note on device: DISCONNECT POWER BEFORE OPENING)
  (Mark your work on the switched-off supply voltage and secure it against being switched on again!)
- Protect all open pipelines and connections from dirt.

	**DO NOT OPEN THE DEVICE IF IT IS IN A POTENTIALLY EXPLOSIVE ATMOSPHERE or IF THE CONDITIONS DESCRIBED IN ISO/IEC 61010-1 ARE NOT COMPLIED WITH** **N'OUVREZ PAS L'APPAREIL DANS UNE ATMOSPHÈRE EXPLOSIBLE au DANS DES CONDITIONS NON CONFORMES À ISO/CEI 61010-1**

	**All covers and hoods, which can be unscrewed to open the housing, must be protected against accidental opening by safety screws.** **Tous les couvercles et capots pouvant être dévissés pour ouvrir le boîtier doivent être protégés par des vis de sécurité contre une ouverture intempestive!**

	The recommissioning procedure must not be carried out in an explosive gas atmosphere. La remise en service ne doit pas être effectuée dans une atmosphère gazeuse explosible.

	**Before the device is switched on or switched back on, it must be ensured that all the gas connections are sealed and the grounding or protective conductor is correctly installed.** **Avant de mettre en marche ou de remettre en marche l'appareil, assurez-vous que tous les raccords gaz sont étanches et que le câble de mise a la terre ou le conducteur de protection est installé correctement.**

	ATTENTION! ELECTROSTATIC DANGER! **The housing of coated devices may only be cleaned with a damp cloth since otherwise electrostatic charging and therefore sparks are possible.** **ATTENTION! DANGER ÉLECTROSTATIQUE!** **Pour les appareils peints, nettoyez le boîtier uniquement à l'aide d'un chiffon humide pour éviter tout risque de décharge électrostatique et d'étincelles.**

2.7. Electrical safety information and emergency stop

	**The installation must comply with the local electrical and explosion protection standards (for example, DIN, EN, VDE, UL, etc.).** **L'installation doit être conforme aux normes locales concernant la sécurité électrique et la protection contre les explosions (par ex. DIN, EN, VDE, UL, etc.).**

Compliance with standards and directives on the following topics is mandatory:

- Electrical equipment for potentially explosive gas atmospheres
- Operation of electrical systems
- Testing and maintaining electrical systems in potentially explosive gas atmospheres
- Erection of power installations with rated voltages below 1000 V – tests – initial tests
- German Ordinance on Industrial Safety and Health

	**The SELV system or the PELV system may be used. All electrically conductive parts (housing and, if available, mounting constructions) must be included in the earthing or potential equalisation. For this purpose, the equipotential bonding connection point (PA) marked GROUND on the bottom of the device housing must be used in any case. Additional connections may be required.** **Le système TBTP ou le système TBTS peut être utilisé. Toutes les parties électriquement conductrices (boîtier et, le cas échéant, constructions de montage) doivent être incluses dans la mise à la terre ou la compensation de potentiel. À cette fin, le point de connexion de liaison équipotentielle (PA) marquée GROUND sur le fond du boîtier de l'appareil doit être utilisé dans tous les cas. Des connexions supplémentaires peuvent être nécessaires.**

	This device must not be operated without an equipotential bonding system/cable or grounding, or if this connection has been intentionally broken. **This must not result in a ground potential shift or ground potential differential.** **L'utilisation de l'appareil sans compensation de potentiel/liaison équipotentielle ou mise à la terre ou l'interruption délibérée de cette connexion est interdite.** **Il ne doit y avoir aucun décalage ou aucune différence de potentiel de terre.**

	**All connected devices have increased insulation against mains voltage. Tous les appareils raccordés doivent comporter une isolation renforcée contre la tension secteur.**

	**Every device must be operated with a separate power supply. This must be protected externally by a fuse or a miniature circuit breaker.** **Chaque appareil doit être alimenté par sa propre source électrique. Cette dernière doit être protégée extérieurement par un fusible ou par un disjoncteur.**

	**The 24 V DC power supply (including power mains fluctuations of ± 15%) must have a safe electrical isolation point. L'alimentation électrique de 24 V CC (incl. les fluctuations électriques ± 15 %) doit être munie d'une isolation électrique fiable. ***

*This may be provided, for example, by Quint-PS-100-240AC/Quint-PS-24DC/24DC/10/Siemens PSU/Siemens Logo or equivalent power supply units.

Isolating device and cable

	**The installation personnel must ensure that the wiring is protected from overloads and short-circuits and has the required overvoltage and overcurrent protection. L'installateur doit s'assurer que le câblage est protégé contre les surcharges et les courts-circuits et équipé des dispositifs de protection contre la surtension et la surintensité requis.**

	**The supply and communication equipment (cables not supplied) must be screened and comply with local installation regulations. Use cables or wires and cable inlets which are suitable for temperatures of 10°C ≙ 18°F ≙ 10K above the maximum ambient temperature. Les câbles pour l'alimentation et pour la communication (non fournis) doivent être blindés et conformes aux instructions d'installation locales. Utilisez des câbles ou des fils et des dispositifs d'entrée de câble adaptés à des températures supérieures de 10 °C ≙ 18 F ≙ 10K à la température ambiante maximum.**

	**The device does not have its own off switch. It must be operated using an isolating device (switch or circuit breaker) and current limiting device (or a combination of the two) to comply with ISO/IEC 60079-14 and ISO/IEC 61010-1.The isolating device must be able to safely isolate at least twice the operating voltage (48 V DC). L'appareil n'a pas d'interrupteur marche-arrêt dédié. Il doit être commandé via un appareillage de sectionnement (interrupteur/interrupteur de puissance) et un dispositif de limitation de courant (ou une combinaison des deux) afin de répondre aux normes ISO/CEI 60079-14 et ISO/CEI 61010-1. Le dispositif d'isolement doit pouvoir isoler en toute sécurité au moins deux fois la tension de fonctionnement (48 V DC).**

This isolating device (not supplied) must be located close to the device to comply with explosion protection and electrical safety regulations. Furthermore, it must isolate all power supply cables in the potentially explosive atmosphere and comply with the requirements for the installation site as mentioned in the standard.

One example of an isolating device of this nature which complies with ISO/IEC61010-1 is a circuit breaker/miniature circuit breaker which trips at a current of 200/U within 120 seconds. At precisely 24V DC, this current is 8.3 A. A suitable size in this case would be a C 4A. Circuit breaker.

	**Internal fuses may only be replaced by trained personnel authorized by Honeywell.** **Les fusibles internes ne peuvent être remplacés que par du personnel formé et autorisé par Honeywell.**

Cable glands and connections

All screw-in parts must be suitable for the IIC area and have explosion-protection certification.

	**The device may only be connected to the electrical supply using the cable glands in the connection box. These must comply with local explosion-protection regulations and be installed or replaced by authorized trained personnel. They must be installed and sealed as specified by the cable gland manufacturer to comply with explosion-protection regulations. The relevant regulations must be observed during this process.** **Le raccordement électrique de l'appareil ne peut être fait que par les presse-étoupes dans le boîtier de jonction! Afin de répondre aux exigences des normes Ex, ces derniers doivent être installés et/ou remplacés sur place par du personnel spécialisé autorisé. Afin de respecter les normes de protection contre les explosions, ils doivent être installés et scellés conformément aux instructions du fabricant des presse-étoupes. Ce faisant, les règlementations applicables doivent être respectées!**

	**The cable inlets must satisfy or exceed the IP rating (IP 64). NEC-compliant cable inlet equipment must be used in the USA. CEC-compliant cable inlet equipment must be used in Canada. ONLY- Japanese Ex approval listed cable inlet equipment must be used in Japan (Please contact Honneywell for information on permitted fitting types)** **Les dispositifs d'entrée de câble doivent atteindre ou excéder la classification IP (IP 64). Pour une utilisation aux États-Unis, les dispositifs d'entrée de câble doivent être conformes au NEC. Pour une utilisation au Canada, les dispositifs d'entrée de câble doivent être conformes au CEC. SEULEMENT - Les équipements d'entrée de câble figurant sur la liste d'homologation Ex japonaise doivent être utilisés au Japon (Veuillez contacter Honneywell pour obtenir des informations sur les types de montage autorisés)**

	It is forbidden to use the adapter several times in a row! Only one adapter may be located between cable gland and device. Blanking plugs must fit directly into the device bore hole, adapters must not be used! Il est interdit d'utiliser l'adaptateur plusieurs fois de suite! Un seul adaptateur peut être placé entre le presse-étoupe et l'appareil. Les bouchons de fermeture doivent s'adapter directement dans le trou de l'appareil, les adaptateurs ne doivent pas être utilisés!

Required properties:

- The cable and cable gland (with sealing ring) must be suitable for temperatures of up to 80°C ≙ 176°F
- The cable gland must be sealed and must have explosion-protection certification II2G Ex db IIC T4 Gb.
- Conduit system (conduit stop boxes as long as they are cast/sealed)
  - Within 1 x D from the housing for ATEX and IECEx
  - Within 45 cm (18") for FM

2.8. Data security information

Honeywell gas analyse devices are used in modern infrastructures and network control systems with the aim of transferring process information such as meter readings, measurements and messages to a central billing or control point. A connection of this type constitutes a significant security risk which must be given careful consideration when designing the network.

2.8.1. General guidelines Software versions and actuality

	**Only use the device with the latest released software according to the approvals of your device. N'utilisez l'appareil qu'avec les logiciels les plus récents, conformément aux homologations de votre appareil.** **Please note that only the software versions mentioned on the cover page are considered in this manual. Veuillez noter que seules les versions de logiciels mentionnées sur la page de couverture sont prises en compte dans ce manuel.**

To increase data security, you may need to install the latest available software version before using the device. You should also check from time to time whether the software used is still up to date.

Check on the website www.elster-instromet.com/en/software-downloads whether your enSuite version is still up-to-date, download the latest version if necessary and install it. To do this you will find information on this website and under "Installing and starting enSuite" in this document.

A modification history, which is also available, provides information on the development of the device series.

	With the help of the latest enSuite version, the status of the other software parts can also be checked. The section 8.4.12 Changing the software configuration (Update / Downgrade) contains the necessary information. If the software is out of date, update all parts.

The device may also be upgraded now by Honeywell upon request. Honeywell shall not be liable for loss of data, provision of incorrect information or other potential problems associated with failure to upgrade the software to the latest release in the manner required.

	You can use the methods described in section 1.4 Version History Updates and File Integrity to verify the integrity of the file. Additional information on how to check the software's up-to-dateness can also be found there.

2.8.2. Password guidelines and role-based access control

Each user has his own access data consisting of **user name** and **password**. The device checks the access data, i.e. the user must be known to the device.

	**The device is supplied with standard users without password protection or password. Honeywell recommends that you first set an administrator password and set up passwords for all super users before operating.** **L'appareil est fourni avec des utilisateurs standard sans protection par mot de passe ou mot de passe. Honeywell vous recommande de définir d'abord un mot de passe administrateur avant d'utiliser et configurer des mots de passe pour tous les principaux utilisateurs.**

Use the best practices for managing your passwords with the device. Special characters like the equal sign "=" are allowed in passwords. Here are some best practices to make password attacks more difficult:

- Always change default passwords
  e.g. your preset by the administrator or super user access data
- Always use strong passwords (at least eight characters)
  Always use a combination of higher and lower case letters, numbers and special characters. Furthermore, protection increases with the length of the password.

The role-based authorization concept of the enCore device series is another tool for increasing data security. Six different roles with six user profiles help to ensure correct operation with correspondingly restricted access.

An administrator profile and five super user profiles (su1-su5) are always available.

	**The device is delivered without preset rights and access management.** **Honeywell recommends the administrator to adjust the authorization concept before operation. The table at the end of the section gives appropriate recommendations to ensure safe use of the device.** **L'appareil est livré sans droits prédéfinis ni gestion d'accès.** **Honeywell recommande à l'administrateur d'ajuster le concept d'autorisation avant l'opération. Le tableau à la fin de la section donne des recommandations appropriées pour garantir une utilisation sûre de l'appareil.**

The administrator profile or the administrator has unrestricted access to the device and manages the other user profiles. The administrator is responsible for setting and transferring user management to the device. Passwords and access rights must be assigned by her or him. The Administrator should therefore have the appropriate equipment knowledge e.g. by participating in a training course. The station operator usually takes on this task.

Section 8.3 User management and login describes the necessary steps.

The access rights are assigned per super user profile and determine which user profile, which parameters **(rights at parameter level)** or system settings **(rights at system level)** may change on the device. A user of this profile therefore only has access to the corresponding part of the device. This provides you with a powerful tool with which you can implement exactly **the role concept** that fits your applications. In the delivery state, all super user profiles are set the same.

The following figure gives you a first overview:

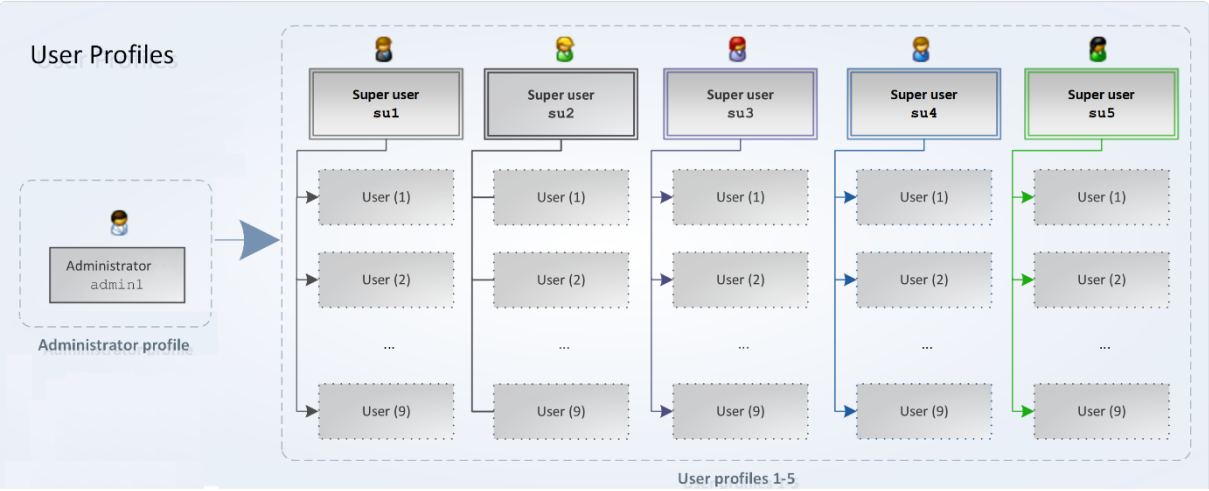


Figure 2.2: Roles and user profiles

All user profiles (exception administrator) are groups of up to nine standard users and one super User (su), who manages his group, i.e. he can add or delete users and change user names.

Users inherit the permissions of their profile.

Groups of people working with the device should only be provided with the required user profile by the administrator after password creation. An example is shown in the table at the end of the section.

By default, users of profiles 1-5 have read-only access to the enCore device after login.

To ensure data consistency, only one user can be exclusively logged on to the device at a time and changes can only be made after successful login.

Apart from password protection and access rights, changes can also be prevented by the calibration switch (SSW) or logged in the fiscal audit trail . The administrator must also make the necessary settings for this protection, which was not installed on delivery. See also section 8.3.4 Viewing position of the security switch.

	Further information and application about user management, logging in, logging out and changing the password, see section 8.3 User management and login or additional **enSuite online help**.

In order to ensure the security of your enCore device, you should always give user profiles 1-5 only the minimum rights required to perform a task. The following table gives an example overview of a few roles and use cases of the permissions proposed by Honeywell:

Administrator profil **enSuite**	**Main actor(s):** Device owner / Station Operator
	Goals: System- / Device-Management
	all rights at system level and at parameter level exists **(no adaption necessary)**
	Use case: Creating and deleting users / assigning rights / assigning passwords
one of the User profiles 1–5 **enSuite**	**Main actor(s):** Honeywell Service Technician / Technical Support Service technician with additional qualification (authorized in legal metrology)
	Goals: Mount device / configure device functions / change software (legally relevant, operational) / adapt parameterization to measuring point / open and close security switch / ensure correctness of the official measurement / seal device
	required rights (administrator rights without user management) **All rights at system level / All rights at parameter level** **(Rights must be adjusted)**
	Use case: Service technician commissions the device in legal metrology or operationally or carries out essential changes to the operating mode or repair measures. Honeywell Technical Support supports service technicians, technical personnel and controllers in their activities
another one of User profiles 1–5 **enSuite**	**Main actor(s):** Honeywell Service partner / Metrologie-Expert with HONEYWELL Training
	Goals: Open and close security switch / erase fiscal audit trail/fiscal archives / change legally relevant parameters according to the approval file / change legally relevant software on the device / ensure correctness of the official measurement / seal device
	Minimum required rights (Rights must be adjusted) **rights at system level:** Change device system time / Reset battery status / Change AFB configuration / Change legally relevant and operational software / Change general system settings / Erase fiscal audit trail/fiscal archives / Change approval file. **rights at parameter level:** Right to change all parameters that are protected by security switch according to the approval file / Change rights around operational AFBs
	Use case: Authorized metrology expert carries out legally relevant maintenance.
a third profile of the User profiles 1–5 **enSuite**	**Main actor(s):** Qualified personnel with HONEYWELL training e.g. electrician / gas specialist
	Goals: Goals: Regularly change a defined set of parameters, e.g. adjust values of the gas component table / change operational software / delete operational archives / perform calibrations / perform maintenance
	Minimum required rights (Rights must be adjusted) **rights at system level:** Change displays / Change device system time / Reset battery status / Change AFB configuration / Change operational software / Change general system settings **rights at parameter level:** rights to change the required set of parameters, z. e.g. gas quality values / gas composition
	Use case: Technical staff carries out operational maintenance work
Rest of the User profiles 1–5 **enSuite**	**Main actor(s):** User without HONEYWELL training e.g. Controller.
	Goals: readout archives / readout parametrization / view and accept error list
	no adjustment of rights necessary (default setting allows read-only access)
	Use case: Employee reads out non-sensitive data from the measuring device

Figure 2.3: Overview of user profiles and proposed authorizations

2.8.3. Networks and security for data at rest and data in transit

All enCore device data is written and stored on the SD card in the device. This data is also called **data at rest.** To prevent unauthorized access, the configuration data is encrypted starting with basic system version 03-39-A. Write access is only possible after authentication with **user name** and **password**. The security switch (SSW) also prevents manipulation of the device.

Data-in-transit is the data that is transferred between an enCore device and e.g. a control station in a public or trusted network or between enCore device and enSuite e.g. when transferring data during parameterization of the device. The communication between the enCore device and enSuite is carried out via **MMS (Manufacturing Messaging Specification)**, which is encrypted since Basic System 03-39-A to prevent data from being read by other network users.

The encryption is carried out using the **TLS (Transport Layer Security)** transmission protocol. The enCore device uses a **self-signed certificate** to authenticate itself to enSuite each time an MMS connection is established. The devices are always delivered without a certificate, which is automatically created when the enCore device is put into operation and announced to enSuite during the first MMS connection. This certificate is retained until it is changed / deleted manualy.

To increase security, we recommend changing this certificate on the enCore device or on the remote operation panel before regular operation and having the device create an up-to-date certificate **with administrator and user passwords set up**. The certificate information can also be viewed on the enCore device or the remote operation panel. Details on the **use of certificates** will follow later in this document.

Other protocols that are also used in the enCore devices - e.g. Modbus - transmit data partly in plain text. If possible, use the secure variant of a protocol. **To increase security, also use a firewall as described in the next section.** Supported data protocols are shown in the following table. Not all options are included in every enCore device.

Communication	Supported data protocols
Ethernet	• DSfG (class B) • HTTP (*only up to version 03-38*) • MMS (secured via TLS) • Modbus TCP • NTP • SMTP (unencrypted, SSL/TLS, STARTTLS)
Serial communication (RS232, RS485)	• DSfG (class A) • Modbus (ASCII, RTU) • UNIFORM

We recommend using a VPN connection whenever you need a secure data connection, but no secure protocol is supported for data transmission. Nous recommandons d'utiliser une connexion VPN chaque fois que vous avez besoin d'une connexion de données sécurisée, mais aucun protocole sécurisé n'est pris en charge pour la transmission des données

	In a VPN, data is transferred between two or more participants in encrypted form. For this reason, a VPN connection is recommended, for example, for mobile access to a flow computer, access to the private network or for data communication via different systems is of great importance.

2.8.4. Preventing unauthorized external access using a firewall

To reduce the risk to your network, we highly recommend including a firewall or some other mechanism to limit the network traffic between the (external) central accounting center resp. control station and the (internal) network of the gas measuring plant in a target manner. Furthermore, we recommend allowing protocols and ports only that are actually used for data exchange with the external network, e.g. by adding these to the white list of the firewall and allow data exchange with trusted participants only. Supported data protocols for GQ devices are shown in the following table.

Protocol	Standard port	Description
MMS	102	Manufacturing Messaging Specification (pursuant to ISO standard 9506) allows communication between enSuite and enCore devices, for example, access to an enCore device via the remote operation panel.
Modbus TCP	502	Protocol for data exchange by user-defined registers between AMR and enCore devices using a standard TCP/IP network.
NTP	123	Network Time Protocol for the high precision time synchronization of enCore devices with an NTP time server.

Following Example shows a router and a firewall between the metering device and the control room during data exchange via Modbus TCP in a trustworthy network.

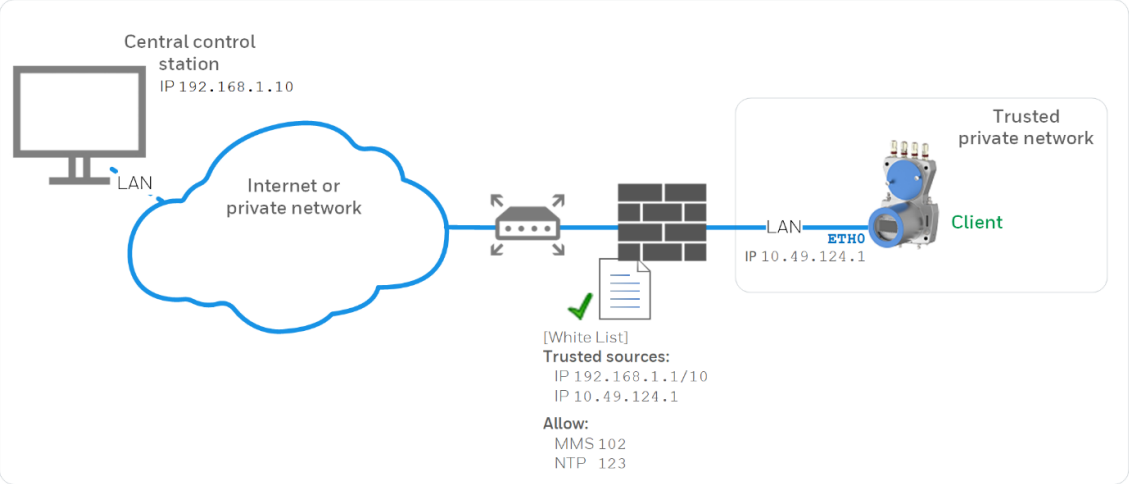


Figure 2.4: Example of a router and firewall

2.8.5. Logging of device events with logbooks

	**Log files can provide useful information to help troubleshooting on site, but also provide valuable data on the use of the device and any violations. Please note therefore the contents of these files. Les fichiers journaux peuvent fournir des informations utiles pour aider au dépannage sur place, mais ils peuvent également fournir des données précieuses sur l'utilisation de l'équipement et sur les éventuelles violations. Veuillez donc noter que le contenu de ces dossiers**

In enCore devices, a distinction is made between the general audit trail and the fiscal audit trail. Both are log archives:

General audit trail: The audit trail is a fixed component of the Basic System and exists in every enCore device. All parameter changes and the following system events are logged here:

- System messages
- All parameter changes
- User login and logout
- Setting counters
- All entries in the fiscal audit trail

The audit trail has a depth of 1000 entries. As soon as the logbook is full and another event occurs, the oldest entry is overwritten by the latest entry using the FIFO (first-in-first-out) principle.

Fiscal audit trail: enCore devices which are used for legal metrology purposes also have a fiscal audit trail. All changes of parameters made while the security switch is closed, which are labeled with the symbol in the device parameterization, are logged here.

The fiscal audit trail has a *maximum* storage capacity of 1000 entries. As soon as the fiscal audit trail is full, parameters with the relevant symbol can *no longer* be changed while the security switch is closed – the fiscal audit trail must first be cleared. This action can only be performed by an authenticated user with the opened security switch.

	The sections on operation and parameterization contain further information on handling the logbooks

2.8.6. Reporting security vulnerability to Honeywell

A security vulnerability is defined as an error or weakness in the software that can be exploited to impair the operation or security of the parameterization or device software or to access sensitive data.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services. For details on Honeywell security policy, visit

https://www.honeywell.com/product-security.

To report a potential security vulnerability against any Honeywell product, please follow the instructions at:

https://www.honeywell.com/product-security (under the “Vulnerability Reporting” section)

To view information on current malware threats please visit:

https://www.honeywellprocess.com/en-US/support/Pages/security-updates.aspx

OR contact your local Honeywell Process Solutions Customer Contact Center (CCC) or our technical support of Elster Gas ©

Contact data (at the beginning of this document)

2.8.7. Uninstalling programs and data

Uninstall enSuite in the usual way in Windows, but only if you do not want to access any enCore device permanently, as the uninstallation removes all enCore devices and data from your parameterization device (PC) at the same time.

In the **navigation window**, remove data by selecting a line and activating **Delete** in the context menu. After confirmation, the line and all subordinate entries are deleted.

If the device is disposed of, the stored data can be easily and safely removed by removing the SD card. Without SD card the device is unusable.

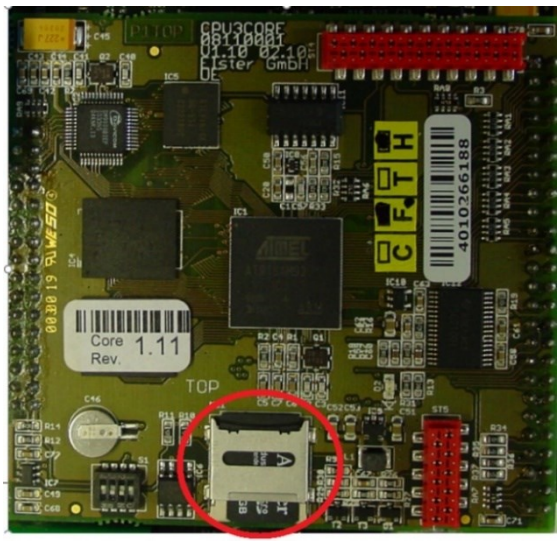
	**If the SD card is removed improperly, additional hardware damage is possible! Disposal of the memory card and device are subject to environmental protection regulations.** **Si la carte SD est retirée de manière incorrecte, des dommages matériels supplémentaires sont possibles ! La mise au rebut des cartes et des appareils à mémoire est soumise à la réglementation sur la protection de l'environnement.**

All data of the device is stored on the SD card. This card is located on a separate board, called CPU3 CORE.

Unscrew the mechanically and electrically uninstalled device. The circuit boards (in the housing or on the HMI module) become visible.

You will then see the CPU3 CORE board with the SD card as shown. The SD card is located in a holder and has a red border in the figure.

Open the holder by first sliding the cover to the edge and then folding it forward. Now remove the SD card and with it all data of the device.



	Infmation about opening the device in section ⇨ 6.1.3 Opening and closing the hardware parameter guard (SSW)

3. Structure and inscriptions of the GasLab Q2

GasLab Q2 is a compact device housed in a two-piece explosion-proof aluminum housing. The parts are mechanically and electrically connected. The measuring instrument contains all parts required to fulfil the measuring task. The built-in additional housing heater and an integrated fan allow an operating temperature range from –25°C ≙ –13°F ≙ 248 K to +55°C ≙ +131°F ≙ 328 K. From a functional point-of-view, the hard work can be divided into three sections.

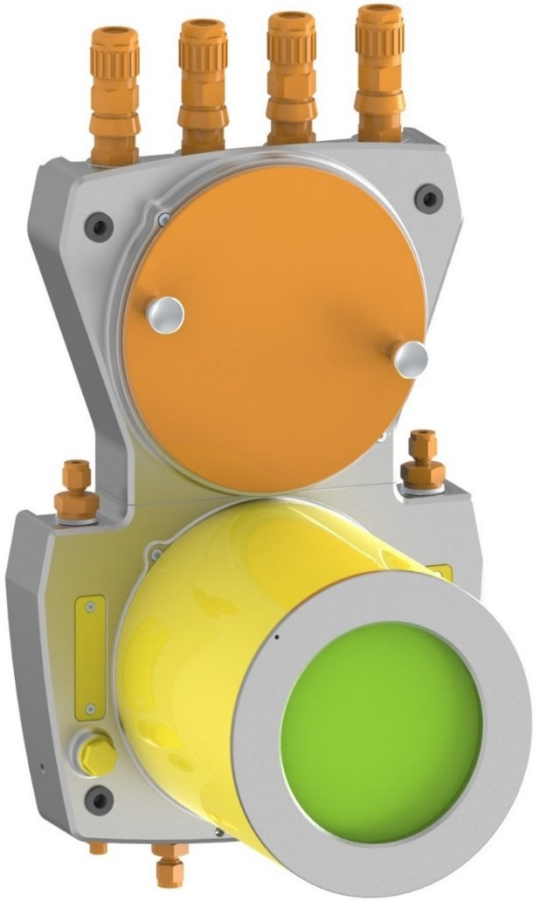


Figure 3.1: Overview Hardware sections

The **connection section** (shown in orange in the diagram) constitutes the interface to external connections, such as the gas supply and electrical cables.

The **instrumentation section** (shown in yellow in the diagram) primarily contains the structure with function modules and provides access for production and service work.

The **human-machine interface** (HMI interface shown in green in the diagram) is the interface to the user.

These sections are explained in more detail in the following.

3.1. Connection section

The connection section is sub-divided into the following parts:

- Gas connections (inputs/outputs and breather)
- Electrical connections (cable inlet and connection circuit board)

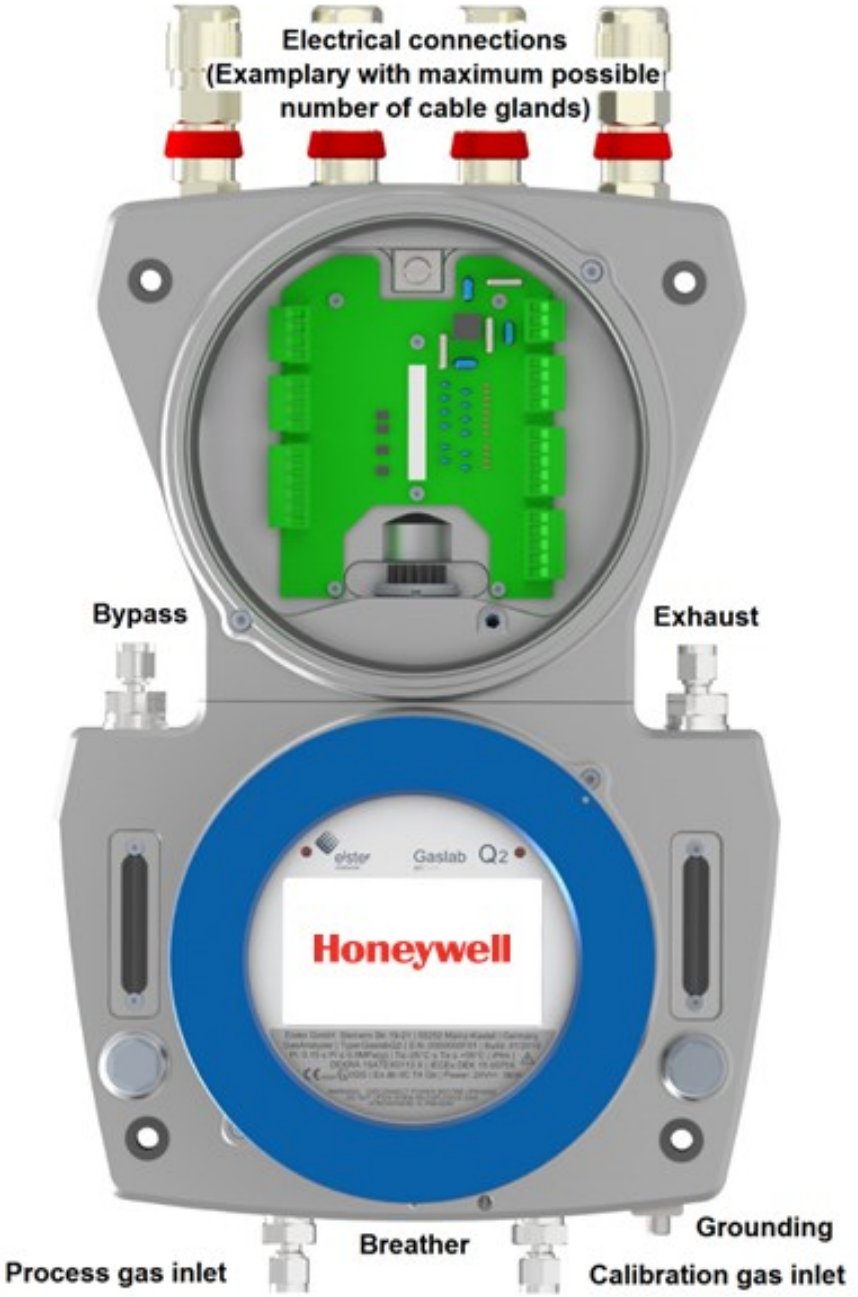


Figure 3.2: Overview of connection section/connection points

Gas connections (inlets / outlets and breathing elements)

The gas connections are pipe fittings and are equipped by the manufacturer.

The gas inlets are located at the bottom of the device. Left for process gas with integrated particle filter. This inlet can also be used for test gas or verification gas. On the bottom right is the inlet for the operational calibration gas. This inlet has no particle filter and is only suitable for connecting particle-free gases.

The gas outlets are located on the upper side of the lower housing part, i.e. in the middle of the device. On the right is the gas outlet for the vent gas from the measurement. On the left is the outlet for gas that can flow through a bypass, e.g. if there are long supply lines and the reduction of the reaction time is desired. The outflowing gas is discharged into separate vent lines for each outlet.

Two breathing points are used to enable atmospheric pressure equalisation between the inside of the device and the environment. These breathing devices must not be closed or blocked. The main breathing device is in the middle of the bottom, the auxiliary breathing devices are located on the back of the device in the upper part of the housing.

	Further information ⇨ 5.3 Fluid installation of GasLab Q2

Electrical connections (cable inlet and connection circuit board)

Figure 3.2 shows an example of four cable glands for electrical inputs and outputs on the top of the instrument. If required, the threaded holes of the housing can also be equipped with dummy plugs or adapters.

The illustration shows, in the upper part of the instrument, also the connection box located below the cable glands. It contains a circuit board with all electrical interfaces. These can be connected with connection cables via plugs on the edge of the board. In the middle of the board is the connection to the lower part of the housing. This connector is secured by barbs and must not be removed.

The housing must be grounded or connected to the local potential equalization. For this purpose, there is an earthing and equipotential bonding screw (GROUND) on the bottom next to the calibration gas inlet. A further functional grounding point (FE) is in the connection box in the upper recess of the board. See Figure 3.2.

Proper operation can only be guaranteed if all system components have the same ground potential.

	Further information ⇨ 5.4 Electrical installation

3.2. Instrumentation section

The instrumentation section contains gas-carrying and measurement components. These include the double-block-and-bleed valve block (DBB) for gas channel switching as well as the sensor block with pressure control and sensors, see also section 4.1 Description of the measuring method. All this is accommodated in the lower part of the instrument, the so-called functional housing and the cylinder connected to it.

Only in the outside area there are elements accessible to the user.

These are located on the left and right of the functional housing (see figure)

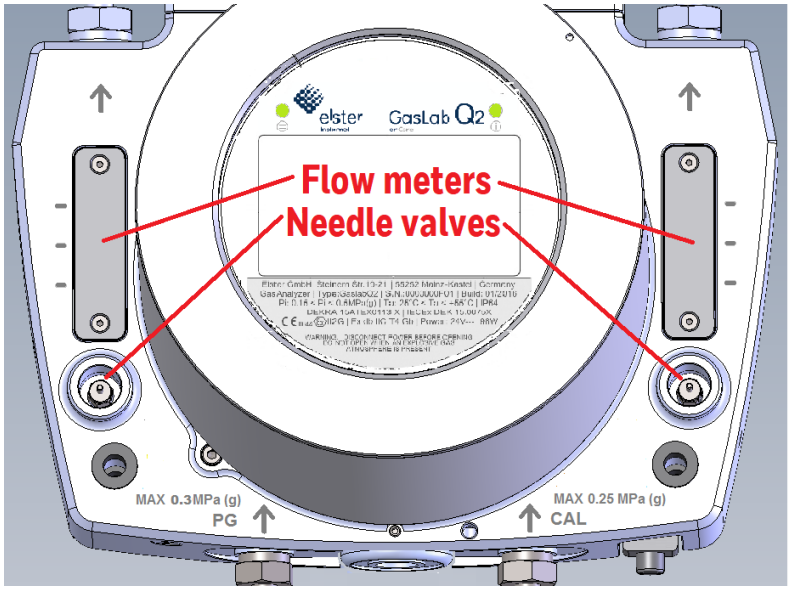


Figure 3.3:
Accessible elements of the instrumentation sectiont

The gas to be analysed reaches the sensor block through the inputs via the DBB valve block. After it has been analysed there, it returns to the bottom section of the housing on the right-hand side. The right-hand flow meter and the right-hand needle valve are used to display and regulate the flow of vent gas from the measurement. The side markings of this flow meter show the usual flow rates of approx. 30 l/h (bottom) approx. 40 l/h (middle) and approx. 60 l/h (top).

The left-hand flow meter shows the gas flow in the bypass. This can be used optionally, e.g. for long supply lines, to accelerate sampling. The flow rate is regulated by the needle valve below it. The ball begins to float at approx. 55 l/h. The side markings indicate flow rates of approx. 90 l/h (bottom) 125 l/h (middle) and 160 l/h (top). When the upper end is reached, the maximum flow rate is set at approx. 310 l/h.

	The flow meters are used for visual function control and only for rough estimation of the flow rate. If the ball is within the marks, there is enough flow for operation. A gas flow already exists even with stationary balls. Honeywell recommends the use of an additional flow meter in the gas path in cases where the exact flow rate is critical. (This can be removed again after the adjustment procedure)

3.3. Human-machine interface (HMI)

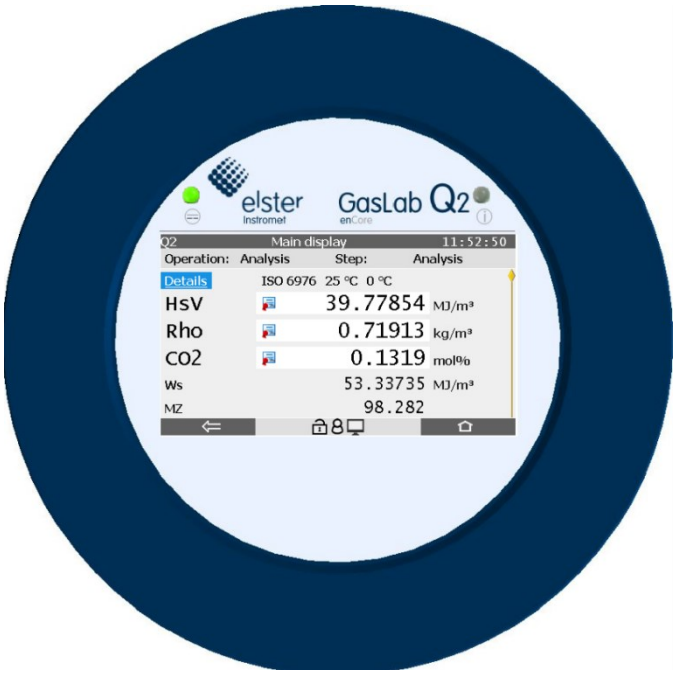


Figure 3.4: Example of interactive display/operation panel

The actual interface to the human operator, the human-machine interface (HMI), essentially consists of an interactive display behind a glass window, also called operation panel, and two status LEDs that indicate the status of the device.

During normal operation the GasLab Q2 can be operated completely via the **operation panel**, which is equipped with 7 touch fields, as it allows direct reading of the measured and target values as well as control and settings. A screen keyboard is displayed if necessary. Various languages are possible.

In addition, the HMI area consists of electronic circuits on circuit boards which are invisible to the operator. These share the cylinder of the instrumentation area with the measuremen components and handle the control, display and archiving of measurement data.

The glass window can be closed using a screw-on cover, the sand guard. See figures 3.5 and 5.1.

Operation and control are not only possible directly at the instrument, but also remotely via network and with the corresponding PC software.

	The software is described in more detail in chapters 7 GasLab Q2 Displays (Operate the Device) and 8 Configuration and analysis software enSuite

3.4. Type labels and setting marks

The main type label with the most important information is located below the interactive screen, behind the inspection window. If the type label is covered by the sand guard, this information can also be read off an additional type label on the outside of the housing. In some cases, the main type label does not offer enough space for all information, so there may be additional warning and type labeles on the housing. The following figure shows the positions of the type labels and warnings on the device.

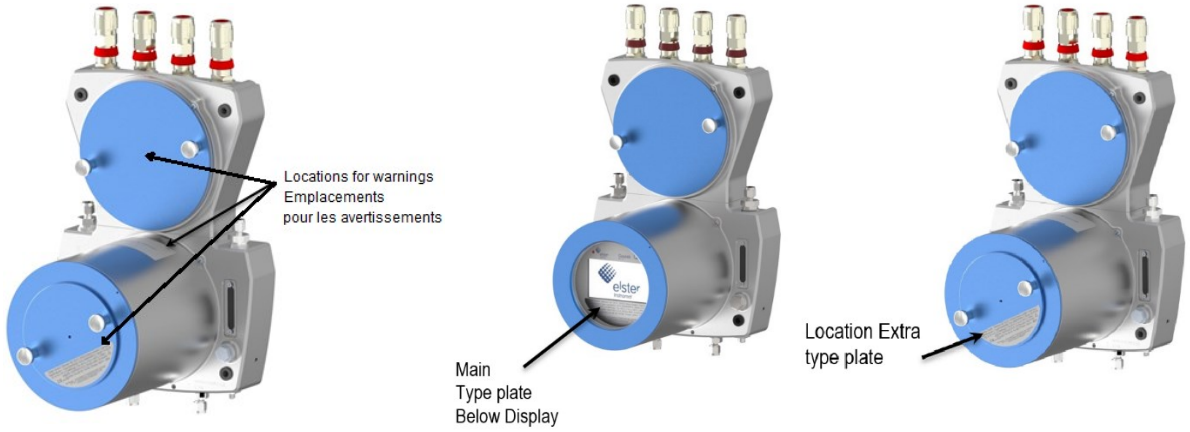


Figure 3.5: Example positions of the type labels and warnings

The equipment of the device with type lables depends on the country of use and the approvals. The type labels will vary in terms of language and the specified standards or regulations. However, the following information is always contained on the label(s):

Information
Manufacturer and manufacturer's address with the address of the production site
Device type, type designation, serial number and year of manufacture MM/YYYY
Warning to refer to this document, environmental regulations to be complied with and 2 D matrix code
Gas inlet pressure range* Ambient temperature range Enclosure (protection class (IP)) Voltage and power consumption
Warning and connection instructions, on a separate label if several languages are necessary

* The input pressure range depends on the application; deviations are also possible on request.

	**Information on the device (type labeles and engravings) must always be observed and followed!** **Les informations sur l'appareil (étiquettes et gravures) doivent toujours être respectées et suivies!**

In addition, the type labeles contain information about the approvals granted and the explosion protection properties. Not all certificates and approvals are listed in this documentation. The following table shows a selection.

Approvals (selection) Only the specifications on the respective device apply!
(For EU) Approval number DEKRA 15.ATEX0113X /IECEx DEK 15.0075X CE mark with auditor number
Approval number FM: FM17US0040X/FM17CA0027X Class I Div 2 Groups ABCD T4
Ex rating: (II 2G) (A) Ex db IIC T4 Gb (for ATEX IECEx and FM)

Depending on application, measuring ranges of the evaluation certificate according to OIML R 140 for calorific value determining devices could be also mentioned. Figure 3.6 shows examples of main type plates and a metrological type plate (bottom right).

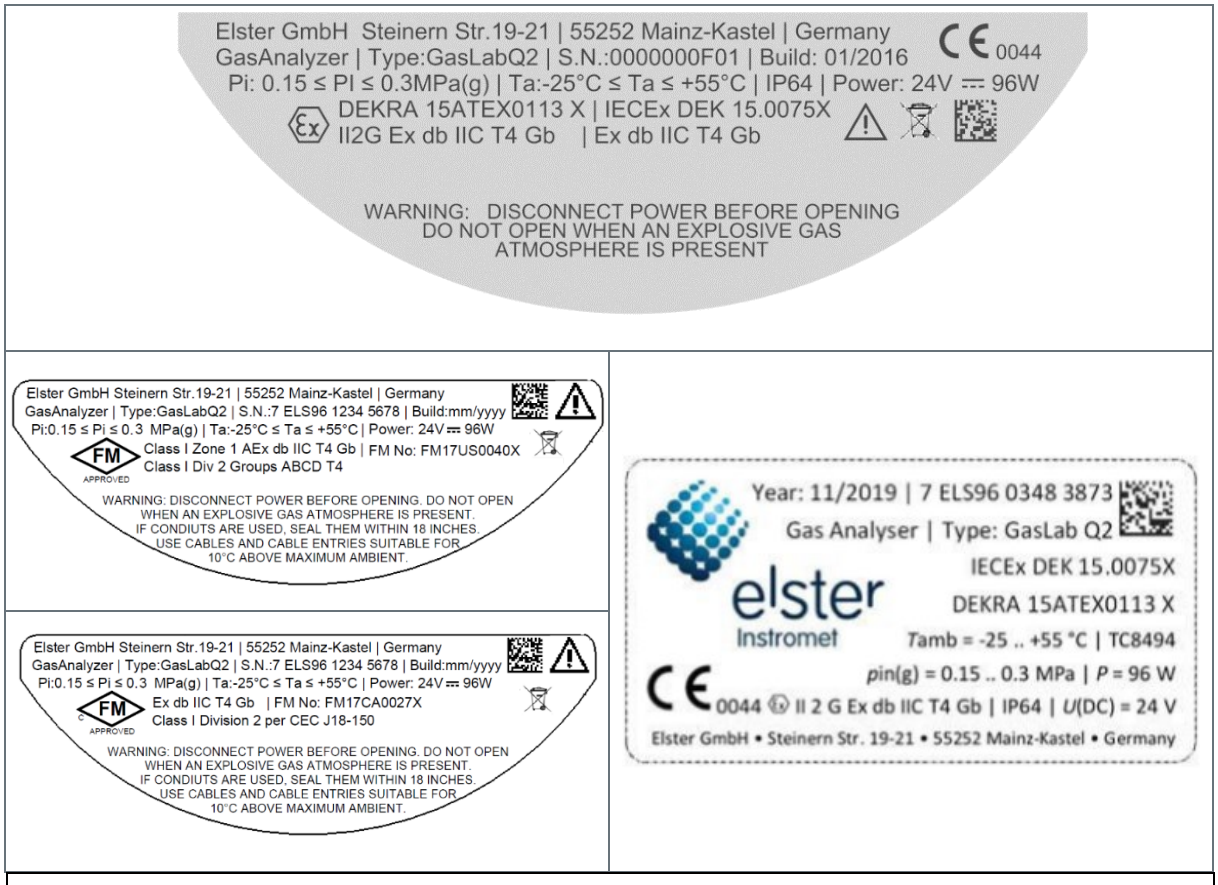


Figure 3.6: Type labeles (examples)

Apart from the type labeles, there is still engraved information on the device. Next to the flow meters there are setting marks for the gas flow rates.

Arrows at the inlet and outlet indicate the direction of the gas flow. Above the gas inlets, the maximum inlet pressures are also indicated, which must not be exceeded under any circumstances.

On the underside of the device there is the designation GROUND for the electrical connection to the equipotential bonding system and earth.

These specifications must also always be observed!

	Setting marks for the gas flow rates
	Arrows for the direction of gas flow
MAX 0.3MPa (g) PG	Maximum inlet pressure process gas
MAX 0.25 MPa (g) CAL	Maximum inlet pressure Calibration gas
	Potential equalization connection point (PA)

Figure 3.7 Engraved device Information

3.5. Explanation of explosion protection markings

Icons / symbols		Meaning
		Designations around these symbols (on the nameplate) indicate the area of application taking explosion protection into account. Notified body, device group, device category, Ex zone, Ex class, type of protection, explosion group, temperature class and device protection level are indicated among other things.
Device Ex symbol		

Used Shorthand	Description / Explanation
0044	Ex marking for Notified Body
	Notified Bodies are state notified and supervised testing bodies. On behalf of the manufacturer, they inspect the conformity or compliance with corresponding standards and regulations for his products and or his production.

Used Shorthand	Description / Explanation
II2G	Ex marking complete device suitable for ex- zone 1 and 2 (gases/vapours)
	Ex-zones Potentially explosive areas are divided into zones according to the frequency and duration of occurrence of hazardous explosive atmospheres. The following applies to flammable gas-air mixtures: **Zone 0 / Division 1** is an area in which a hazardous explosive atmosphere is present continuously, for long periods or frequently. **Zone 1 / Division 1** is an area in which a hazardous explosive atmosphere may occasionally occur during normal operation. *(Division 1 comprises the combination of Zone 0 and Zone 1 areas)* **Zone 2 / Division 2** is an area in which a hazardous explosive atmosphere normally does not occur during normal operation, and if it does, it does occur only rarely and for a short period of time.
Ex db / AEx db	Principle and type of ex-protection (in this case flameproof enclosure)
	Flameproof enclosure By using this **protection principle and type of protection** parts that can ignite an explosive atmosphere are enclosed in a housing. The enclosure will withstand an internal explosion and prevent transmission to the atmosphere surrounding the enclosure.
IIC	Ex marking of explosion group
	Explosion group Group I contain equipment for mine workings endangered by firedamp. **Group II** for all other potentially explosive atmospheres. The classification is based on the equipment design and the hazardousness of the gases. It increases from expl. group II A to II C.
T4	Ex marking of temperature class (in this case 135°C)
	Temperature class The maximum surface temperature of the device must always be lower than the ignition temperature of the explosive mixture. The following temperature classes are specified: T1=450 °C≙ 842 °F ≙ 723 K T2=300 °C ≙ 572 °F ≙ 573 K T3=200 °C ≙ 292 °F ≙ 473 K T4=135 °C ≙ 275 °F ≙ 408 K T5=100 °C ≙ 212 °F ≙ 373 K T6= 85 °C ≙ 185 °F ≙ 358 K
Gb	Ex marking of equipment protection level (in this case "high")
	Equipment Protektion Level (EPL) Equipment for potentially explosive atmospheres where there is no risk of ignition during normal operation is classified in three levels of protection. These apply to gas (G) and dust (D) „Very high“ protection level (**Ga or Da)** no danger of ignition in case of foreseeable or rare malfunctions „high“ protection level (**Gb or Db)** no danger of ignition in the event of foreseeable faults or malfunctions „increased“ protection level (**Gc or Dc)** Additional protective measures are taken to ensure that there is no danger of ignition in the event of foreseeable malfunctions of the device.

4. Measurement technology and measuring point

In the analysis mode, the gases are measured in a continuous flow every second and the calculations of the gas composition are updated. The measured values can be displayed on site and forwarded to a control room, for example.

	The application is described and explained in detail in the chapters 7 GasLab Q2 Displays (Operate the Device) and 8 Configuration and analysis software enSuite

4.1. Description of the measuring method

The used correlative measuring principle is based on the determination of infrared absorption and the thermal conductivity of the gas being analyzed. Instead of the gas values such as superior calorific value, density at base conditions and CO_2 content, the measuring method uses values which are physically related to the target values and are easier to measure. GasLab Q2 therefore analyzes the following gas properties:

- Infrared (IR) absorption of the CH gas
- Infrared (IR) absorption of the CO_2 gas
- Thermal conductivity of the full gas mixture
- Pressure and gas temperature

All the partial measurements are subjected to a correlative evaluation process which is based on the physical background, the typical composition of natural gas. The nitrogen, as well as the superior calorific value, density at base conditions and CO_2 content can be calculated using an appropriate equation system.

The Wobbe index can be calculated using the superior calorific value and density at base conditions. These values are enough to determine the other properties of the natural gas. This means that all the main gas components can be identified directly or indirectly and are available for further processing. The figure shows a schematic overview of the measuring principle (without pressure and temperature).

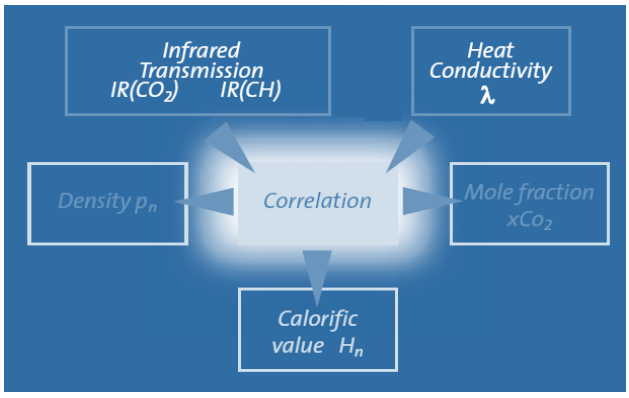


Figure 4.1: Measuring method

The physical measurement is carried out in the instrumentation section with the aid of a sensor block containing the electronics for the complete control, regulation, measurement acquisition and transmission.

A two-channel double block and bleed valve block (DBB) supplies the gases to the sensor block. Each gas channel is shut off by 2 solenoid valves. There is ventilation between the valves. This DBB technology prevents the supplied gases mixing, even if the valves leak. The figure shows a layout of the gas routes. The arrows indicate the flow direction of the gas.

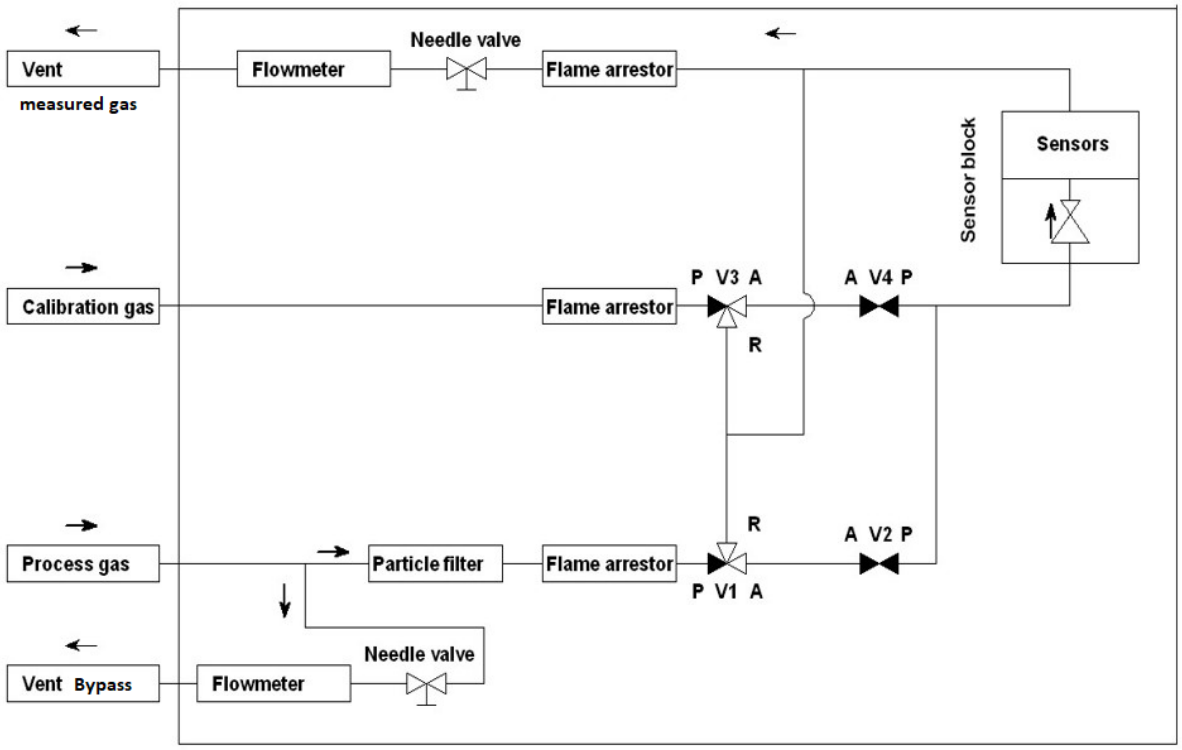


Figure 4.2: Gas routes in the device

The sensor block consists of parts with gas channels as well as the electronics and sensors. An integral pressure regulator reduces the inlet pressure for measurement. The measuring system typically operates at a gauge pressure of around 16 KPa ≙ 2.32 psi ≙ 160 mbar. The gas is then supplied to the actual sensor chamber. The infrared sensor and the thermal conductivity sensor analyze the gas there and a pressure transmitter measures the gas pressure.

The block is heated electrically to 70°C ≙ 158°F ≙ 343K to ensure stable results. An installed fan prevents the temperature from rising too high. A temperature sensor records this block temperature, which is called TSB.

After the measurement the gas is led back into the lower part of the housing. The typical flow rate is between 1.059 ft^3/h to 2.118 ft^3/h ≙ 0.03 m^3/h to 0.06 m^3/h ≙ 30 l/h to 60 l/h. The flow rate may be changed depending on the application.

4.2. Measuring point overview

A typical measurement point consists of a sampling line from the gas pipeline to the measurement device. The stream of gas is measured quickly and continuously and then fed into the vent (waste) gas. If the pipeline pressure is higher than the maximum inlet pressure of the GasLab Q2, a pressure reduction system must be installed and adjusted upstream of the process gas inlet.

The operational calibration gas mixture is generally supplied using a gas cylinder with a pressure reducer near the GasLab Q2 and ensures that the measuring accuracy is maintained. The gas in a 10 l ≙ 0.01 m^3 ≙ 0.353 cft cylinder will suffice for several years of operation. The vent (waste) gas line should be routed separately, see section 5.3.2 Connect the vent gas line for details. In general, all pipes and components should be permanently installed. The power supply and the communication cables must be connected and installed as usual in industrial environments. The following diagram shows a typical system layout:

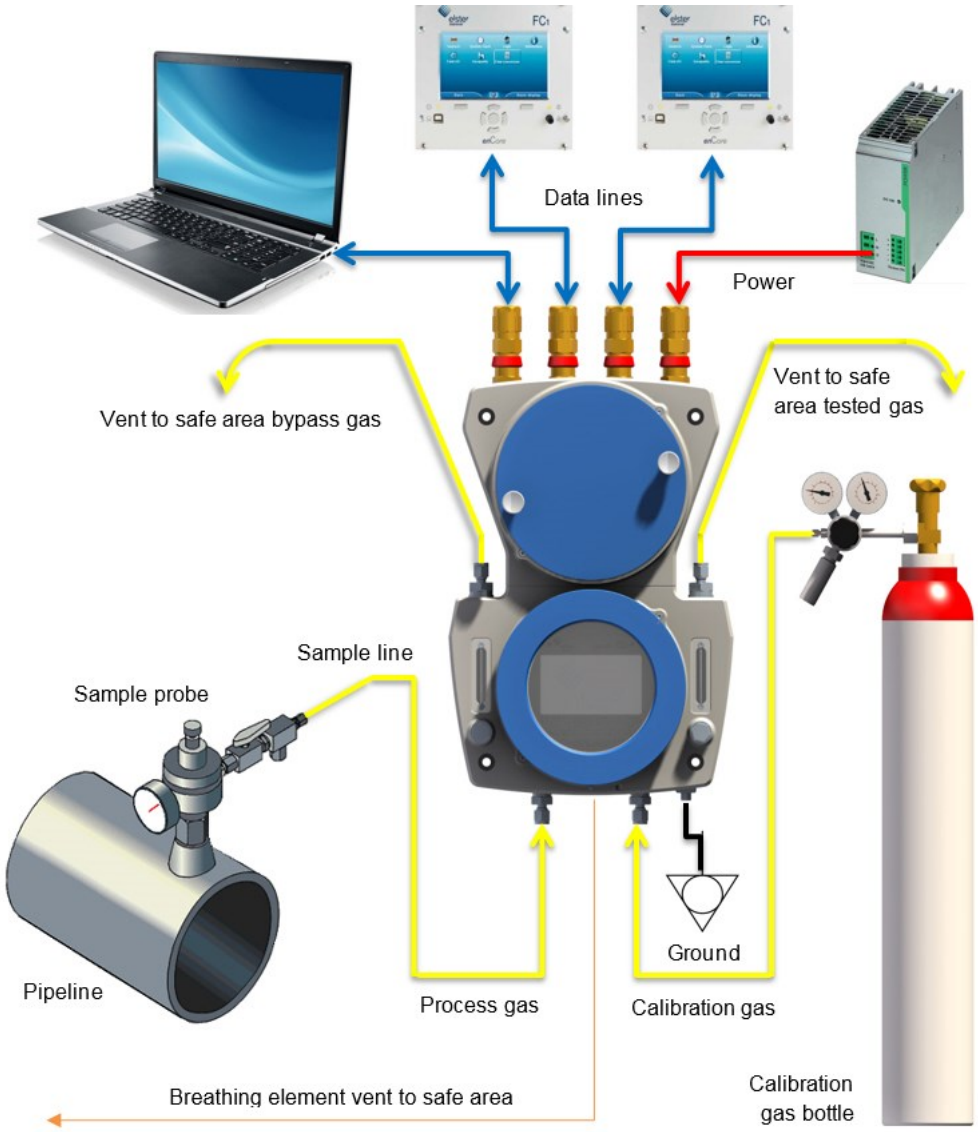


Figure 4.3: System overview

5. GasLab Q2 after delivery and at the place of use

This chapter gives an overview of how to handle the device before, during and after installation at the place of use.

	**Avoid transport damage after the device has been handed over, improper storage or assembly.** **Évitez les dommages dus au transport après la remise de l'appareil, un stockage ou un assemblage inadéquat.**

Sequence of the required work:

Step	Action
1.	Unpack the measurement device and any other components and check them for signs of damage and missing or incorrect parts.
2.	Install the device in its position using the fastening materials provided. ⇨ 5.2 Mechanical installation of GasLab Q2
3.	Connect the gas pipelines and the auxiliary and vent lines to the GasLab Q2 and set the gas pressures, open the shut-off valves and check all lines for leaks. ⇨ 5.3 Fluid installation of GasLab Q2
4.	Install the power supply and connect the communication cables ⇨ 5.4 Electrical installation
5.	If you wish to use the extended device functions, install enSuite on your computer/ laptop (parameterization device). ⇨ 8.2.1 Installing enSuite.

The installation sequence is described in detail in the following subsections.

5.1. Storage

	**Store the GasLab Q2 in a clean, dry place. Prevent dirt getting inside the device. Prevent material damage caused by the formation of condensation. Gardez le GasLab Q2 dans un endroit propre et sec. Empêchez la saleté de pénétrer à l'intérieur de l'appareil. Évitez des dommages matériels dûs à la formation de condensation.**

The following applies to storage:

- The ambient conditions must be maintained. Do not expose the Q2 temperatures below –25°C ≙ –13°F ≙ 248 K or above +55°C ≙ +131°F ≙ 328 K.⇨ 11.4 Notes on device characteristics and operating conditions
- The packages may only be stored in enclosed rooms.
- Avoid mechanical impacts during storage.
- The storage time with a battery is up to one year, 2 years if the battery is then replaced.

If the device is transported in cold weather or extreme temperature fluctuations have occurred, GasLab Q2 must be slowly returned to room temperature (temperature at the place of use) in order to prevent damage caused by the formation of condensation.

	Do not remove transport guards and other safety devices, for example, for gas connections, before the device has been installed at its destination and if dirt can still penetrate it. Le retrait des dispositifs de protection de transport et des dispositif de protection, par exemple des raccords gaz, n'est pas autorisé avant l'installation finale de l'appareil, et cela demeure vrai tant et aussi longtemps que la saleté peut pénétrer l'appareil.

Storage is also crucial for devices that are to be reused after dismantling.
⇨ 6.3Decommissioning / Dismantling / Disposal.

	Removed devices should generally be stored in the same way as new devices. We recommend replacing the battery with a new one (for safety reasons done by Honeywell) if the device has not been supplied with power for more than one year. After two years without a power supply, the battery charge will be less than 20% and it must be replaced by Honeywell service personnel. After three years, the battery will be completely discharged. Please contact Honeywell if you wish to store the device for a longer period.

5.2. Mechanical installation of GasLab Q2

Select an installation height between 1.10 m ≙ 3.608ft and 1.8m ≙ 5.906ft above the floor which is suitable for operation and reading. An empty space with minimum dimensions of 270 mm ≙ 10.63 inch wide and 500 mm ≙ 19.69 inch long in the field of view must be available. We also recommend a space at the side to make installation and maintenance work easier.

Prevent dirt and / or moisture from entering the device during work and possibly causing damage.

5.2.1. Place of use and installation

	**Obey the explosion-protection rules at all times when working with tools or on items in hazardous zones. Prenez note qu'il est essentiel de toujours suivre les règles de protection contre les explosions lorsque vous travaillez avec des outils ou sur des objets dans les zones à risque d'explosion.**

The GasLab Q2 must be installed as close as possible to the process gas sampling point to avoid having long supply lines and to ensure that you obtain current measurements.

The measurement device weighs around 16 kg ≙ 36 lb. Before installing it, ensure that the installation surface is strong enough to support it.

	**The installation site must meet the safety conditions. Le site d'installation doit répondre aux conditions de sécurité.⇨ 2.2 Place of use Environmental conditions and installation** **The sand guard (HMI cover) should be screwed on in sandy environments. Please contact Honeywell for further information. La protection contre le sable (couvercle de l'IHM) doit être vissée dans les environnements sableux. Veuillez contacter Honeywell pour de plus amples informations.**

GasLab Q2 does not require a special mounting plate since the measurement device contains all the parts required for the measuring task in its explosion-protected housing. It may be installed on a flat vertical surface (wall/measuring board).

Use the 8 mm ≙ 0.31 inch fastening holes provided in the housing for this purpose. Use size M8 (minimum M6) fastening material or equivalent in all four fastening holes to secure the device.

Suitable complements (in other words, nuts or anchors) depend on the material and the type of installation surface. The material to which the GasLab Q2 is fastened must withstand a combined vertical load of 1000 N ≙ 224.809 lbf at the four fastening points.

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	**GasLab Q2 must be installed so that the main breather element points downwards and the cable connections point upwards. Le GasLab Q2 doit être installé de telle sorte que le dispositif d'évent principal soit orienté vers le bas et les presse-étoupes vers le haut.**

5.2.2. Device dimensions

Please note that all dimensions in the following drawing are shown in mm. The dimensions with information (1 (2 (3 depend on the types of fluid and electrical couplings used.

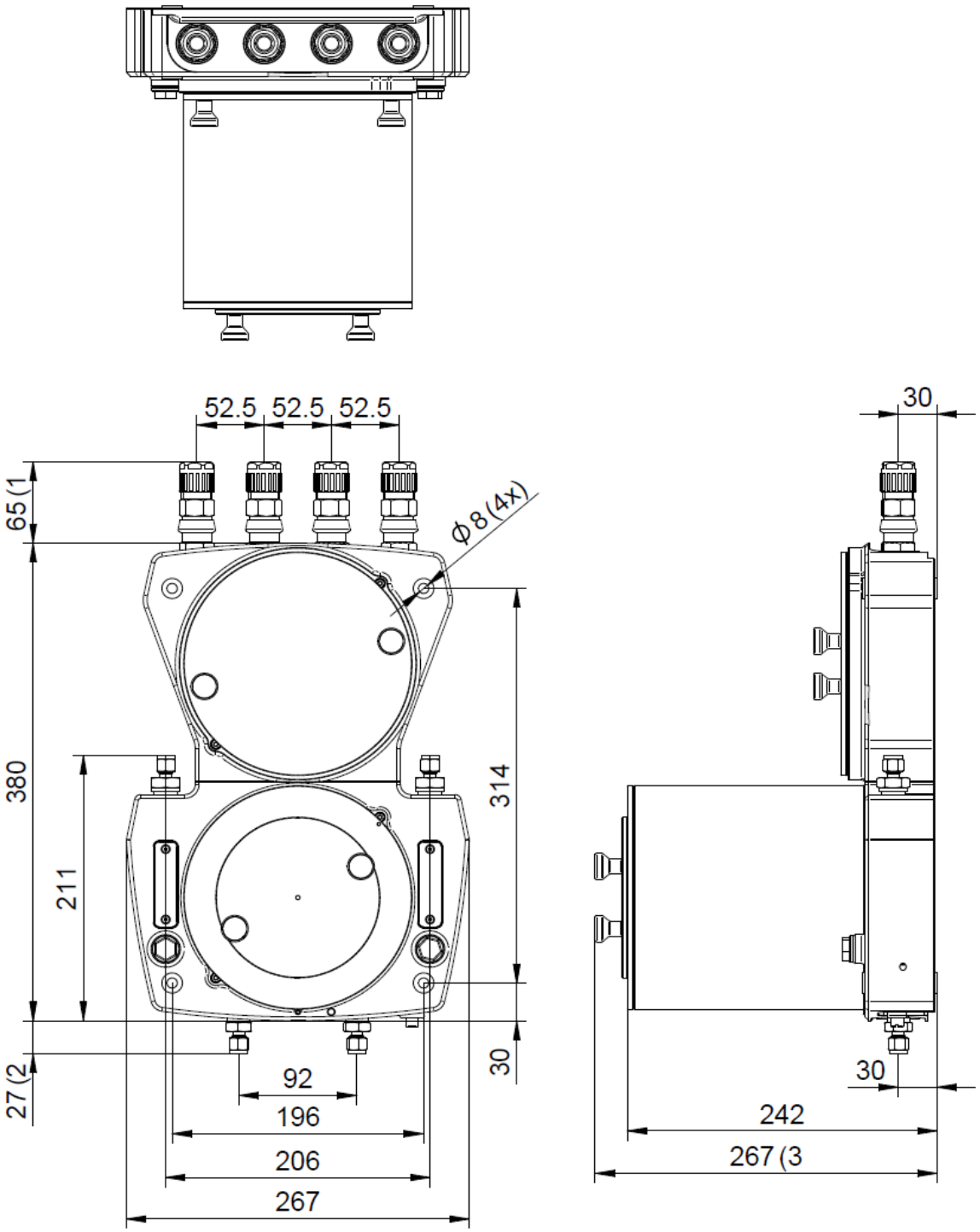


Figure 5.1: Dimension drawing (with optional sand guard)

5.3. Fluid installation of GasLab Q2

For all work described in the following, the recognized rules of technology for handling high purity gases and the piping plans drawn up and specified by the plant operator must be observed. Surfaces which come into contact with gas must be free of grease, oil, solvents and other impurities.

	Never mix connection elements from different system suppliers to connect gas appliances. Il est interdit de mélanger des raccords provenant de fournisseurs système différents pour établir le raccordement gaz des appareils.

	All gases must not be contaminated or adulterated when being transported from the source (pipeline or cylinder) to the measurement device. Only use permanently connected, tight, clean stainless-steel gas lines. Fittings and pipe couplings with few dead spaces are to be preferred.

Route the gas pipelines to the GasLab Q2. Ensure that every pipeline and every gas route is fitted with the required safety, shut-off and pressure regulation equipment. Shut-off valves and pressure regulators are not parts of the measuring device and are not included in the scope of delivery. The piping and safety devices must be installed in accordance with the applicable general rules and the specifications in this manual.

	**The maximum pressure at the gas inlets of the device must not be exceeded, so as to prevent damage and dangerous situations. This must be guaranteed on site by external protection which is not part of the GasLab Q2. La pression maximale spécifiée pour les entrées de gaz de l'appareil ne doit pas être dépassée afin de prévenir les dommages sur l'appareil et les situations dangereuses. Celle-ci doit être assurée par le client par une protection externe, qui ne fait pas partie du GasLab Q2.** **Refer to the information for setting the maximum pressure.** **Respectez les instructions le réglage de la pression maximale!** ⇨ **2.5 Safety information about gases and pressures**

	**After completion of the entire installation, when all gas and exhaust pipes are connected and pressurised, a leak test must be carried out. Une fois l'installation complète terminée, lorsque tous les tuyaux de gaz et d'échappement sont raccordés et mis sous pression, un test d'étanchéité doit être effectué.** ⇨ **10.1.10 System tightness test** **As the test cannot be carried out on all parts when the unit is switched off, the leak test for these parts must be carried out first or made up for later with the unit running. Comme le test ne peut pas être effectué sur toutes les pièces lorsque l'appareil est éteint, le test d'étanchéité de ces pièces doit être effectué en premier lieu ou compensé ultérieurement avec l'appareil en marche.**

5.3.1. Fluid interfaces

GasLab Q2 has 2 gas inlets and two gas outlets, each of which is protected by a flame arrester. Two breathing points are used to enable atmospheric pressure equalisation between the inside of the device and the environment.

An overview of all gas inlets and breathing elements is shown in the following figure:

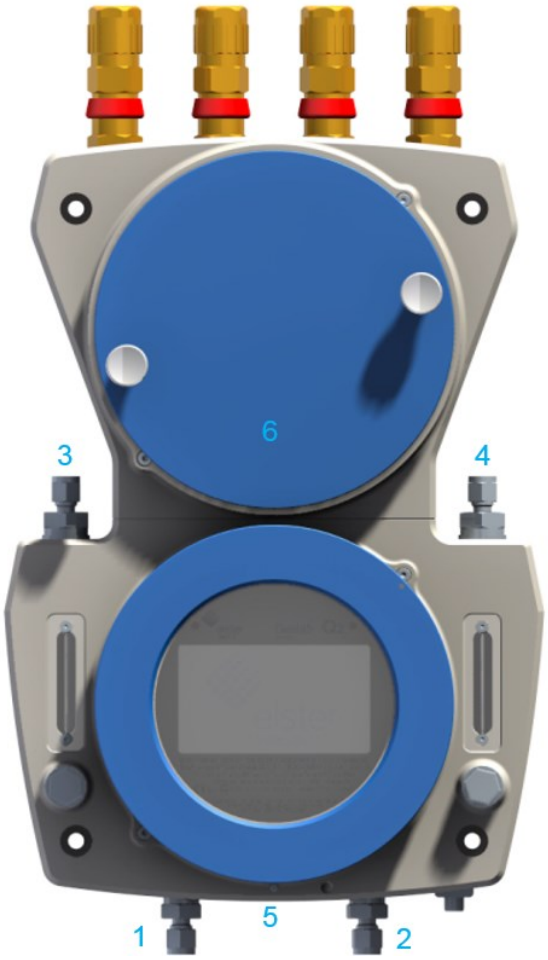
No.	Connection	Position on the device
1	Process gas (PG) with integral particle filter to act as a frit in the gland **Inlet pressure (gauge):** from 0.15MPa ≙ 21.76psi ≙ 1.5bar to 0.3 MPa ≙ 43.51psi ≙ 3bar	
2	Calibration gas cylinder (CAL) Operational calibration gas (CH_4 + CO_2) **Inlet pressure (gauge):** from 0.15MPa ≙ 21.76psi ≙ 1.5bar to 0.25MPa ≙ 36.26psi ≙ 2.5bar	
3	Outlet from integrated bypass Flow rate up to around 300 l/h ≙ 0.3 m^3/h ≙ 10.59ft^3/h (if necessary)	
4	Outlet from sensor path Typical flow rate 1.059ft3/h ≙0.03m^3/h ≙30l/h Max. flow rate 2.118ft3/h ≙ 0.06m^3/h ≙ 60l/h h	
5	Main breather with ¼" NPT connection thread for pipelines as described in section 2.6. **If a pipeline is connected, it must be separate from all other vent (waste) gas lines**.	
6	Auxiliary breathers (on the reverse) Pipeline connection not possible and not required	

Figure 5.2: Definition of fluid connections

The gas connections are always equipped by the manufacturer in the standard version with 6 mm Swagelok pipe screw unions. Alternatively, ¼ " is possible.

The process gas connection (bottom left) has an internal particle filter, which serves only as device protection and is not a replacement for a primary filtration system. The right gas inlet is used to connect the operating calibration gas or particle-free test gases.

The inlet pressure must not exceed the engraved maximum pressure at any inlet

The gas outlets are used to convey measured gases and the gas from the bypass into a vent line. Details of the vent line in the next section.

The breathing elements must not be closed or blocked, e.g. by water, condensation, ice, insects, dirt or similar, as otherwise the required pressure compensation is impaired.

5.3.2. Connect the vent gas line

	**Vent gas lines must be vented atmospherically and protected from dirt and moisture. These lines must be routed to a safe area away from GasLab Q2, as flammable gas flows through them permanently. Les conduites de gaz d'échappement de l'appareil doivent assurer une ventilation atmosphérique et être protégées contre la saleté et les liquides. Ces conduites doivent être dirigées loin du GasLab Q2 vers une zone sûre en raison du flux constant de gaz inflammable.**

The gas outlets of the device are connected to the vent lines via a 6 mm Swagelok connector (alternatively ¼"). These must discharge the gases **without back pressure**. **The inside diameter (at least 4 mm ≙ 0.158 inch) must never be tapered!**

The minimum internal diameter is 12 mm (1/2") for long lines or manifold lines. The vent line must be laid separately, at least 1m ≙ 3.28ft (3 m≙ 9.84ft recommended). If the bypass has a high flow rate, it should preferably be equipped with a separate vent (waste) gas line to prevent return effects. Please contact Honeywell in case of deviating exhaust gas conditions.

	If the bypass is not used, the outlet must be closed by a gas-tight dummy plug! The needle valve (not gas-tight) on the left side of the device may also only be opened when the bypass is in use to increase safety! Si la dérivation n'est pas utilisée, la sortie doit être fermée par un bouchon aveugle étanche au gaz ! La vanne à pointeau (non étanche au gaz) située sur le côté gauche de l'appareil ne peut également être ouverte que lorsque la dérivation est utilisée afin d'accroître la sécurité !

Step	Action: Connect the vent gas line
1.	Remove the transport protection from the gas outlets.
2.	Connect the vent lines directly to the respective outlets. Prevent the dirt from entering the device.

	The pipeline at the breather (if connected) is not part of the waste gas system and must never be connected to other waste gas lines. La conduite du dispositif d'évent (si connectée) ne fait pas partie du système d'échappement et ne doit jamais être reliée à d'autres conduites d'échappement! **Refer to / Respectez les** ⇨ 2.6 Handling explosion-protection devices

Since no tightness test can be carried out when the device is switched off, the vent line must be checked for leaks with a gas detector immediately after commissioning.

5.3.3. Connect the process gas line

Prerequisite: The process gas from the process line (pipeline) is provided according to specification via the tapping equipment with temperature equalization system and pressure regulator. ⇨ 11.3 List of suitable gases and calibration gases

For this purpose, additional shut-off devices, further pressure reductions, filter system, gas dryer, etc. were installed on site and provided in the pipeline.

If an automatic verification measurement is to be carried out via the process gas inlet, an additional automated 3-way valve must be installed in the gas flow.

Step	Action: Prepare the process gas sampling line connecting the device
1.	Ensure that the shut-off valve in the process gas pipeline is closed! If there is a pressure regulator, it must be set to its lowest setting!
2.	Check whether the pressure and other parameters are correct and connect the end of the line intended for the device connection to the vent gas properly using a hose.
3.	Carefully open the shut-off valves to create a permitted gas flow above the operating conditions. Then flush for around 30 seconds to clean the pipeline system. For very long lines you must extend this time accordingly.
4.	Close the line shut-off again. Set to a process gas pressure between 0.15 MPag ≙ 21.76psig ≙ 1.5barg and maximum 0.3MPag ≙ 43.51psig ≙ 3barg. (The exact pressure will be set later).
5a.	The pipeline is now ready for connection to GasLab Q2. Prevent the penetration of dirt and moisture if the connection is not made immediately.
5b.	Remove the protection (sealing stopper/ sealing screws) from the (PG) device inlet and connect the gas line for the process gas as shown in Figure 5.2.
6.	Carefully open all the shut-off valves in the gas path so that the gas is present at the device inlet
7.	Check the tightness of the process gas path from the source to the device ⇨ 10.1.10 System tightness test

5.3.4. Connect the calibration gas

For proper operation of the GasLab Q2 a regular automatic calibration with a binary mixture of methane (CH_4) and carbon dioxide (CO_2) is necessary. Normally the mixture is taken from a gas cylinder close to the instrument. ⇨ 11.3 List of suitable gases and calibration gases

Prerequisite: A suitable pressure reduction and shut-off devices are required to connect the gas cylinder to the GasLab Q2 via the permanently installed lines.

	Honeywell can supply prefabricated boards with high pressure reduction systems for this purpose.

If an automatic verification measurement is to be carried out via the calibration gas inlet, an additional automated 3-way valve must be installed in the gas flow. Only clean, particle-free gas can be used at this inlet.

	**Complete the following steps in accordance with national regulations on the basis of the information in this document. Suivez impérativement les étapes suivantes conformément aux normes locales en respectant les instructions de ce manuel.** **Refer to / Respectez les ⇨ 10.3 Connecting and replacing gas cylinders** **Failure to do so may result in significant destruction of the device or the system. Le non-respect de ces étapes peut entraîner des dommages importants sur l'appareil ou l'installation!**

Step	Action: Prepare the calibration gas line connecting the device
1.	Connect the end of the line intended for the device connection to the vent gas properly using a hose.
2.	Carefully open the shut-off valves to create a permitted gas flow above the operating conditions. Then flush for around 30 seconds to clean the pipeline system.
3.	Close the line shut-off again. Set to a process gas pressure between 0.15 MPag ≙ 21.76psig ≙ 1.5barg and maximum 0.25 MPag ≙ 36.26psig ≙ 2.5barg. (The exact pressure will be set later).
4.	The line is now ready for connection to GasLab Q2 which should be done immediately. Therefore, remove the protection (plugs / screw plugs) from the (CAL) inlet of the instrument and connect the gas line - according to figure 5.2.
5.	Carefully open all the shut-off valves in the gas path so that the gas is present at the device inlet
6.	Check the tightness of the calibration gas path from the source (gas cylinder) to the device ⇨ 10.1.10 System tightness test

5.4. Electrical installation

Before starting work, make sure that you observe and follow all the information in Chapter 2 Safety and warning information. A functioning effective lightning protection must exist at the place of use and an external switch-off device must be installed near the device by the system operator. Above all, the following sections are important:

⇨ **2.2 Place of use Environmental conditions and installation**
⇨ **2.7 Electrical safety information and emergency stop**

Always observe the general safety rules, especially in potentially explosive atmospheres. Always use a gas detector when working on the instrument and make sure that the GasLab Q2 is voltage-free (supply and signals) before any change of the wiring. The local / national installation guidelines (e.g. EN 60079-14) must be observed for all work. The device must be connected to the equipotential bonding or earth at the place of use.

	**The explosion protection is lost if the cable glands are installed incorrectly, the installation is explosion safety relevant! Make sure that the installation is safe and correct. The manufacturer therefore only accepts responsibility for cable glands made by him or on his behalf. La protection contre les explosions est perdue si les presse-étoupes sont mal installés, l'installation est importante pour la sécurité contre les explosions ! Veillez à ce que l'installation soit sûre et correcte. Le fabricant n'assume donc la responsabilité que pour les presse-étoupes fabriqués par lui ou en son nom.**

It is essential that you follow the instructions in the following sections.

	The device is protected against polarity reversal. The device will not work if the connections have been reversed.

5.4.1. Power supply and protection

	**The 24 V (DC) power supply must have reinforced insulation to isolate it from other networks. Only one device may be operated on each power supply unit. The overvoltage /overcurrent and electrical cable protection must be provided by the power supply unit.** **L'alimentation électrique de 24 V (CC) doit être isolée de manière renforcée des autres réseaux. Un seul appareil doit être branché sur une alimentation électrique. L'alimentation en énergie doit garantir la protection contre la surtension/surintensité et la protection de la ligne électrique.**

	GasLab Q2 does not have any protective devices which can be replaced by the user. The internal thermal and electrical fuses cannot be reset. Please contact Honeywell if this protective device has tripped. See also ⇨9 Possible malfunctions and troubleshooting

Check the voltage used at the place of use to ensure it is correct and suitable as described in the following data:

Power supply (see also section 2.7)	Voltage range: 24 V DC. Fluctuations, including mains fluctuations ± 15%
	An external safety device which shuts down within 120 seconds* is installed
	A rating of up to 96 W nominal power can be supplied.

* Note: The shut-down current is 200/Supply voltage. The tripping properties depend on the ambient temperature. This must be taken into account if the temperature is significantly higher than room temperature.

A maximum rated operating current of 4 A should be considered for the power supply (also consider the voltage drop on the cables). Ensure that the power supply is capable of tripping the external circuit breakers or the internal 4 A fuse in the event of a short-circuit.

5.4.2. Cables (power supply / communication)

For the connection between GasLab Q2 and other instruments different control and signal cables are suitable, the choice depends on the requirements at the place of use.

	Cables and wires are standard products (not from the manufacturer) which are necessary to operate the GasLab Q2. It is recommended to disconnect the data cables from the power supply cable.

Generally, the connection cables can be routed to 2 separate locations without additional ex-rated junction boxes. The insulation must at least comply with flammability class 1. Use screened cables.

The screen on the connection cable must be connected in compliance with local regulations.

	**The connection box temperature may rise to 10°C ≙ 18°F ≙ 10K above the ambient temperature. Cables must be suitable for this increase in the local ambient conditions. La température du boîtier de jonction peut monter jusqu'à 10°C ≙ 18°F ≙ 10K au-dessus de la température ambiante. Les câbles doivent être adaptés à cette augmentation de la température ambiante locale.**

The connection terminals are suitable for conductor cross-sections from 0.25 mm² ≙ 24 AWG to 2.5 mm² ≙ 14 AWG. Signal cables require conductor cross-sections of ≥ 0.25 mm² ≙ 24 AWG. We recommend signal cables with a conductor-to-conductor capacity of less than 120pF/m ≙ 36.58 p S^{-1}/ft and an inductance of less than 0.7 µH/m ≙ 0.213 µΩs /ft.

The number of cores varies depending on the application, whereby the cores should be twisted into pairs and screened jointly. The maximum cable length depends on the type of signal and must not be exceeded.

A cable type of category 5 (Cat 5) is recommended for data communication links via Ethernet. See also the next section.

Cable or cores pass through cable glands on the top of the device into the connection box.

All the electrical interfaces are housed here. The cables are connected to the connection board in the connection box using the plugs at the edge of the board.

The relevant installation guidelines must be obeyed for routing the cables!

5.4.3. Opening and closing the connection box

To carry out the electrical installation and for subsequent maintenance work, the connection box must be opened. Never open the device at the place of use without the permission and consent of the system operator. Please note the following:

	**DISCONNECT POWER BEFORE OPENING (Text on the device)** **DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT** **Only open the device in controlled conditions as described in ISO/IEC 61010-1.*** **DÉCONNECTEZ LA TENSION AVANT L'OUVERTURE** **N'OUVREZ PAS L'APPAREIL DANS UNE ATMOSPHÈRE EXPLOSIBLE** **L'appareil ne peut être ouvert que dans un environnement contrôlé conformément à la norme ISO/CEI 61010-1**

* These conditions (temperature 5°C ≙ 41°F ≙ 278K to 40°C ≙ 104°F ≙ 313K; humidity up to 80% at 31°C ≙ 88°F ≙ 304K decreasing linearly to 50% at 40°C ≙ 104°F ≙ 313K) generally prevail in residential and office environments. If you are in any doubt, read the standard or contact Honeywell.

Before working on the device, turn off all gases, **mark your work on the switched-off supply voltage** and **secure** it against being **switched on again!**

	**To open the locking screws, turn them inwards and unscrew the elements counterclockwise. Always obey the warnings.**

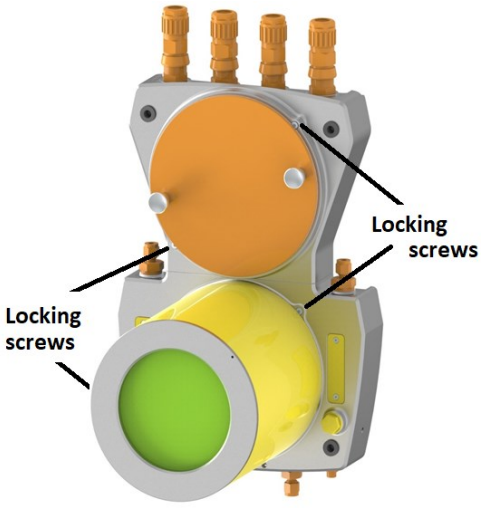


Figure 5.3: Device open Locking screws

After the end of installation or maintenance, the connection box must be closed again.

	**All covers and hoods, which can be unscrewed to open the housing, must be protected against accidental opening by the locking screws.** **Tous les couvercles et capots pouvant être dévissés pour ouvrir le boîtier doivent être protégés par des vis de sécurité contre une ouverture intempestive!**

5.4.4. Grounding and potential equalisationErdung und Potentialausgleich

	**The housing must be electrically connected to the local earth and the equipotential bonding. For this purpose, the equipotential bonding connection point (PA) marked GROUND on the bottom of the housing next to the calibration gas inlet must be used.** **Le boîtier doit être relié électriquement à la terre locale et à la liaison équipotentielle. À cette fin, il faut utiliser le point de connexion de la liaison équipotentielle (PA) marqué GROUND sur le fond du boîtier, à côté de l'entrée du gaz d'étalonnage.**

The conductor cross-section for grounding is least 6 mm² ≙ 10 AWG (maximum 10 mm² ≙ 8 AWG) copper conductor. The specified ground connection must be used with no modifications. The torque for the connection must not exceed 3.5Nm ≙ 2.582 ftlb.

If GasLab Q2 is mounted on a metal plate, the plate must be properly included in the grounding and the equipotential bonding system. Use the appropriate connections or install such connections.

There is another functional earth point (FE) in the connection box, see Figure 5.4.

The device will only operate correctly if all the system parts have the same grounding potential. Before making any further cable connections, ensure that this is permanently guaranteed.

If potential differences are found, they must be rectified by the system operator by taking appropriate measures, giving due consideration to explosion protection (see section 2.1 Intended use and Responsibilities).

The screens on the supply and communication cables must be connected in compliance with explosion-protection regulations (for example, EN 60079-0; EN 60079-14) and local regulations.

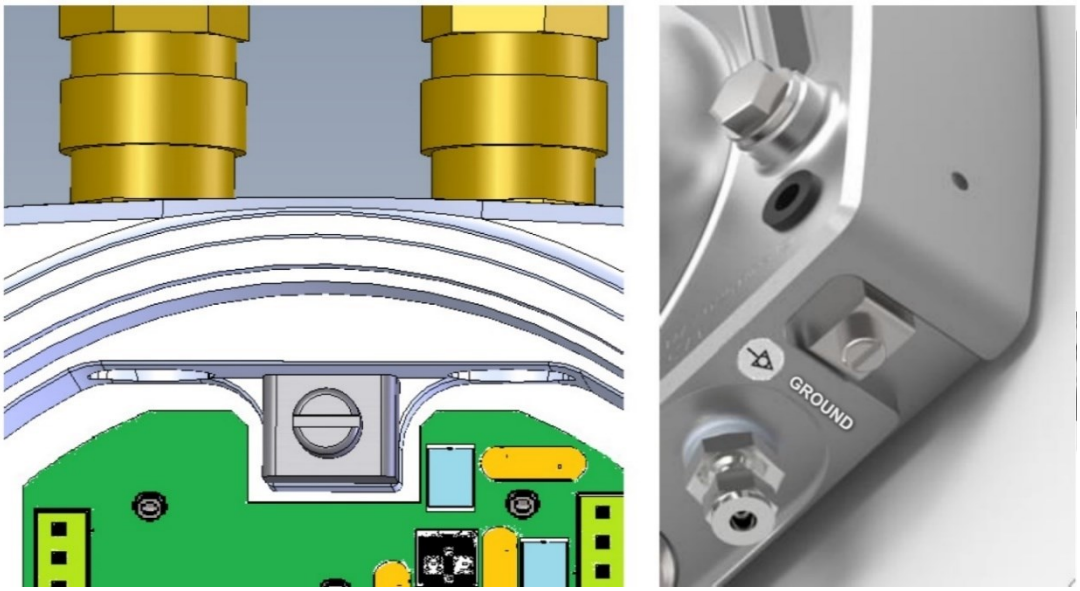


Figure 5.4: Grounding inside connection box (FE) and outside of the device (PA)

5.4.5. Cable glands (adapter / dummy plugs)

On the upper side of the device there are four threaded holes with M20x1.5 thread. These can be fitted as required. Possible are dummy plugs, adapters (½"NPT thread) or cable glands like shown in the example right. These are standard products (not from the manufacturer) which are necessary for the operation of the Q2.

Most applications require only 2 cable glands, one for the data transfer cable and one for the power supply (24 V DC). The remaining holes provide access for further signal cables if required.

The screw-in parts used must comply with the specifications at the place of use. For example, when used in Japan, only cable glands approved there may be used.

Figure 5.5: Position of the cable glands

The correct IP class (IP 64 or better / higher) must also be observed. An operating temperature range up to 80°C ≙ 176°F ≙ 353K must be covered. Appropriate Ex-certifications (II2G Ex db IIC T4 Gb) must also be provided for these parts.

Select a suitable type of cable gland depending on the location and requirements, contact Honeywell if necessary.

In order to maintain the specified explosion protection, the screw-in parts must be must be installed and cast in accordance with the gland manufacturer's specifications. Compliance with the IP rating may require the use of sealing rings.

Openings which are not required must be fitted with appropriate dummy plugs

::

	**The cable inlets must satisfy or exceed the IP rating (IP 64). NEC-compliant cable inlet equipment must be used in the USA. CEC-compliant cable inlet equipment must be used in Canada. ONLY- Japanese Ex approval listed cable inlet equipment must be used in Japan (Please contact Honneywell for information on permitted fitting types)** **Les dispositifs d'entrée de câble doivent atteindre ou excéder la classification IP (IP 64). Pour une utilisation aux États-Unis, les dispositifs d'entrée de câble doivent être conformes au NEC. Pour une utilisation au Canada, les dispositifs d'entrée de câble doivent être conformes au CEC. SEULEMENT - Les équipements d'entrée de câble figurant sur la liste d'homologation Ex japonaise doivent être utilisés au Japon (Veuillez contacter Honneywell pour obtenir des informations sur les types de montage autorisés)**

The required accessories listed below are supplied in the recommended or ordered version.

List of cable glands and dummy plugs recommended by Honeywell (all threads M20x1,5):				
Type of dummy plug			Enclosure	Order number
Redapt PA-D brass stopping plug type 'A'			Ex db IIC	PA-D-1-0-04-00
Type cable gland Hawke ICG 653/UNIV	Enclosure	Number of cores*	Cable diameter (mm)	Order number ICG 653/UNIV...
Cable gland, pressure-resistant (can be sealed with sealant**), and screen connection	Ex d IIC	6/12	5.5 to 12	...Os M20 Brass
		6/12	9.5 to 16.0	...O M20 Brass
		10/15	12.5 to 20.5	...A M20 Brass
		6/12	9,5 bis 16,0	...O M20 Brass
		10/15	12,5 bis20,5	...A M20 Brass

* High number of cores for ATEX and IECEx only; low number of cores for all other certificates

** To comply with the specified explosion protection, the cable gland must be sealed as specified by the cable gland manufacturer

Alternativ screw-in parts for use in Japan
EX CABLE GLAND MODEL SFLU 10-M
EX CABLE GLAND MODEL SFLB/T 10-M
EX BLANKING ELEMENT PLUG-M10/M25/M32

Furthermore, many variations are possible, such as the use of tubes and individual wires or conduit stop boxes if they are sealed or potted. Under FM conditions these must be sealed within 18" (45cm). For ATEX and IECEx this distance is 1xD from the enclosure as for a normal cable gland. Please contact Honeywell if you wish to deviate from the standard equipment.

If cable glands and dummy plugs are not pre-assembled on the device, the following applies with regard to installation and replacement: The IP classification (IP 64) must be met or exceeded; depending on the type of cable gland, sealing rings and washers must also be used. The thread of the cable gland and dummy plugs must be treated with threadlocking agent! To do this, apply Loctite 243, Loctite 511 or equivalent threadlocking agent to the thread flanks in the last third of the internal thread.

Si les presse-étoupes et les bouchons factices ne sont pas préassemblés sur l'appareil, les dispositions suivantes s'appliquent en ce qui concerne l'installation et le remplacement :

La classification IP (IP 64) doit être respectée ou dépassée; selon le type de presse-étoupe, des bagues d'étanchéité et des rondelles doivent également être utilisées.

Le filetage du presse-étoupe et des bouchons factices doit être traité avec un produit de blocage du filetage! Pour ce faire, appliquez du Loctite 243, du Loctite 511 ou un agent de blocage équivalent sur les flancs du filetage dans le dernier tiers du filetage intérieur.

5.4.6. Electrical connection diagram and electrical interfaces (inputs and outputs)

The cables are connected to the board in the connection box via the plugs on the edge of the board. All electrical interfaces (galvanically isolated) are located here. The plugs are secured with snap-in hooks. The connections and interfaces are supplemented and explained in figure 5.6 and in the following section.

Connection	Interface
TB1	Power supply (see also sections 2.7 and 5.4.1).
TB2	Future extension.
TB3	Ethernet connection 10/100 Mbit/s; (TCP/IP; Modbus TCP) electrically isolated, range: 100m ≙ 328.084 ft
TB4	RS485 port 1 and port 2(Modbus serial) (electrical isolation), range: 500m ≙ 1640ft
TB5	Digital inputs 1 and 2 (2 cores each, electrically isolated) supplied by the device, max. 9 V to a potential-free contact or NAMUR sensor. e.g. process and calibration gas pressure monitoring
TB6	4 digital outputs (electrically isolated) common return cable (1 breaker closed when de-energized, suitable for general alarms, 3 makers) (circuit operates as a floating contact), max. 120 mA at 28.8 V (DC).
TB7	4 analog outputs 0/4...20mA (electrically isolated) common return cable; short-circuit-resistant; R max. = 390 Ω

Never remove the plug connection in the center of the connection board. (next figure)

Ne retirez jamais le connecteur au milieu de la platine de raccordement. (illustration suivante)

Check that the connectors are secure. Tighten the screws on any unused terminals.

Vérifiez que les embases sont bien fixés! Les vis de bornes inutilisées doivent être serrées!

Connect the cables and screens in compliance with the explosion protection regulations. In practice, the screens are not attached in explosion hazard areas, but are only connected in the safe area.

Raccordez les câbles et effectuez les blindages conformément aux règles de protection contre les explosions! Dans la pratique, les blindages ne sont pas installés à l'intérieur de la zone explosible, mais seulement à l'extérieur.

The possible electrical connections for the GasLab Q2 are shown in the following diagram:

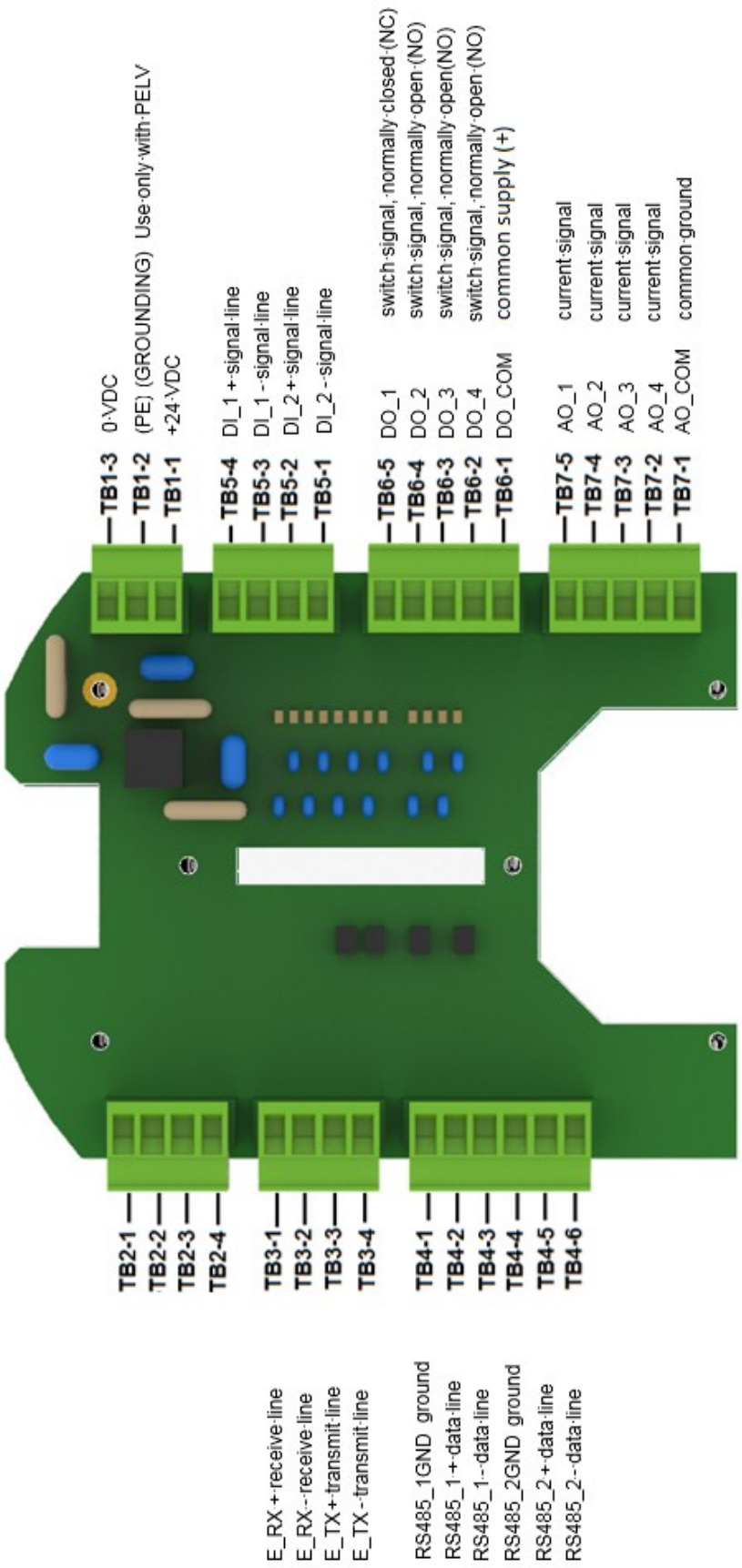


Figure 5.6: Electrical connection assignment (circuit board)

5.4.7. Connection to other devices and system parts

The connection diagrams for sensors and devices to which the GasLab Q2 can be connected are shown in example form in the following. This may require special parameterization in enSuite.

	Detailed information on parameterization is available in chapter 8 Configuration and analysis software enSuite and the online help. Only the minimally required settings are shown below in keywords.

The explosion protection, general industrial and local regulations, for example, EN 60079-0 and EN 60079-14, apply to the wiring, screening and grounding.

Screening the cable creates a space which is not affected by external fields. The cable screens can best be described as an extension of the housing. We recommend that the screen be applied over as wide an area as possible with multiple contact points in order to discharge any interference that may occur.

The following options for attaching the screen to the connection cable are possible as long as they do not breach explosion protection regulations		
1.	**Two-sided attachment** (It is extremely important and mandatory that there are no grounding potential differences between the end points of the shield.)	
	Benefit	EMC-compliant connection is also effective against inductive coupling components
	Drawback	Compensating currents (ground loop formation), which flow through the screens should be prevented where possible and require appropriate action.
2.	**One-sided attachment**	
	Benefit	Lower voltage with potential isolation in conjunction with low frequency signals No compensating currents and ground loop formation
	Drawback	Is only effective against capacitive couplings and only produces significant success if the screened circuit has no connection to the ground, at least on the cable side.

	**In order to comply with the specified explosion protection level, the cable connection in the gland must always obey the gland manufacturer's specifications.** **The isolation or surge (lightning) protection on the cables must be installed by the user, depending on the situation of use.** **Afin de respecter la protection contre les explosions indiquée, le montage des câbles dans les presse-étoupes doit dans tous les cas être effectué conformément aux instructions du fabricant desdits presse-étoupes!** **L'isolation ou la protection contre les surtensions (foudre) des câbles doit être installée par l'utilisateur, en fonction de la situation d'utilisation.**

Ethernet

Cable type refer to ⇨ 5.4.2 Cables (power supply / communication) length 100m ≙ 328ft.
The connection is made using the terminals designated TB3-1 to TB3-4 in the Q2 connection box. The core colors depend on the standard used, normally EIA/TIA 568B. The twisted pairs must not be untwisted or regrouped. The polarity of the cores within the core pair is unimportant and the core pairs can even be swapped.

Core pair	Plug (pins)	Color depending on standard					Remark	Terminal inside Q2
		EIA/TIA 568 B	EIA/TIA 568 A	IEC	REA	DIN 47.100		
1	4 / 5	blue + white/blue	blue + white	white/+ blue	white+ blue	white+ brown		
2	3 / 6	**white/green + green**	white + orange	red+ orange	turquoise violet	green+ yellow	**Only core pairs 2 and 3 are required**	TB3-3 TB3-4
3	1 / 2	**white/orange + orange**	white + green	black+ grey	white+ orange	grey + pink		TB3-1 TB3-2
4	7 / 8	white/brown + brown	white + brown	yellow+ brown	turquoise+ violet	blue + red		

The following drawing is only designed to illustrate the screening using an example.

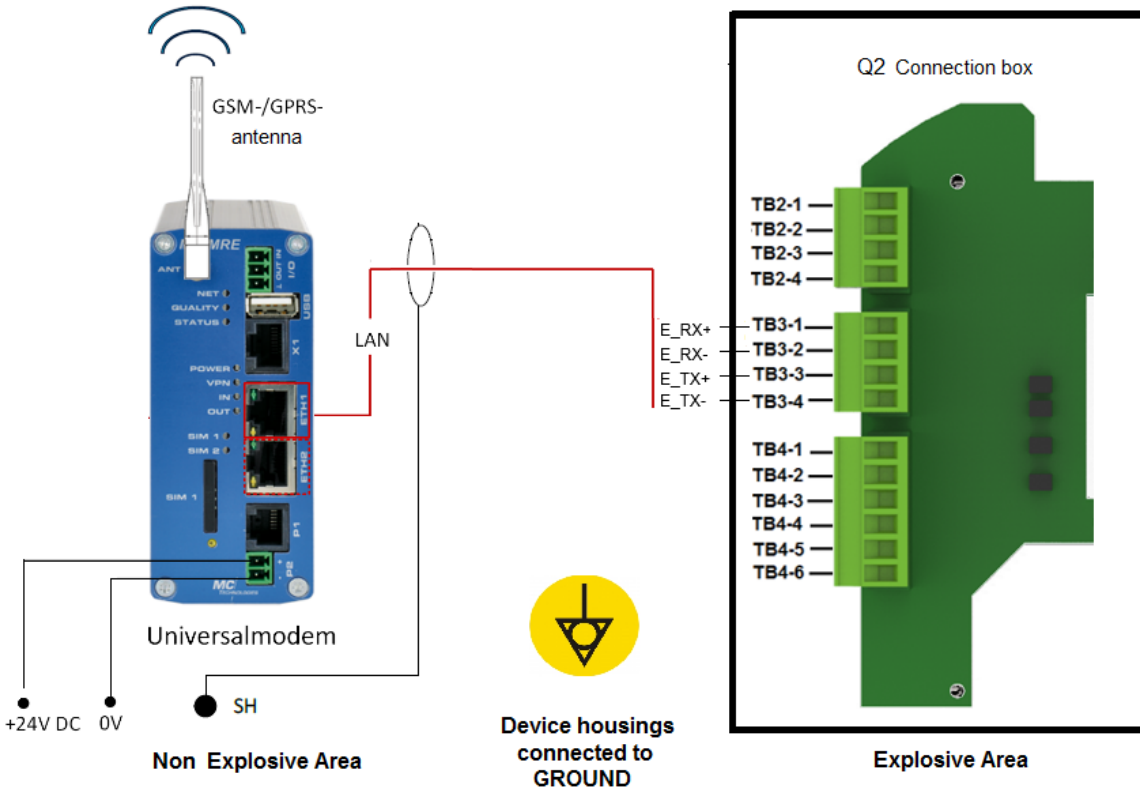


Figure 5.7: Sample LAN/Ethernet connection (diagram)

Additional to the wiring, settings must be made before this interface can be used.
On the Q2 ⇨ 7.3.14 System display I/O (basic network settings / Inputs /Outputs)
Or with enSuite ⇨ 8.4.5 Changing the IP address basic network and I/O settings".

Serial interface RS485

Connections include, for example, other measurement devices, devices for final processing and evaluation, PLC systems, and so on. Cable type refer to ⇨ 5.4.2.Cables (power supply / communication).

There are 2 interfaces in the connection box (TB4-terminals 1 to 3 for CH1 and TB4-terminals 4 to 6 for CH2, details see figure 5.6). The connection varies depending on the device (see dotted cable in the following example). The ground (0 V) is either connected directly to the device/system or connected to GND.

Pull-up / pull-down resistors should be installed at the cable end near the data evaluation unit to generate the neutral potential. A 470 Ω resistor must be connected between RSA and the positive supply voltage of the connected data evaluation unit. A further 470 Ω resistor must be connected between RSB and GND. For cable lengths over 200 m ≙ 656ft, additional bus connection resistors of 120 Ω each between RSA and RSB at the cable end at the data evaluation unit are recommended.

The following drawing is only designed to illustrate the screening using an example.

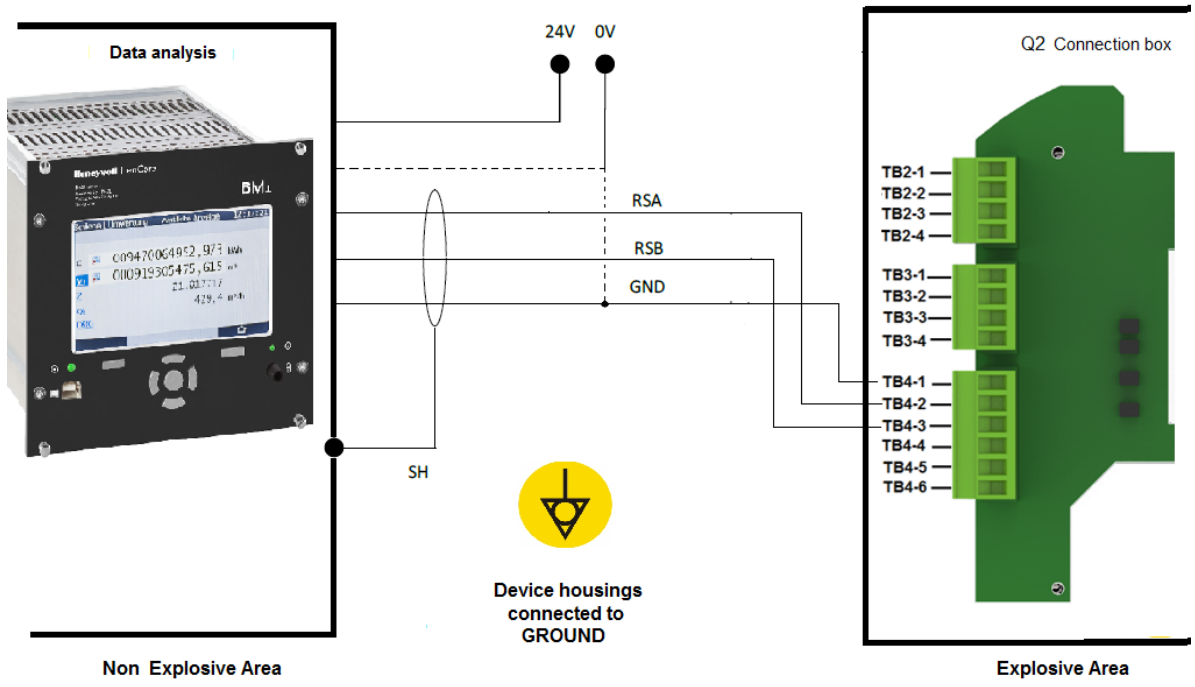


Figure 5.8: Example of RS485 connection (diagram)

	In addition to the wiring, various enSuite settings are required before this interface can be used. ⇨ 8.4.5 Changing the IP address basic network and I/O settings".

Digital inputs

There are two electrically isolated inputs supplied in the connection box (TB5-terminals 1 to 2 and TB5-terminals 3 to 4, details see figure 5.6). The maximum supply voltage is approx. 9 V.

For cable type refer to ⇨ 5.4.2.Cables (power supply / communication) The figure also shows the appropriate terminals in the connection box. The wiring in the drawing is only designed to illustrate the screening using an example.

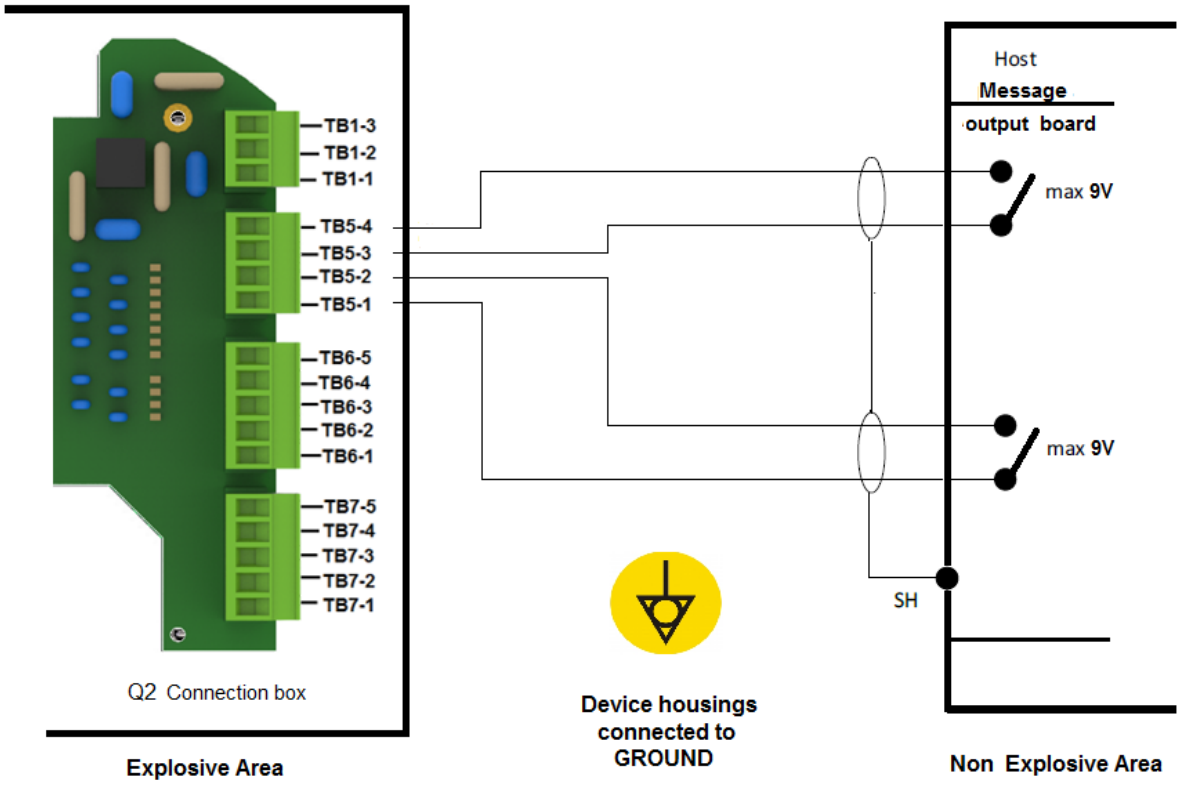


Figure 5.9: Example connection of digital inputs

	In addition to the wiring, various enSuite settings are required before this interface can be used. ⇨ 8.4.5 Changing the IP address basic network and I/O settings".

Digital outputs

There are four digital outputs (electrically isolated passive output circuits) in the connection box (TB6-terminals, details see figure 5.6).

The output at TB6-5 is a breaker (NC, “normally closed”), the other outputs are makers (NO, “normally open”). The maximum load per channel is 28.8 V DC/120 mA. The maximum pulse rate is 25 Hz.

Cable type refer to ⇨ 5.4.2 Cables (power supply / communication) the maximum length is 250m ≙ 820ft. The figure also shows the appropriate terminals in the connection box. The wiring in the drawing is only designed to illustrate the screening using an example.

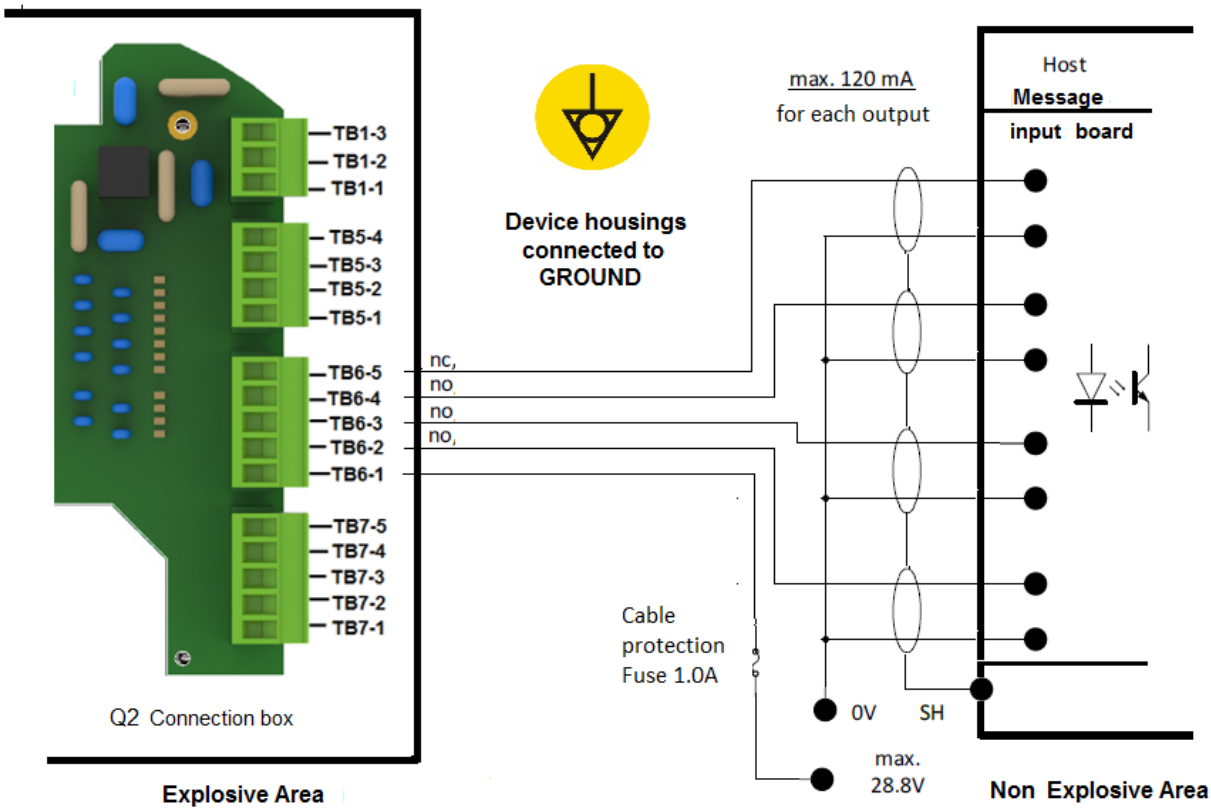


Figure 5.10: Example connection of digital outputs

	In addition to the wiring, various enSuite settings are required before this interface can be used. ⇨ 8.4.5 Changing the IP address basic network and I/O settings

Analog outputs

There are four common electrically isolated active output circuits (“common ground”/short-circuit-resistant) with 0 or 4 to 20 mA in the connection box (TB7-terminals, details see figure 5.6). The maximum supply voltage is around 9 V. The maximum load is 390 Ω.

Cable type refer to ⇨ 5.4.2 Cables (power supply / communication) the maximum cable length is 500m ≙ 1640ft. The figure also shows the appropriate terminals in the connection box. The wiring in the drawing is only designed to illustrate the screening using an example.

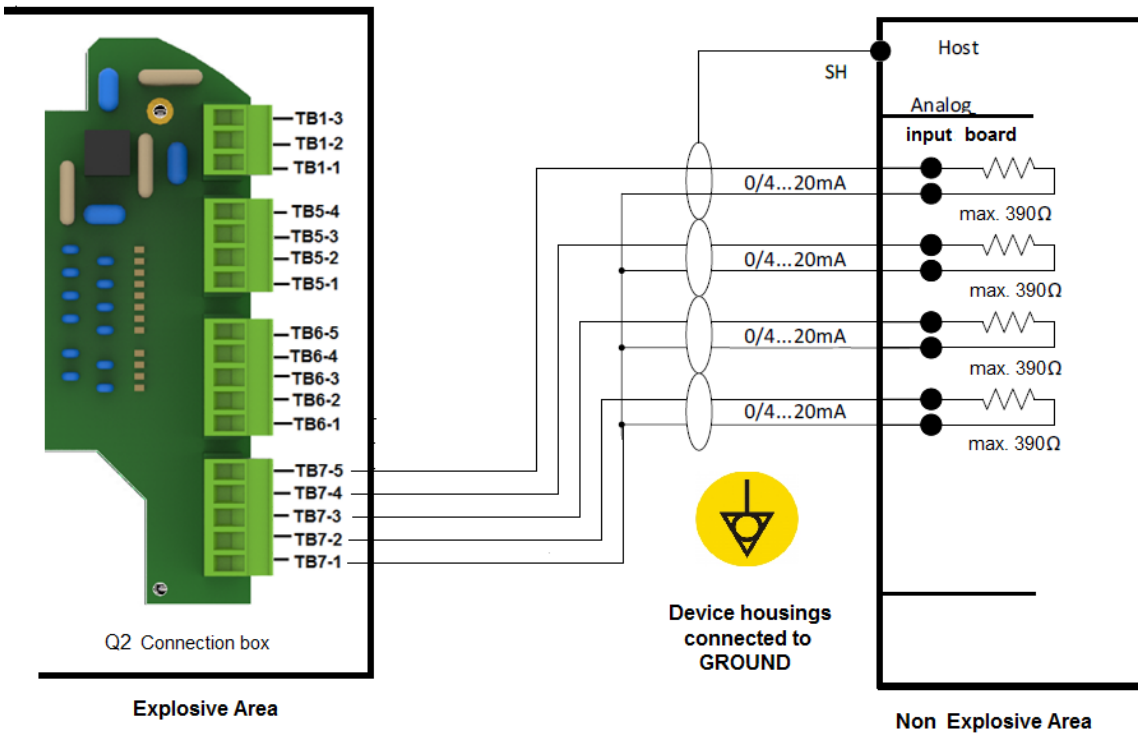


Figure 5.11: Sample connection of digital outputs

	In addition to the wiring, various enSuite settings are required before this interface can be used. ⇨ 8.4.5 Changing the IP address basic network and I/O settings.

6. Commissioning and decommissioning

	Do not carry out any of the work described in this chapter if you do not have permission and have not received the required training from the manufacturer or its agents.N'effectuez pas les travaux décrits dans ce chapitre, si vous ne disposez pas de l'autorisation ni des instructions du fabricant ou de ses agents!

The commissioning procedure may only be carried out by qualified technician or field service personnel. Honeywell can provide training and commissioning services.

Before commissioning, make sure that Chapter 2 Safety and warning information have been observed and followed and that the GasLab Q2 has been installed and connected in accordance with this document.

All new devices are supplied with default parameter set also called parameterization, which enables them to perform the measuring task. If you are not familiar with the operation and software of the instrument, please read first the chapters 7 GasLab Q2 Displays (Operate the Device) and 8 Configuration and analysis software enSuite of this document before you continue.

	**Refer to the regulations for explosion protection and the safety information, particularly for starting up the device in a potentially explosive atmosphere.** **Les exigences relatives à la protection contre les explosions et à la sécurité doivent être respectées, en particulier lors de la mise en service dans une atmosphère explosible.**

6.1. Commissioning preparations and requirements

The following points must applie:

- The upstream sample handling and conditioning system must be operating properly, providing the correct pressure to the device, and at its operating temperature.
- An operational calibration gas cylinder is correctly connected.
- Delivery is less than 1 year ago, (battery charge above 20%). If you are unsure check according to hints in section 7.3.4 Info display (Device monitor) or have the battery replaced as a precaution.
- The device is installed and fully closed.
- There is no moisture condensation inside the device. If in doubt, remove the covers (see next section) and allow the appliance to dry for at least 12 hours; or contact Honeywell.
- Power supply and communications are carried out properly and is available.

6.1.1. Set password for Administrator (admin1)

Assign password at first login to the enCore device! In the delivery state, user passwords for standard users are empty for all enCore devices, including admin1. Even if you create a new user in enSuite, enSuite creates these users without a password.

We strongly recommend that each user changes his or her password at the first log into the device.

	Further details in sections➪ 2.8 Data security information, 7.3.11System display Users (Login/Logout / Password) and 8.3 User management and login

6.1.2. Adapting the factory parameterization

In the factory parameterization (default parameter set), usually only calibration gas properties, automatic calibration intervals and the purging / flushing times for the gases must be adjusted. For extreme ambient conditions, the setting for the auxiliary housing heater or the fan is still required.

The default parameter set automatically switches on the additional heating system at 0°C ≙ 32°F ≙ 273K with a switching hysteresis of 2°C ≙ 3,6°F ≙ 2K. This supplementary heater function is only available up to a maximum housing temperature of + 13°C ≙ 55°F ≙ 286K.

Other parameters are normally left at their factory-set values and, if necessary, supplemented by customer-specific requirements.

To understand these parameters and to change their values if necessary, please refer to Chapter 8 Configuration and analysis software enSuite and the **enSuite online help**.

6.1.3. Opening and closing the hardware parameter guard (SSW)

You can protect settings which affect the measuring properties. This is done with the Security Switch (short: SSW) also called calibration switch. On delivery the connection is open. To open or close the SSW, the device must be opened.

	**Never open installed devices without the permission and consent of the system operator. Observe the explosion protection and safety regulations!** **N'ouvrez jamais les appareils installés sans l'autorisation et le consentement de l'opérateur du système. Respectez les règles de protection contre les explosions et de sécurité !**

Additionally, the housing hood may only be removed in controlled conditions as described in ISO/IEC 61010-1.

These conditions (temperature 5°C ≙ 41°F ≙ 278K to 40°C ≙ 104°F ≙ 313K; humidity up to 80% at 31°C, falling in linear form to 50% at 40°C ≙ 104°F ≙ 313K) generally prevail in residential and office environments. Contact Honeywell if you are in any doubt.

The instrumentation section contains sensitive parts which can easily be damaged by mechanical or electrostatic effects. When working on the device, it must be protected by an ESD guard (for example, one which complies with EN 61340-5-1). Proceed with the appropriate care.

To open the instrumentation section, screw in the locking screws (see figure). Then remove the hood by turning it counterclockwise. You will now see the elements in the section in front of you. The SSW is a physical connection (jumper) to the main circuit board (Q2BASE) next to the battery.

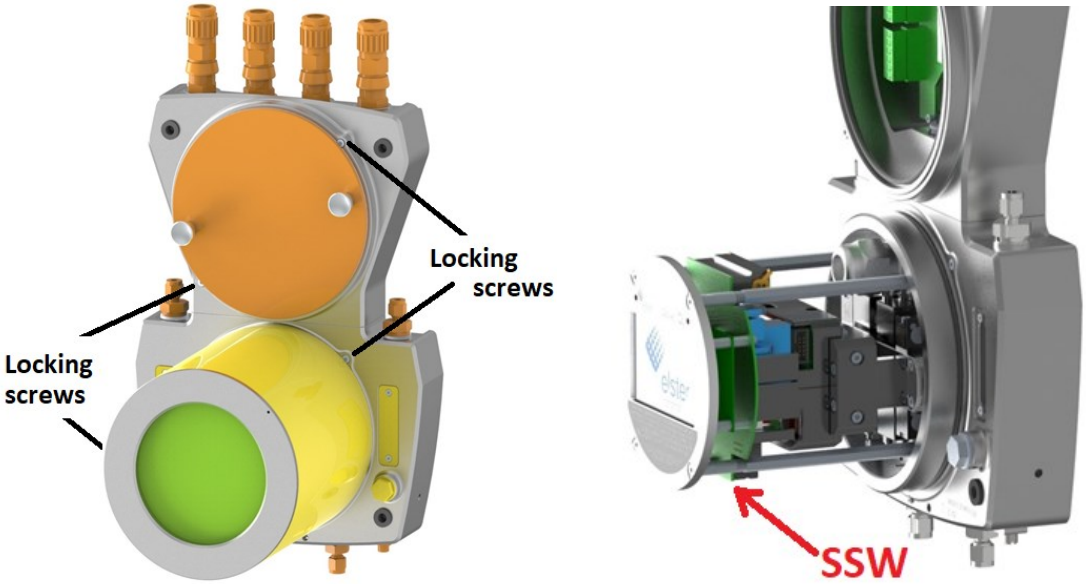


Figure 6.1: Overview of security switch (SSW) position

The following figures (seen from underneath) show the details more clearly.

The SSW is opened and closed by attaching or removing a jumper, see following figures. The SSW connection pins can be found after opening the housing on the underside of the main circuit board (Q2BASE) between the battery and the USB connection.

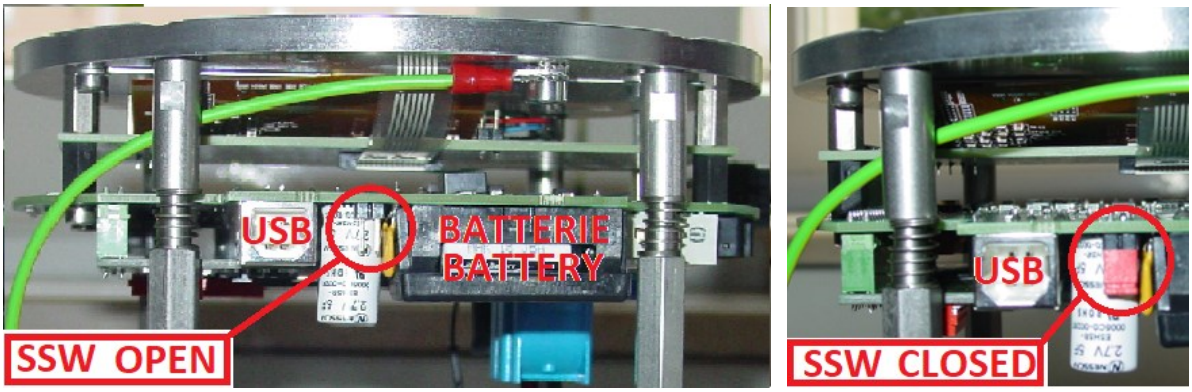


Figure 6.2: SSW open (no jumper) and closed (jumper connected)

	Use angled pincers or pliers to connect the jumper. A small mirror will also help you to find the connection pins and check that it is correctly positioned. You can view the setting by using devices displays and enSuite. See chapter 7 GasLab Q2 Displays (Operate the Device) and chapter 8 Configuration and analysis software enSuite

6.1.4. Additional conditions for fiscal metering

In the case of fiscal use, the conditions laid down in the relevant approval must be met. This is ensured by a file in the device that adjusts the settings. For final commissioning, the calibration switch or security switch (SSW) must be closed. You can attach a seal directly to the SSW (jumper) to prevent or detect unauthorized access.

	Within the scope of fiscal metering, depending on the regulations of your country, for the final commissioning the presence of an authorized person (calibration officer), who carries out officially protected work on gas-technical plants is required.

For details on the SSW, see Section 6.1.3 Opening and closing the hardware parameter guard (SSW) for the approval file see 8.4.10 Fiscal parameters and optional using approval file (Select approval).

The applicable regulations on sealing the device must also be observed during fiscal operation. Make sure that you comply with these regulations.

6.2. Standard commissioning and normal operation

Step	Action: Commissioning
1.	Check the state of the system and the connections.
2.	Open the operational calibration gas cylinder (setting 0.2 MPag ≙ 2 barg≙ 29.01psig)
3.	Open the process gas (PG) (setting from 0.15 MPag ≙ 1.5 barg ≙ 21.76psig to 0.3 MPag ≙ 3 barg ≙ 43.51psig = max. inlet pressure)
4.	Switch on the power supply.

The start procedure is now executed automatically. It starts by powering up the computer and heating the sensor block.

The current temperature of the sensor block (TSB) is also shown on the display during this time. The heating time of a cold device can take up to one hour in a cold environment. All dependent values are displayed in RED as an error before the working conditions are reached.

When the temperature of the sensor block reaches the operating range (70°C ≙ 158°F ≙ 343K), a start delay, which is also displayed, will commence. Outputs and inputs of the device are not yet active during this time.

After the start delay has expired, the instrument is flushed with measuring gas and the inputs and outputs are activated. The device then automatically switches to standard mode, known as "**Analysis**". This is displayed on the screen of the instrument. The Q2 now operates with the adapted factory setting, which also determines the starting behaviour described above.

Step	Action: Continuation commissioning
5.	If necessary, open the bypass and check the gas flow. If necessary, set it to the valid range. see next section.
6.	Check and change the device settings and signals if necessary, see next section

GasLab Q2 works continuously after all steps have been carried out and the standard commissioning is finished.

	The right LED flashes in RED when errors occur. If there are currently no errors, the LED lights up permanently. The color depends on the event history. For more information, see section 7.1 LEDs above the interactive screen

6.2.1. Checking the setting and signals

Adjustment of the gas flow is only necessary if you want to use the bypass or if the right LED of the device flashes red.

When using the bypass, its flow rate must be adjusted to the conditions of the installation. This can be done with the left needle valve, which you only open and lock for this purpose. The valve spindle is provided with a lock nut for this purpose.

If the right LED flashes after the commissioning steps or the setting of the bypass, it is possible that the internal pressure is not enough for the measurement. In this case, first try to increase the pressure of the process gas to 0.2 MPa ≙ 2 barg ≙ 29.01psig overpressure.

If this is not possible or if the pressure is already higher, carefully turn the right needle valve until the LED lights up permanently. The valve spindle is secured with a lock nut, which must first be loosened and tightened again after adjustment.

	The needle valve on the right-hand side of the device (see Figure 4.2) is for regulation only, it is not a shut-off valve and must never be fully closed. La vanne à aiguille située sur le côté droit de l'appareil (voir fig. 4.2) sert uniquement à la régulation, il ne s'agit pas d'un robinet d'arrêt et elle ne doit jamais être complètement fermée!

A complete check of the current parameter set can be made using the enSuite configuration and analysis software with an online connection to the GasLab Q2. See also section 8.4.3 Changing the device parameter set in the connected device (online parameterization).

Parameterized output signals can be measured using suitable measuring equipment. The digital communication (Modbus, etc.) can be checked using suitable tools (for example, a protocol analyzer).

	Preferably use the cable ends outside the instrument for the measurement. Only open the device with the permission and agreement of the system operator. Observe the explosion protection and safety regulations!

6.3. Decommissioning / Dismantling / Disposal

Please proceed in the following order if you take the measuring instrument out of operation and may want to reuse it later at another location or dispose of it.

Step	Action: Decommissioning
1.	Switch off the voltages (supply and communication) and secure them against being switched on again. Any further disassembly is prohibited without this prerequisite!
2.	Shut down all gas streams and depressurize all gas inlets. Prevent the unintentional opening of the shut-off valves by suitable measures so that no danger can arise from further disassembly.

	**The battery buffers data for approx. one year and may need to be replaced afterwards. Data for example, archive data and time settings, will be lost if the battery is empty. The device will no longer start correctly. You will then require a Honeywell service visit.** La batterie tamponne les données pendant environ un an et peut avoir besoin d'être remplacée par la suite. Les données, par exemple les données d'archives et les réglages de l'heure, seront perdues si la batterie est vide. L'appareil ne démarrera plus correctement. Vous devrez alors faire appel à un service d'entretien Honeywell.

To complete **dismantling** or disassembly, continue the above steps with the following, note before:

	**If the device contains hazardous media e, g. toxic gases, they must be removed before its dismantling. Prevent the release of potentially pollutant or dangerous substances.** Si l'appareil contient des fluides dangereux, par exemple des gaz toxiques, ceux-ci doivent être retirés avant son démantèlement. Empêcher le rejet de substances potentiellement polluantes ou dangereuses.

Step	Action: Continue decommissioning with dismantling
3.	Allow the device to cool down to ambient temperature and disconnect all the gas tubing at the couplings. Immediately seal all outlets and inlets.
4.	Open the connection box **in a non-potentially explosive atmosphere** and remove all the cables by releasing them in the cable gland or cutting them if they are sealed. Dismantle the device mechanically.
5a.	If you want to use the device later in another location, please bring it into the condition in which it was transported. Observe the instructions in section 5.1 Storage.
5b.	Observe the following information on disposal if you no longer wish to use the device.

Disposal:

	GasLab Q2, like all enCore devices, falls under the WEEE directive. The adjacent EU WEEE symbol symbolises that this device may not be disposed of with household waste in the EU.

As the EU member states have transposed the WEEE directive into national legislation in different ways, the regulations for the return of disused equipment vary. Outside the EU, you must comply with the applicable laws on the disposal of industrial waste.

Please ask your local Honeywell sales partner how the take-back of your equipment is regulated.

	**Batteries are subject to hazardous waste treatment and must therefore be removed before disposing of the enCore device. If necessary, ask your Honeywell sales partner how to treat used batteries in your country.** Les piles sont soumises à un traitement des déchets dangereux et doivent donc être retirées avant de jeter l'appareil enCore. Si nécessaire, demandez à votre partenaire commercial Honeywell comment traiter les piles usagées dans votre pays. **The Battery is located near the SSW see figure 6.2.** La batterie est située près du SSW ; voir la figure 6.2 on ⇨ 6.1.3 Opening and closing the hardware parameter guard (SSW)

7. GasLab Q2 Displays (Operate the Device)

GasLab Q2 will begin its starting procedure after the power supply has been connected and it has been switched on. After this starting procedure has been completed, the device will provide an overview of the state of the measurement on the screen. Both LED's above the screen also called display, will be permanently lit. There is no need to exit this screen for normal analysis mode. GasLab Q2 continuously displays new measurements here; **the values for partly saturated gas** will be shown.

Some functions and operating modes (known as **operations**) do require the use of other displays, or the use of the **enSuite configuration and analysis software**.

Therefore, two types of access to the instrument are possible:

Access methods	
1.	via the operation panel local on the device (described in this chapter)
2.	via a PC or laptop with the Configuration and analysis software enSuite (described in Chapter 8)

For each type of access applies:

- The device has a user management system protected by a password to protect important settings and simplify the parameterization process.
  There are no passwords when the device is supplied!
- Only one user can be logged in at any one time.
  Your own password can be created and edited at any time on the device.
- Changes which have been completed but not yet saved are discarded when you log out. Logins, logouts and password changes are entered into the device's logbook.

	Honeywell can provide classes and training to make the measuring equipment easier for you to use and for using all the individual options offered by the device. If you are interested, please contact Honeywell. The Contact data can be found at the beginning of this document.

7.1. LEDs above the interactive screen

There are two multi-colored LEDs positioned above the interactive screen. The Power LED on the left and the Status LED on the right. They are simulated on the remote operation panel.

Their color and behavior (permanently lit or flashing) indicate whether the measuring device is operating flawlessly or whether an error is or has been active.

Power LED - State	Explanation
Off	Power supply off, no connection no operation
Green, permanently on	Power supply on, connection and operation possible
Status LED	**Explanation**
Off	Power supply off, no connection no operation
Green flashing	Start-up phase after restoration of the power supply
Green, permanently on	There are no entries in the error list. The device functions perfectly in measuring mode.

Information on the error list see section 7.3.8 Error List – Main display (accepting / quit error messages).

A red or yellow status LED indicates that there are pending errors or errors which have not been accepted. (The LED status will be retained even after a restart and will be redisplayed.) The status LED shows the error state as follows (in sequence of priority):

Status LED	Explanation
Red flashing	The error list contains at least one pending alarm which has not been accepted.
Yellow flashing	The error list contains at least one pending warning which has not been accepted.
Red, permanently on	The error list contains at least one alarm which has already ended but has not yet been accepted.
Yellow, permanently on	The error list contains at least one warning which has already ended but has not yet been accepted.

Honeywell can provide assistance with troubleshooting work.
The Contact details are provided at the start of this document.

7.2. The (local / remote) Operation panel

The screen or display on the device is interactive (part of the HMI, see section 3.3 Human-machine interface (HMI)) and is also called **operation panel**.

	The display lighting is switched off automatically after a period of inactivity, whose length is adjustable. The display will be visible again after it has been tapped again.

The **operation panel** can be operated in various ways. Locally on the device or remotely, then called "**Remote operation panel**". This remote operation is done with the Configuration and analysis software enSuite. The handling is essentially the same.

Operation panels are used to display the measurements and to control the various operating modes, for example, analysis (process gas measurement), calibration and date setting.

Result influencing (official) parameters cannot be changed. The configuration and analysis software enSuite with its extended functions is designed for this purpose.

The operation panel features 7 touchscreen boxes for this purpose (see red areas in the following figure, which does not show the device).

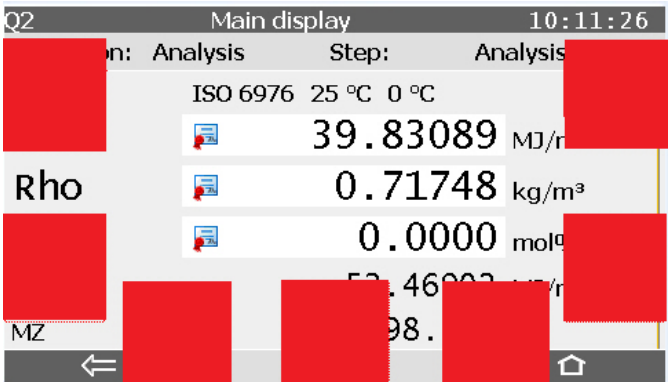


Figure 7.1: Interactive screen on the device

The **Remote operation panel** is a graphic image of the Q2 front view. It behaves exactly like the real device front and can be displayed on the PC **using enSuite**. This enables remote operation and observation of the device, analogous to local action on the device.

	The remote operation panel simulates tapping the device using the mouse. It is provided by enSuite ⇨ See section 8.5 Remote operation panel functions of enSuite

7.2.1. Navigation in the operation panels and displays

The following section describes the menu control and local and remote operation in general form on the basis of examples. Following figure provides an initial overview of the structure of the display. The details are described later in this information.

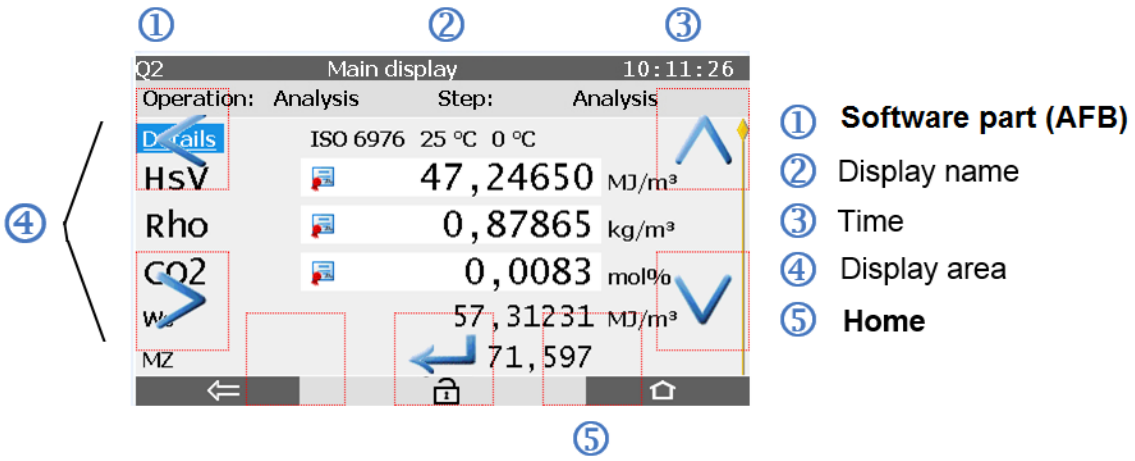


Figure 7.2: Section of the remote operation panel on a PC

If you move your finger on the device around the border areas (red areas in Figure 7.1) or, if you click in the areas with red borders in the remote operation panel (see Figure 7.2), direction arrows will be displayed pointing left and right, as well as up and down.

A confirmation arrow will appear at the bottom of the display. These displays are known as **superimposition keys**. If no further taps or clicks are made, these keys will disappear again. There are only slight display differences between local operation and remote operation.

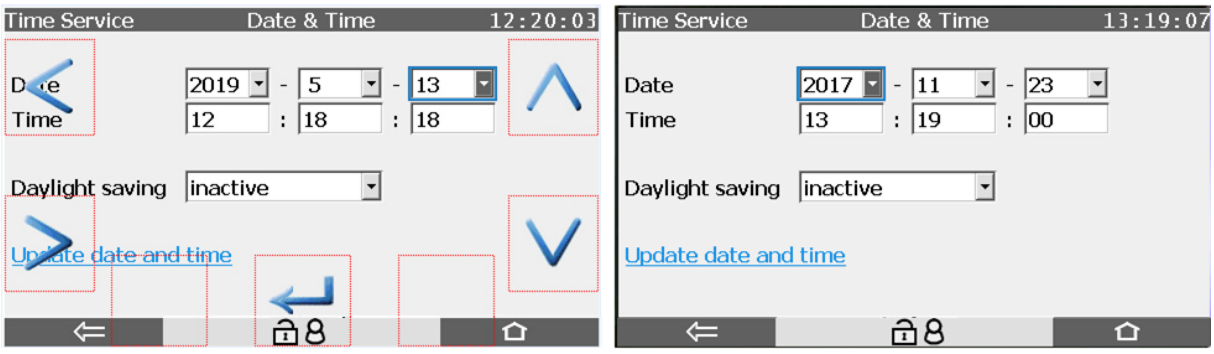


Figure 7.3: Superimposition keys and touch area fields with superimposition keys

	To enable the complete screen to be used, the superimposition keys are only displayed when they are required for as short a time as possible. The superimposition keys are not displayed when the device is started.

Refer to the following information relating to the superimposition keys:

- The first time the (invisible) sensitive areas are activated, the superimposition keys will only be displayed without any further functions being executed. They will then disappear again after 30 seconds if no further action is taken.
- If an area is tapped or clicked again while the superimposition key is visible, the corresponding function will be executed, and the superimposition keys will remain visible for 10 more seconds.
- If no further actions are taken, the areas under the superimposition keys, which are now invisible again, will be active for a further 20 seconds. The keys will be displayed again if actions take place during this time.
- If 30 seconds pass without activity, the display will return to its initial state.

Since some displays are too long to be shown completely, a small yellow diamond on the right-hand edge indicates where you are in the list. You can scroll through the list of displayed values using the superimposition keys (cursor keys).

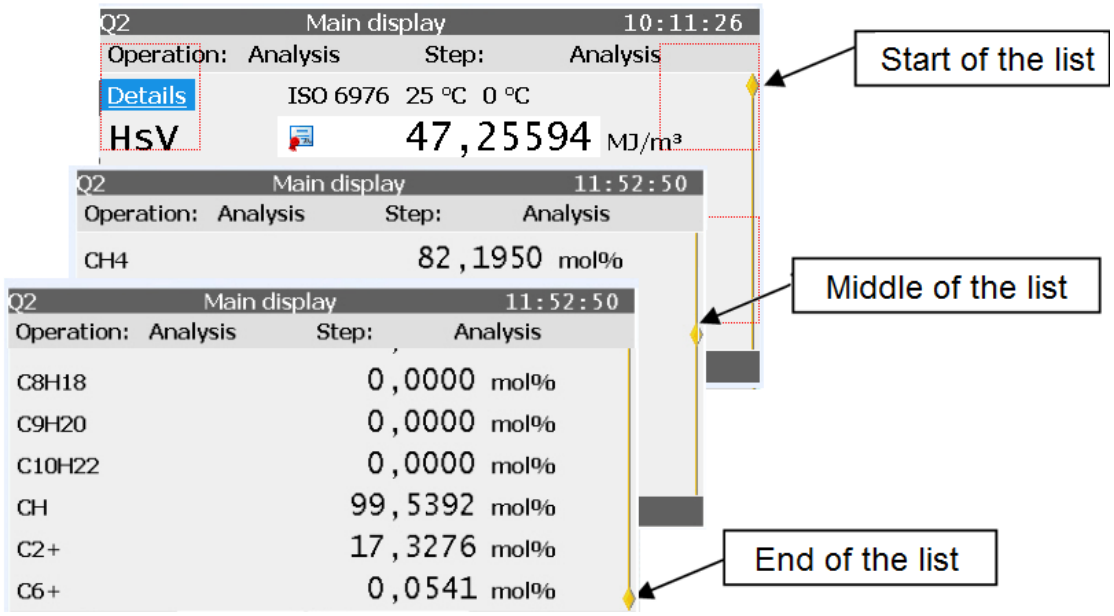


Figure 7.4: Position in longer display lists

Other menu control properties include items which can be selected on the display such as **hyperlinks, actions, drop-down lists** and **input boxes**.

You can select all the entries in question using the superimposition keys.

This selection then has a background or is highlighted, such as "**Day**" in the date display in Figure 7.3 or "**Device monitor**", "**Date**" and "**Time**" in the following examples.

Not all displays have this option, see Figure 7.1.

Hyperlinks and actions are shown in the displays in blue.

Figure 7.5: Hyperlinks and actions

	**Hyperlinks** enable you to navigate through the displays by opening the appropriate display automatically when they are activated. **Actions** enable you to perform a specific function. Dialogs appear for editing values.

A **drop-down list** can be identified by the triangle on the small grey box next to the value with everything being framed in blue when selected.

Input boxes show their values in white boxes. When a value has been selected, it will be displayed with a blue background and there will be a blue border around the box. See the following examples:

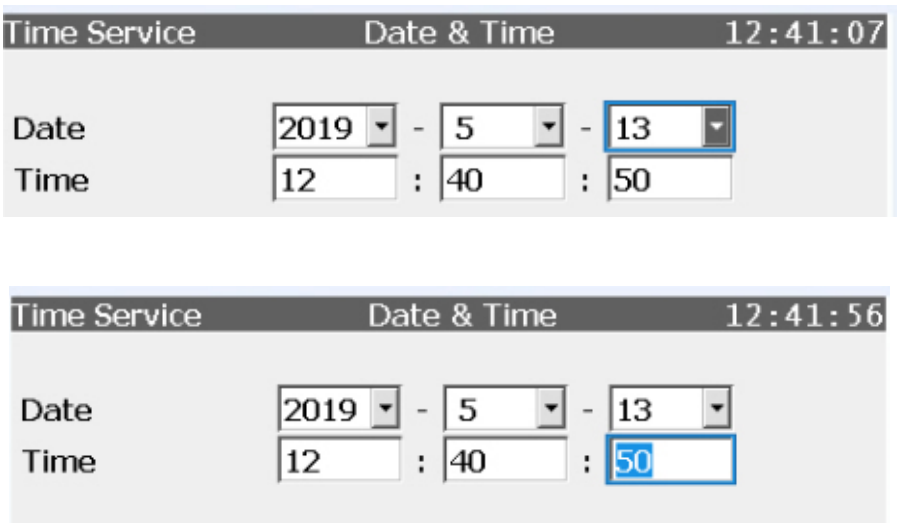


Figure 7.6: Drop-down list and input boxes

	A **drop-down list** enables you to choose between predefined values. **Input boxes** enable you to edit values freely within specified limits.

Selectable points are underlined in blue, for example, "**Device monitor**" and "**Software status**" in Figure 7.5.

If the text is not underlined, as is the case with "Reset battery status to 100%" (in the next figure), the item cannot be selected

You can use the **superimposition keys** to jump to the next selectable item, even if it is not in the visible section of the display. In this case, look for the small yellow diamond on the right-hand edge. To confirm or execute the **selection with a blue background** (in Figure 7.5, for example, device monitor), press the **confirmation arrow box** on the device in the center of the bottom line. On the remote operation panel, click in this area.

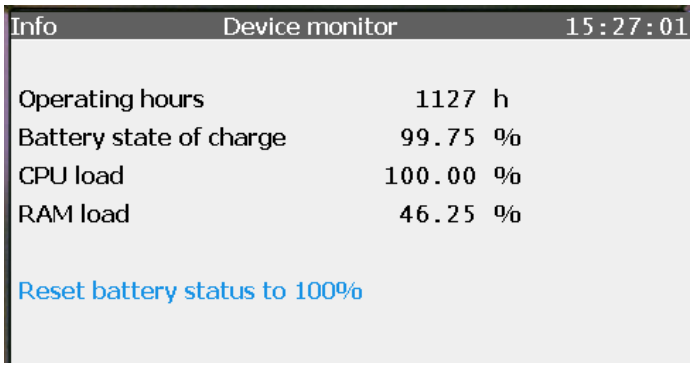


Figure 7.7: Selecting and executing hyperlinks and actions

There are two sensitive navigation areas on the bottom edge of the display which may be available and change their appearance depending on context. The figure below shows the possible combinations (without the possible symbols in the center).

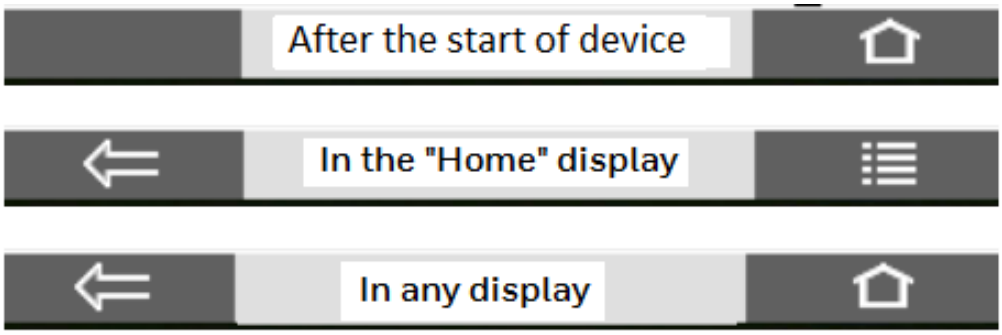


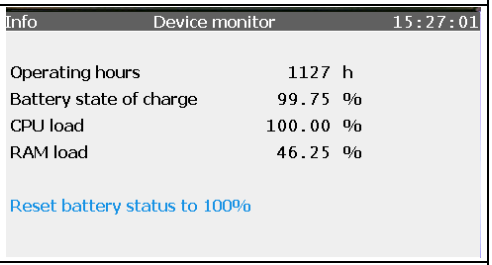
Figure 7.8: Buttons on the bottom edge of the display

Generally, these enable you to jump to a different display. Select a sensitive area (red area in Figure 7.1) next to the symbols, by tapping or clicking it.

Clicking on the area returns you to the "**Home**" display. The area returns you to the "**Main display**". Clicking on returns you to the previous display.

Navigation example:

If you are in a display, there are the following navigation destinations:

1. To subordinate displays or dialogs (for example, from Info Q2 to Device monitor) Tap or click the area of the superimposition keys until the required target has a blue background and then tap or click on the **Confirmation arrow.** 	
2. Back to the previous display (for example, from the Device monitor to Info Q2) Tap the display or click on ⇦.	
3. Back (from any point via Home) to the Q2 main display (for example, from the Device monitor display) Tap the display or click on ⌂ to go to the Home display (display Info Q2 is skipped in this example, the symbol changes to ☰). Tap or click on ☰ to go to the Q2 main display.	

	Regardless of the current device display, you can always return to the start screen using the buttons on the bottom right of the screen (symbols ⌂ or ☰) with a maximum of 2 taps. This display is the GasLab Q2 main display. It is also automatically displayed after lengthy breaks in operation.

7.2.2. The middle of the bottom status line and the visibility of the displays

Additional information symbols are shown at times in the center of the bottom line:

Figure 7.9: Symbols in the middle of the status line of displays

	These symbols are only displayed in context. It is possible that not all or none are displayed

Safety settings which comply with the approval must be protected for fiscal measurements. This is done using the security switch (SSW). This is a physical connection (jumper) inside the device.

If this security feature is missing, this is shown by this symbol  of a padlock which then appears in every display.

In "**non-fiscal operation**", this connection may be open, and the symbol is displayed. Since the housing must be opened to close the security switch (SSW), special rules apply, see section 6.1.3 Opening and closing the hardware parameter guard (SSW).

You can also have a seal affixed to the switch its selve to verify unauthorized access. Please contact Honeywell if necessary.

If the  symbol is shown, somebody has logged in and is working with the device. Normally you are the logged in user, if not you should not carry out any further activities, so as not to disturb the work of the user who is logged in. If several people access the device, mutual agreement is always required.

(Further information on this is provided in section 7.3 Displays and functions)

 These symbols provide information about the visualization settings and input conditions on device displays or the remote operation panel.

The following table gives an overview:

	means that the security switch (SSW) is open.
	means that the user is logged in.
	One or more remote controls are active. The local user sees the screen content and can operate the device
	The device is operated remotely. The local user sees the actual screen content but cannot operate the device
	The remote user sees a lock screen because the local input is active

	Without user login, remote operation panel and with closed security switch (SSW) no symbols are visible. Further information will follow in the course of this manual.

When **accessing the device via remote control**, the local user sees a lock screen on the device by default, unless the remote user changes these settings, see section 8.5 Remote operation panel functions of enSuite)

The lock screen hides the actual device display and does not allow any operation. **By simultaneously activating the sensitive navigation areas at the bottom of the display, remote access can be cancelled.** The device display becomes visible again and the device can be operated.

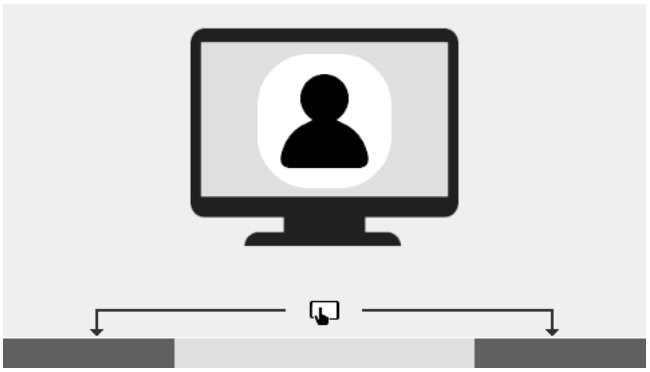


Figure 7.10: Lock Screen"

7.2.3. Entries and changes using the operation panel

	Changes on the device are always made in the following steps: • **Log into the device** • **Complete and confirm the changes on the device** • **Log out of the device**

Use the **Users main display** to log in, confirm and log out ⇨ see section 7.3.11 System display Users (Login/Logout / Password). The procedure for changing parameters is also described there.

Values which can be changed are displayed in white boxes. These are editable boxes. These editable boxes appear depending on the login status and user rights. Changes are not finally entered and saved to the device until the user has explicitly confirmed them. If the user has logged out beforehand or is logged out due to another event without confirming the changes, any changes that have been made will be discarded.

Entries and changes can be made either using a **drop-down list** or the displayed **keypad**.

Changes using a drop-down list

are shown in the following example.

A drop-down list can be identified by the small gray box with a triangle next to the value to be changed, in this example after month and day.

The view will change when you click on it, in the example the year.

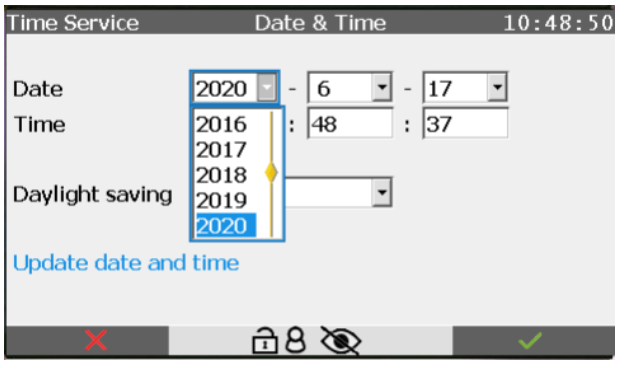


Figure 7.11: Drop-down list open

The drop-down list is opened and displays the available values. The superimposition keys enable you to select a value from the drop-down box. Your selection then has a blue background (in the example 2020). After this user action, a confirmation of the selection is requested, which is why the buttons at the bottom of the display area are marked with a check or an X symbol. See figure.

Figure 7.12: Selection confirmation

You can now accept your selection by clicking on ✓ or discard it by clicking on ✗.

	If you have accepted the selection with ✓, you also must execute your change. In the above example, this is the action Update date and time. which is then underlined.

Changes using a displayed keypad for entering letters and numbers. To prevent local users from inadvertently blocking remote access, the virtual keyboard closes automatically after one minute of inactivity - no input is visible on the remote operation panel.

You can identify an entry box by its white background. When the box has been selected, it will have a blue border and the content (if there is any) will have a blue background. In the following examples, the entry boxes for **Password** and **Time** can be seen. The view will change after you click on a box as shown below and the keypad will be displayed.

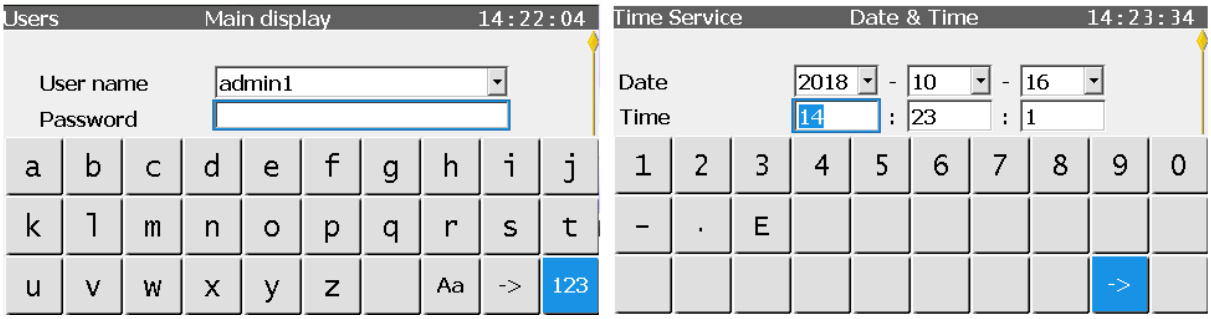


Figure 7.13: Keypad displayed

Depending on the expected entry, a keypad which can be switched between letters and numbers (on the left in the example) or just a number pad (on the right in the example) will be displayed. You can switch between upper- and lower-case letters using the “Aa” key. You can switch between letters and numbers using the “123” or “ABC” key. If a special symbol must be entered, the “Aa” key will also appear on the number pad. When this is pressed, the special characters will be displayed and can be selected.

The superimposition keys enable you to select a key (button) in the box. Your selection then has a blue background. You can adopt the selected value using ↵. In this case, the keypad will remain open and you can select and add another value in the box. If all the values are already filled in, you can close the keypad using ✓ and keep all the entries in the box.

You can discard the entries using ✗. The keypad will also close. When you leave entry mode, a consistency check is made to find whether a value has been entered which in this context is nonsensical or not allowed. If this is the case, the value is not saved and the previous one is retained or replaced by a substitute value.

	If only individual characters are to be replaced, it is possible to jump to the end of the existing entry using the -> key and then supplement the entry. At the same time, the key changes and shows the following symbol <- which allows individual characters to be deleted starting from the right.

If the entry requires a restart, this is indicated in the display with a link. The restart is then carried out immediately after you click on the link. If you log out without completing the restart, the changes will not be saved. An example of this is changing the IP address.

7.3. Displays and functions

Although the **Q2 main display** contains all the relevant information, some applications require you to change the display. You can get to any display using the **navigation methods** explained in the previous section. In addition, device dialogs and confirmation prompts guide you through the displays. Progress displays provide information about the success and progress of actions.

	The current time is shown in the top right-hand corner of most device displays.

Changing display is generally done using a special display known as "**Home**". This is the main node for the device. This display is explained first of all as it provides a better understanding and a good overview. Starting from the "**Home**" display, various other displays and functions are then presented as well as the details described.

7.3.1. Home (display overview/device language/start-up error)

	After start-up or power-up, the "Home" display can be accessed using . This is a special display; it shows the software structure of the GasLab Q2.

Individual software parts and selected other functions which should be easy to access (for example, changing the language) are displayed here in the form of small symbols. These symbols are marked with the name of the relevant function and may contain additional branching. The following figure shows the main node, the "**Home**" display.

The menu structure is like a tree, in other words, a subordinate menu option of a module may, in turn, include subordinate menu options and branch off to the side.

Only the contents of the **"Home**" display on delivery are described below.

If you have the required rights, you can change and supplement this structure.

(⇨ see chapter 8 Configuration and analysis software enSuite)

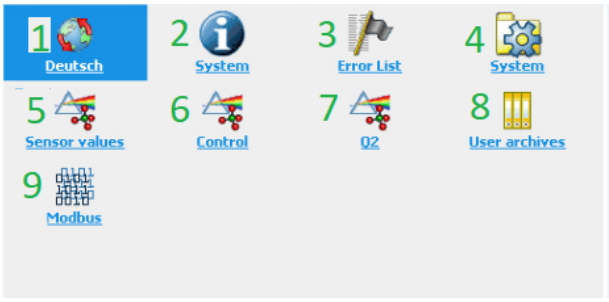


Figure 7.14: "Home" display nodes

Navigation options in the Home display

Selecting a symbol (using the superimposition keys) in the Home display will open it to display the functions grouped in this folder. If only one function is assigned to this symbol, selecting it will immediately take you to the main display of this function.

Symbol	Explanation
1	The "**Globe**"enables you to **change the language** to the language stated below the symbol.
2	The displays behind "**Info (System) Q2**" provide an overview of "Serial number", "TLS-Certificate", "Device monitor", "Software status", "Display test" and "License info". The state of the security switch is also specified. ⇨ sections 7.3.2, 7.3.3, 7.3.4, 7.3.5, 7.3.6, 7.3.7
3	The "**Error List – Main display**" display contains a complete list of all active errors and those which are no longer active (but have not been accepted). ⇨ section 7.3.8 Error List – Main display (accepting / quit error messages)
4	The gear wheel symbol opens the **System display**, another node to the displays for the time service, user management, logbooks and I/O functions ⇨ sections 7.3.9, 7.3.10, 7.3.11, 7.3.12, 7.3.13, 7.3.14
5	The **Q2 sensor values** display supplies the current incoming measurements (raw values) from the transmitters and sensors inside the device. ⇨ section 7.3.15 Display Q2 sensor values
6	The displays under "**Q2 control**" enable a calibration or test gas measurement to be started and adjusted and the touchscreen to be deactivated. ⇨ section 7.3.16 Display Q2 control (calibration/verification/touch)
7	The symbol designated **Q2** also enables you to access the **Q2 main display** (device starting screen) or further information ⇨ section 7.3.17 Q2 main display (calculation standard)
8	The "**User archives**" display enables you to select various archives and view them. ⇨ section 7.3.18 Display User archives
9	The "**Modbus**" display enables you to select various tabs and view them. ⇨ section 7.3.19 Display Modbus

Changing the device language (optional)

Up to two languages are possible. English is always the second language. The devices will always start in the first language. Please notify Honeywell if you wish to change the first language installed in the device. **If English is selected as the first language, the device can only be operated in English.**

The design of displays and menus, for example, date and time format, depends on the current parameter set and language. If the language is changed, all the data in the device will be renamed or reformatted and displayed in the current language. Carry out the following steps in the "**Home**" display to change the device language:

Step	Action
1	Select the "Globe". The alternative language is shown below the symbol Confirm your selection. 
2	The language has changed. The text beneath the "Globe" shows the previous language as the new alternative. 

Error display after start-up or for system errors

A system error may occur in very rare cases. If this happens, a prohibition sign will be displayed, and the device will switch to emergency mode.

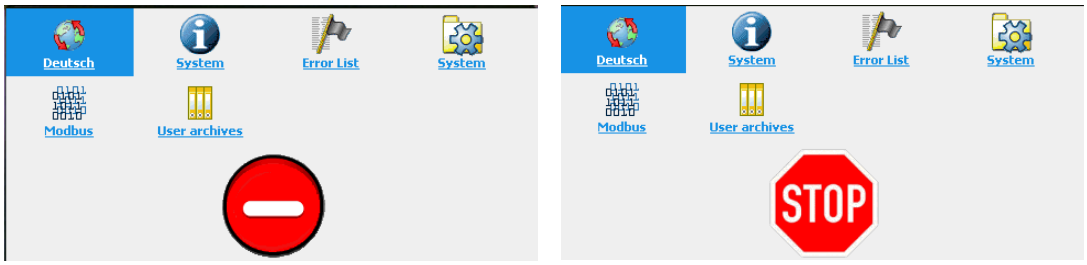


Figure 7.15: Device not ready

Examples of these errors include uploading an incorrect parameter set or internal connection errors. This means that after or during the start-up process, for example, a one-way street sign will be displayed, and only the basic functions for troubleshooting will be active; all other functions are disabled.

	Was the error caused by the parameter set? Rectify it by transferring a correct parameter set to the device, for example, the default parameter set. ⇨ Details 8.4.11 Restoring the parameter set to factory settings (importing data) If the error cannot be rectified by the parameter set, please contact Honeywell.

7.3.2. Info display (overview)

	**This symbol opens the following display:**

The display shows the device's serial number (first line) and the status of the security switch (SSW). This is a switch which can be sealed, also known as the calibration switch.

This protection prevents changes to the fiscal settings or main device settings and software downloads (see section 8.4.12 Changing the software configuration (Update / Downgrade)).

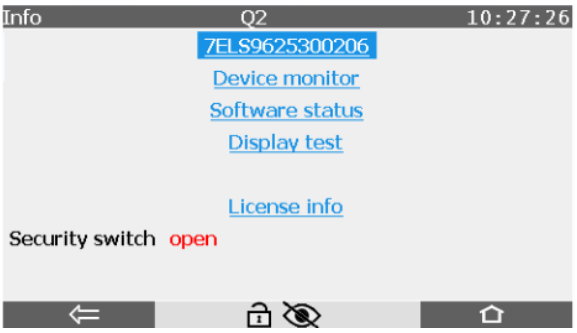


Figure 7.16: Info (System) display

Furthermore, the display provides access to the following functions:

7.3.3. Info display (Serial number and TLS certificate)

The serial number shows after a klick on it as second display information of the device type and the used CPU.

The link **Certificate** enables to view the MMS certificate for secure data transmission. The action **Delete certificate** allows the authorized user to delete the existing certificate and create a new one.

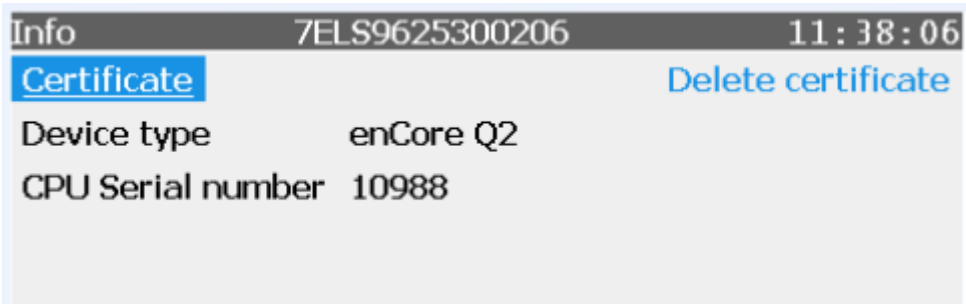


Figure 7.17: Display serial number (example)

The certificate display shows the details of the used certificate for secure data transmission. Since the display is too long to be shown completely, use the small yellow diamond on the right-hand edge or scroll use the **up and down arrows** on the display.

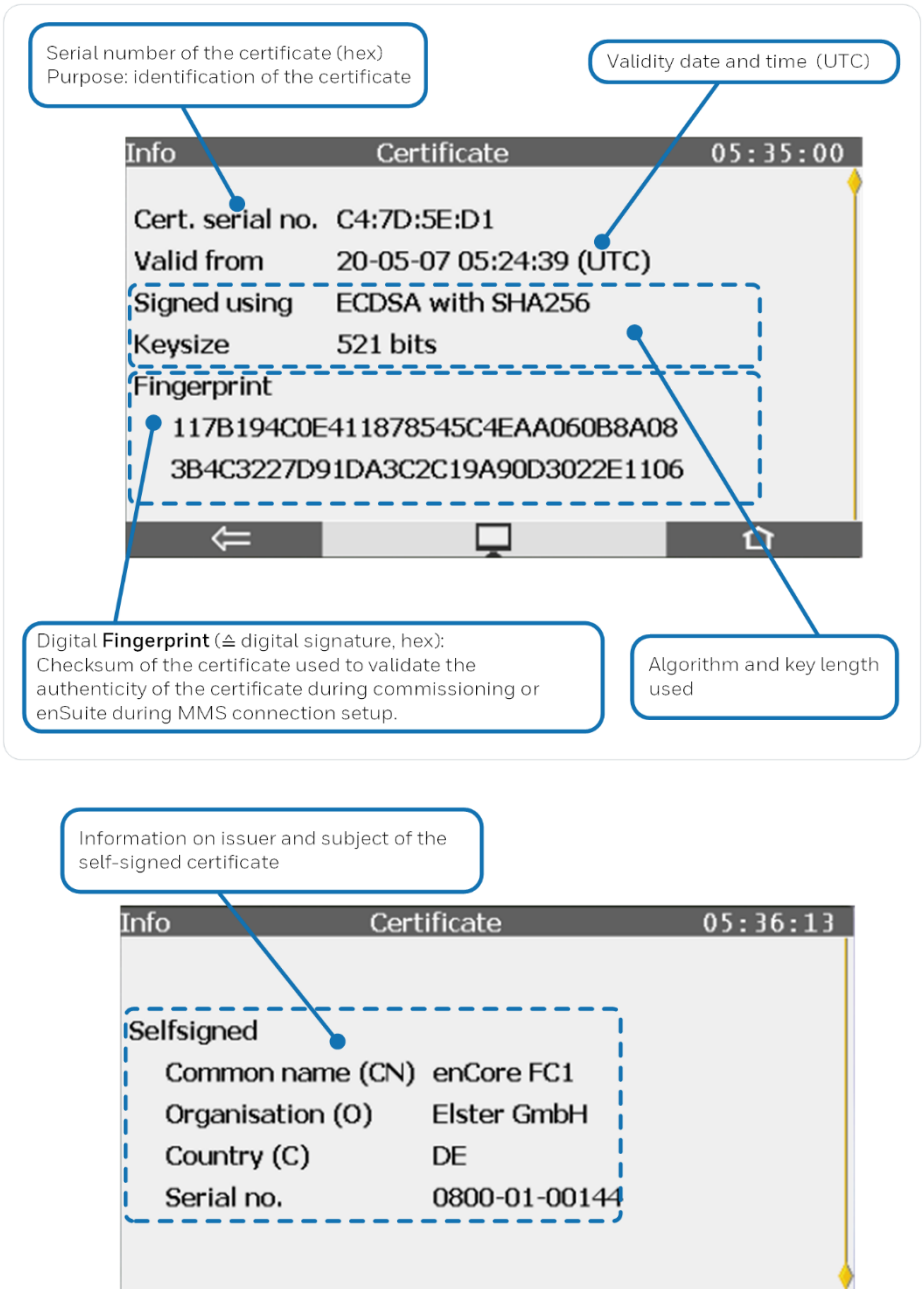
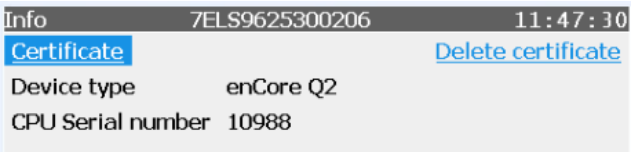
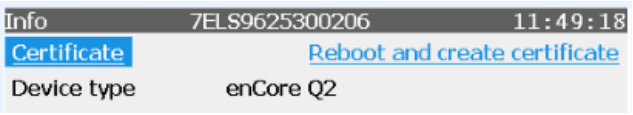


Figure 7.18: Display certificatepage one and two (example)

	To increase security, we recommend that a new TLS certificate always be created if the existing one was made under unknown conditions, e.g. on the transport route or in trial operation.

Step	Change a TLS certificate and publish it to enSuite
1.	Log in to the "**User Main Display**" on the device or on the remote operationl panel (Home >> System >> Users). See also section 7.3.11 System display Users (Login/Logout / Password).
2.	Switch to Diplay **Info (System)** via **Home** >. Activate the <device serial number >. You will see the 2nd page of the display as shown below. 
3.	Delete the existing certificate with the action **Delete certificate**. The text of the action will change, see figure.  The certificate will only be permanently deleted on shutdown
4.	Restart the device with the action **Reboot and create certificate**. On restart, the device generates a new certificate for MMS communicationt.

7.3.4. Info display (Device monitor)

The device monitor shows information about the operating hours and battery charge and about the CPU and RAM load.

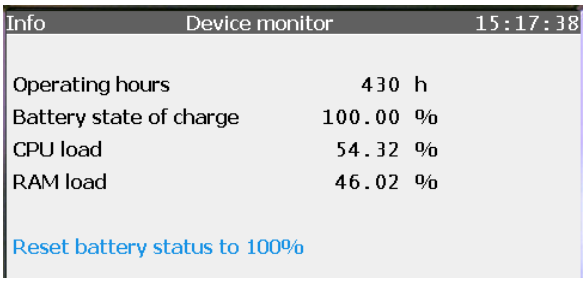


Figure 7.19:
System info – Device monitor display

The battery is mainly used when the device is switched off. After service or repair work (including battery replacement), a user with the appropriate rights can reset the battery status to 100%.

	**The battery must be replaced when the charge falls to below 20%. A discharged battery may, in certain circumstances, result in the loss of calculated and saved measurement data. The device will no longer start correctly.** **DANGER OF EXPLOSION IF THE BATTERY IS NOT REPLACED CORRECTLY.** **The battery replacement must be carried out by Honeywell service personnel.**

	La batterie doit être remplacée lorsque la charge est inférieure à 20 %. Une batterie vide peut, dans certaines circonstances, conduire à la perte de données de mesure calculées et stockées. L'appareil ne démarre plus correctement. RISQUE D'EXPLOSION EN CAS DE REMPLACEMENT NON CONFORME DE LA BATTERIE. Le remplacement de la batterie doit être effectué par le personnel de service de Honeywell.

7.3.5. Info display (Software Status)

Software status shows the identification data of all software parts in the device. The data consist of the name of the software parts, the version number and the checksum. In addition to the "**Last check**", the topmost line contains the date of the readout for the following information.

The first column lists the names of the software parts. These names are selectable hyperlinks and take you to subordinate displays (component displays) containing information on the corresponding software part.

The second column contains the software version number of the components and the third column contains the relevant checksum. During operation, the actual checksums are calculated and compared to the reference values.

If an entry (checksum) is marked red, the last test failed, in other words, a discrepancy was identified.

In this case, an error is generated, see also section 1.3 Symbols, abbreviations and definitions.

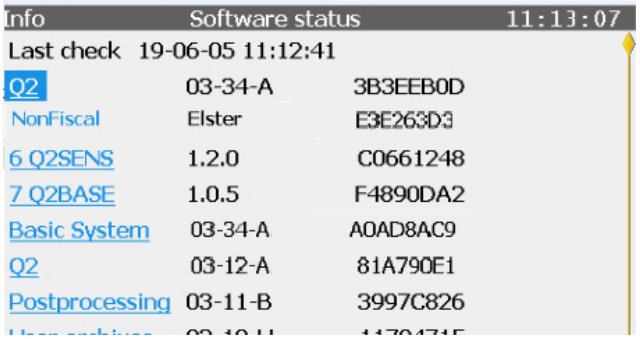
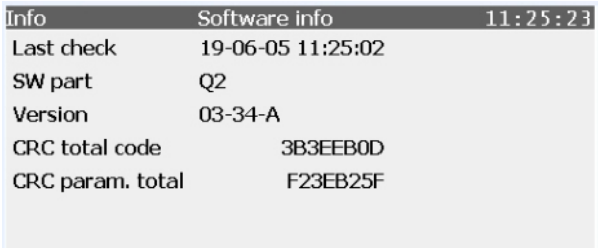
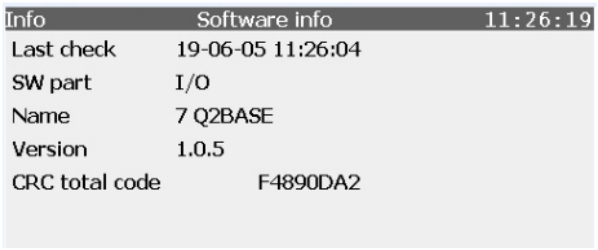


Figure 7.20: System info – Software status display

The following shows examples of component displays. You will find the following information:

Last check/Software part/Name/Version/Software/All parameters





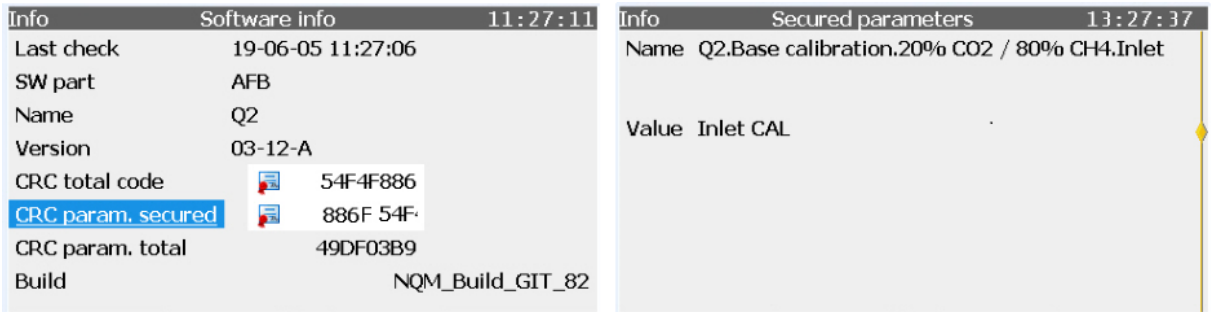


Figure 7.21: System info – Software info display

	The above figure only shows examples. If, for example, the device is not used without an approval file, the "Secured parameters" display will not be available. Furthermore, some links can only be selected if there are no red entries. As the example shows, the component displays do not have a uniform structure.

The "**Software status**" display shows the short name of an **approval file** in second place on the list. This file contains the definition of which parameters are backed up before being changed so that the device can be operated in compliance with customer specifications or approvals.

Operation without an approval file is also possible. In this case, as in the example above, **NonFiscal** is displayed as the abbreviation. If the device is operated with an **approval file** and a closed SSW, the appropriate parameters are protected to prevent them being changed.

	If you wish or have to backup parameters with an approval file, refer to section 6.1.3 Opening and closing the hardware parameter guard (SSW) and section 8.4.10 Fiscal parameters and optional using approval file (Select approval). If necessary, please contact Honeywell.

	If an approval file is used and both the official access rights of the parameterization as well as the fiscal software component versions are in line with the approval file, then this text is black; the text is red in the event of any deviations. If you activate the hyperlink of the **Approval,** a display is then evoked which contains detailed information on the approval.

If the device is operated with an **approval file** and a closed SSW, the appropriate parameters are protected to prevent them being changed.

7.3.6. Info display (Display test)

Display test shows a display in which all the pixels in the display area are switched on and off alternately. This enables you to check whether the screen is working correctly.

You can end the test using ⇦ or ⌂.

Figure 7.22: System info – Display test display

7.3.7. Info display (License info)

The hyperlink leads to a display with details of licenses, copyright and rights.

Figure 7.23: System info – License info display

7.3.8. Error List – Main display (accepting / quit error messages)

Background: If the status LED is lit or flashing in red or yellow, there are entries in the error list.

	**The device manages warning and alarm messages in this list and records them in the logbook. Which messages appear, depends on the parameterization of the device. The list can be opened by clicking on this symbol.**

The error list shows all the alarms and warnings which are either currently active or have already ended but have not yet been accepted. These alarms and warnings also affect the reaction of the status LED. After it has been opened, the list is "**frozen**" to avoid having to re-sort the entries. The list is arranged in ascending order by date and time. The last event before the display was opened is at the top.

Time stamps (date and time of the start of the error and, if applicable, the end of the error) are shown above each message. These time stamps for all alarms are displayed in red text and for all warnings in yellow text.

A current error can be identified by the fact that the *Ends* time stamp (right) has not yet been entered and instead empty boxes are displayed. The figure below shows an example of the error list and explains the display in detail.

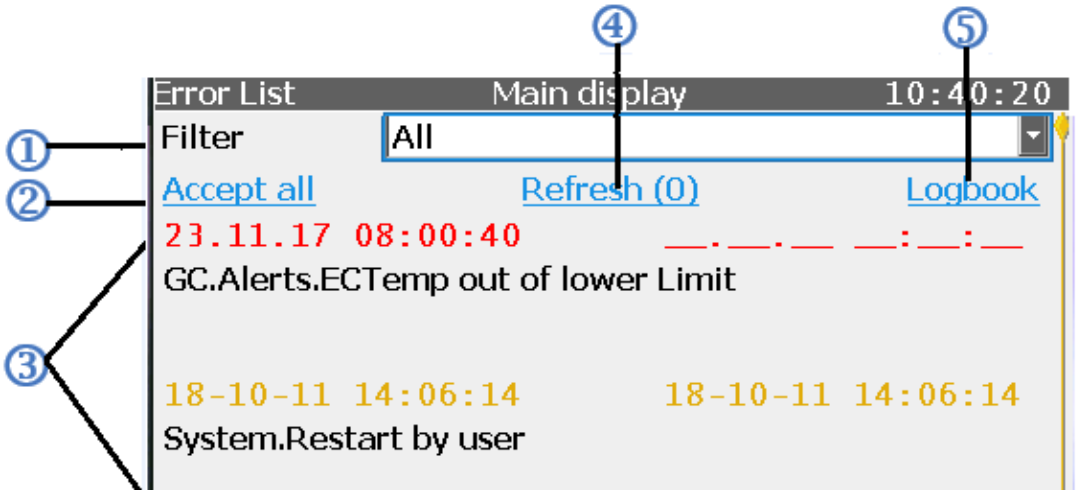


Figure 7.24: Error List – Main display

Item	Error List details
①	**Filter selection box**: In the first line, you can use the drop-down list to restrict the display to the selected range.
②	Action **Accept all**: All displayed errors which are no longer current can be accepted at the same time so that they are no longer displayed. They must comply with the Configuration and analysis software enSuite defined acceptance action for this purpose. Messages which are still active or have been filtered out will be retained.
③	Section of the **error display**: The date and time of the start of the error are displayed on the left and the end of the error on the right (if applicable), with the relevant message beneath. If the list contains more than 2 events, you can scroll through it (yellow diamond on the right-hand edge).
④	Action **Refresh:** the error list which was “frozen” when it was opened, will be updated.
⑤	Link to go to the **logbook:** you can go to the “**Logbook error list**” ⇨ See section 7.3.12 System display (Logbook)

The error list is sorted in chronological order with the latest message being displayed first. If there are more messages than can be displayed at once, the scroll bar appears at the right edge. If only a few faults are contained in the overall list, scroll down to see individual messages. If the list is longer, you can filter the contents according to the message origin by selecting the software part, e.g. "**Time servic**e", from the **Filter selection list**. Only the corresponding messages of this software part are displayed.

	**Entries in the error list must be accepted** (see the following steps). On delivery of the device, this is only possible using the defined acceptance action if the cause of the entry has been rectified. You may also require the appropriate rights. You can change the acceptance action using Configuration and analysis software enSuite. Details are also available in **enSuite online help**

Step	Action: Clearing (accepting) the error list
1.	Navigate to the Error List main display and open it. (Click on **Home >> Error List**).
(2.)	To accept only messages for a specific software part from the list, open the filter and select the appropriate entry.
3.	Select "**Refresh**" to update the list which had been frozen upon opening (number in brackets = number of new messages).
4.	Start the **Accept all** action. The selected list will be accepted and refreshed according to the parameterized acceptance action.
(5.)	Repeat these steps for other display texts from other software parts if necessary.

After all the entries have been accepted, the system will be returned to error-free status. The status LED will be lit in green.

You can go straight to the logbook display from the error list display using the **Logbook** hyperlink.

The logbook will also log the start and end of all messages (alarms and warnings).

It is similar to an archive; each entry is assigned an ordinal number. The entries which have been removed from the error list can be found here.

	Honeywell provides assistance with troubleshooting work. Contact data are provided at the start of this document.

7.3.9. System display (overview)

	**The system display, a node to additional displays, is opened by selecting this symbol.**

You can go to the following sub-displays using this node:

Time Service,
Users,
Logbook,
Audit trail,
I/O.

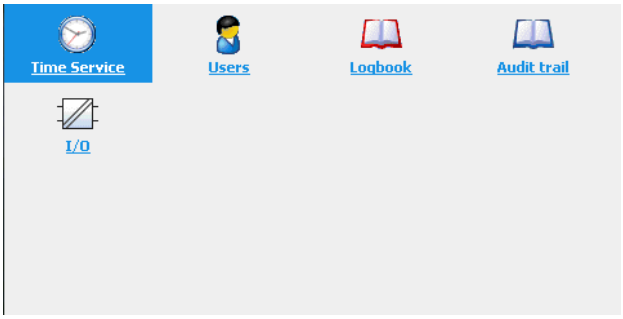


Figure 7.25: System display

7.3.10. System display Time Service (System time and date)

The system time (permanent device-internal calendar with date and time) is saved on a battery-buffered clock block. The time or system time is therefore available even after the device has been switched off and on again.

Changing the system time is the generic term for both ***synchronization*** and for ***adjusting the date and time***.

	**The time service to output and change the device's internal time has up to four standard displays.** **These displays will change depending on the parameterization and the user's login.**(see section 7.3.11 System display Users (Login/Logout / Password) and Configuration and analysis software enSuite)

The following figure shows the hierarchical structure and the navigation through the displays

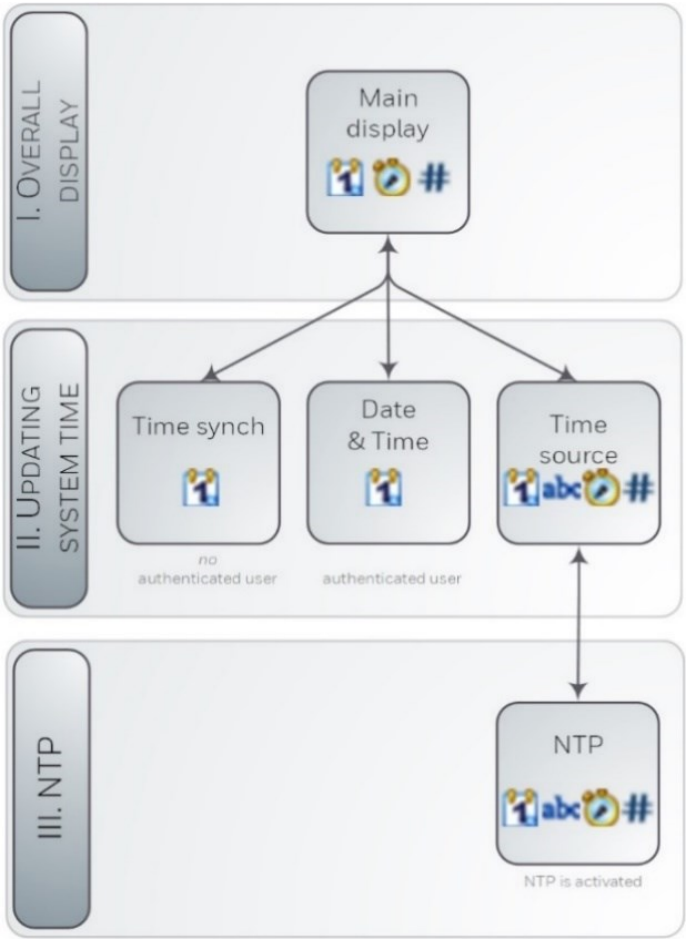


Figure 7.26: Time Service display overview

Depending on the user's authentication, the main display branches to the corresponding display to change the system time. The hyperlink **NTP overview** is only displayed when time polling via NTP is enabled in the enCore device.

The initial display of the Time Service is the **Main display**. Access: **System – Time Service**

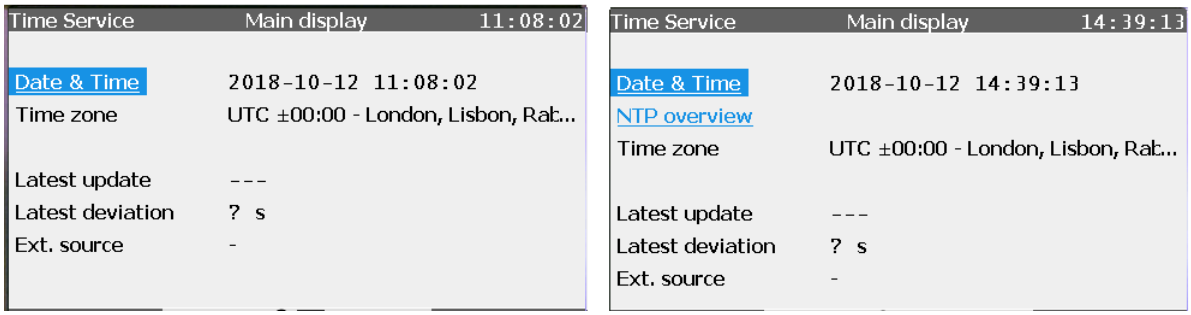


Figure 7.27: Time Service main display without/with NTP synchronization

The **Time Service main display** shows the date and time (also known as the **system time**). The abbreviation (DST) means daylight saving time and is only shown if the current time is in daylight saving time.

The Network Time Protocol (NTP) is a standard for clock synchronization in computer systems. The NTP overview link is only displayed if NTP synchronization has been enabled in this device. Information about activating this function ⇨ see chapter 8 Configuration and analysis software enSuite.

Furthermore, the following is also displayed:

Time zone: Geographical location
Latest update: Time stamp of the last time change.
Latest deviation: Deviation (in seconds) at the last time change
Ext. source: Number of the external source for the last time synchronization

For a user who is not logged in or a user who is logged in but is not entitled to change the device time,

"**Time Service – Time Synchronization**" will open as the second display after "Date & Time" has been activated.

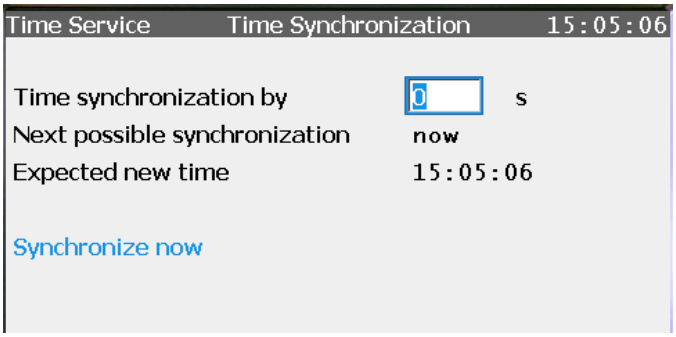


Figure 7.28: Time Service – Time Synchronization display

The display shows following information:

Time synchronization by: Enter the seconds in the box by which the system time is to be changed. The entry depends on the limits defined in the Configuration and analysis software enSuite.

Next possible synchronization: Next possible time for another synchronization. The calculation is made after a synchronization based on the synchronization interval parameter which is also set in enSuite.

Expected new time: The time service continuously calculates the new system time in this line.

Synchronize now: This action (if available) specifically saves the new time as the system time.

Step	Action: Time synchronization (can be performed by all users)
1.	Open the **Time Synchronization** display without logging in (System > Time Service > Date & Time).
2.	Enter the seconds (box after **Time synchronization by**) by which the system time is to be changed. Both positive and negative values may be entered. The box will only accept values within the parameterized synchronization window.
3.	Check the information after "**Next possible synchronization**". If the entry is **Now**, you can synchronize the system time (step 4); otherwise, you must wait until the next specified time.
4.	Click on the action "**Synchronize now**" and the expected new time will be saved as the system time.

For a **user who is logged in** and entitled to change the device time, after "**Date & Time**" has been activated, the display with the same name will open as the second display. The type and sequence of the display (this can be parameterized with the the Configuration and analysis software enSuite) is dependent on the language and the time stamp format, for instance. The following shows an example:

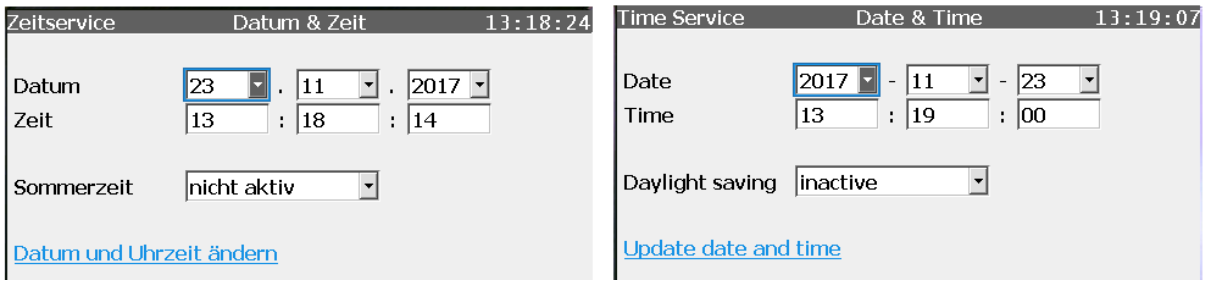


Figure 7.29: Time Service display "Date & Time" (various time stamp formats)

The system time can be adjusted in this display. You require the appropriate rights for this purpose and the security switch (SSW) must be in the setting specified in the parameter set. The display provides a selection for using daylight saving time.

Step	Action: Setting the time and date
1.	Log in and open the **Date & Time** (System > Time Service > Date & Time).
2.	Enter the current date and time using the drop-down lists and keypads.

Step	Action: Setting the time and date
3.	If applicable, click on the Daylight saving box. This is only possible if the appropriate setting has been made in enSuite. Then choose between the following: **Active** The device's system time is in daylight saving time. **Inactive** The device's system time is in standard time. Automatic switchover between daylight saving time and standard time is not provided for in the default parameter set. Information about setting the time using enSuite is provided in section 8.6.1Update date and time (system time action).
4.	When the entries have been made and are correct, select or click "**Update date and time**". A status message is displayed briefly at the bottom of the screen for confirmation and the new time setting is used. If the synchronization fails, this is indicated by red text.

The final optional display entitled **NTP overview** is only displayed if NTP synchronization has been enabled in the device (by using the Configuration and analysis software enSuite).

It will open after NTP overview has been selected in the main display.

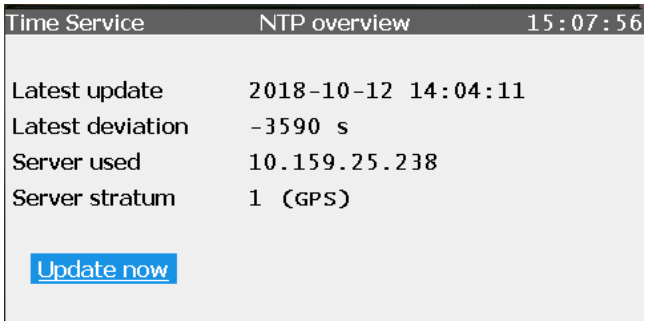


Figure 7.30: Time Service – NTP overview display (optional

This display provides the action **Update now** with NTP server synchronization. Select "**Update now**" to view the current time information values from the parameterized NTP servers, regardless of the specified query interval

In addition, the following entries are displayed:

Latest update: time stamp of the last time synchronization using NTP. If a synchronization has already been completed, the precise time of the synchronization can be read in the display (date, time and time zone).

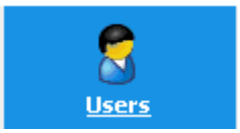
Latest deviation: The deviation (in seconds) at the last time synchronization using NTP shows by how many seconds the internal time deviated from the standard time at the last synchronization.

Server used: name or IP address of the NTP server used for the last time synchronization, for example, ptbtime1.ptb.de or de.pool.ntp.org or company servers as in the figure.

Server stratum: stratum value of the NTP server used for the last time synchronization (number of computers up to the time reference in the NTP hierarchy).

	Further details are available in the Docuthek (www.docuthek.com) under "enCore ZM1, BM1, MC1, FC1 – basic system with SFBs" and in the online help.

7.3.11. System display Users (Login/Logout / Password)

	**The User management only provides a main display. Users can log in and out using this display whose appearance changes accordingly.** **It can be accessed via Home >> System >> Users**

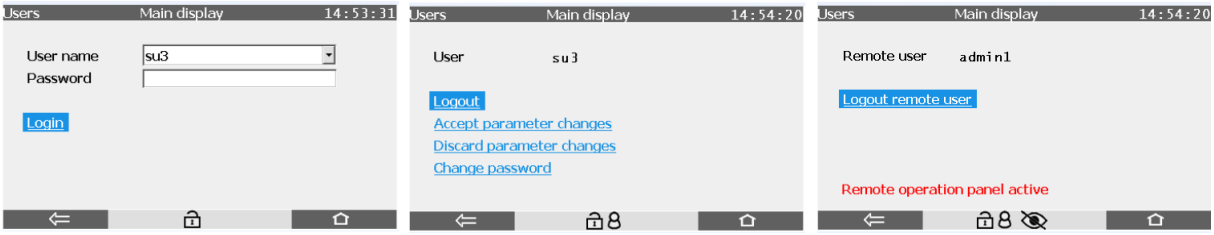


Figure 7.31: Users main display in different appearances

	**Remote operation panel active** This warning (see above picture on the right) is displayed whenever a user uses the remote operation panel. This warning is shown on the GasLab Q2 if there is a connection to enSuite and the remote operation panel is not used or the lock screene has been removed via enSuite user. See also 8.5 Remote operation panel functions of enSuite

The main display can show the action **Login** as in the figure above left. The users, created in the parameter set of the device (see section 8.3 User management and login) as well as the always existing main users and the administrator can be viewed and selected via the "**User name**" drop-down field. Only one user can be logged in at a time. If another user is already logged in locally, via enSuite or the remote operation panel there, no more logins are possible. The main display shows the **user name** (example center and right) of the user already logged on to the device. You can (by arrangement) disconnect the user from the device using the "**Logout**" or "**Logout remote user**" functions to enable your own login.

	In addition to the operation panel or the remote operation panel, it is also possible to login and logoff in enSuite. enSuite is also used to access the user administration. Besides the always existing main users, only the users created there can select their name on the main display. Details about the user administration, which exists for all enCore devices, can be found in the Docuthek (www.docuthek.com) under "enCore ZM1, BM1, MC1, FC1 - basic system with SFBs".

If no user is logged on to the device, the **User name** box shows the name of the last user. "**Login**" is possible if your user name appears on the list and you select it. See the following example figure.

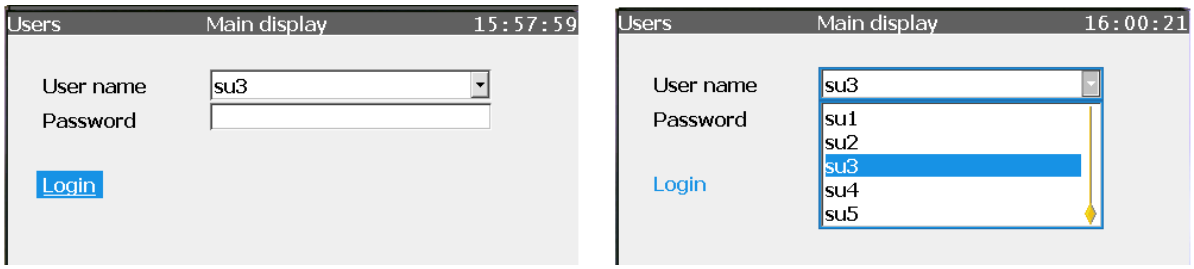


Figure 7.32: Users main display with the possibility to login

After selecting your user name, you then have to enter your "**Password**" if it has been set up. If no passwords have been set up, this box will remain empty.

	**Attention – data security!** Veillez à la sécurité des données! **The device is delivered without default passwords. Passwords should be assigned to all users by the administrator or super users at first. If no passwords have been set up, the login could be done with an empty "Password" box by everyone** **L'appareil est livré sans mot de passe par défaut. Les mots de passe doivent être attribués à tous les utilisateurs par l'administrateur ou les super-utilisateurs dans un premier temps. Si aucun mot de passe n'a été défini, la connexion peut se faire avec une case "Mot de passe" vide par tout le monde.**

You may then have to carry out the following steps:

Step	Action
1.	Select the "**Password**" entry box.
2.	Enter the password using the keypad which appears. Each character in the password is replaced with an * on the screen. When all characters have been entered, click on ✔.
3.	Navigate to the "Login" line and click on this action

You are now logged in and have the rights assigned to you until you log out. The display appearance is as shown in Figure 7.31 in the middle.

	**If you are logged in as an administrator, you will have all device rights. All the factory settings can be changed, even inadvertently. Take the appropriate care with your work.** **Si vous êtes connecté en tant qu'administrateur, vous disposez de l'ensemble des droits sur l'appareil. Tous les préréglages effectués en usine peuvent être modifiés, même accidentellement. Effectuez vos travaux en prenant les précautions adéquates!**

If no action is carried out, you will be logged out automatically after a preset/adjustable time. (Further information about this inactivity timeout can be found in section 8.2.2 Starting enSuite; the first steps).

After logging in, you can make changes to the parameters. You can then save or discard them. You can also change your own password or create a new one. The scope of access depends on the assigned rights of the user group under which you are logged on.

	Please do not forget that changes do not take effect until they have been confirmed.

You can carry out the listed tasks by following the steps below.

Step	"Accept parameter changes" action
1.	Do the required changes in the appropriate displays and return to **Users main display**.
2.	Navigate to the "**Accept parameter changes**" line and click on this action.
3.	The changes completed earlier on the device will be saved.
Step	**"Discard parameter changes" action**
1.	If changes in the appropriate displays are not for saving, return to **Users main display**.
2.	Navigate to the "**Discard parameter changes**" line and click on this action.
3.	The changes you previously made on the device will be discarded and not saved.

Step	"Changing (own) password" action
1.	Navigate to the "**Change password**" line (see Figure 7.3.1). Click on this link and the display will change to the one shown below
2.	Navigate to the entry box at the top and click on it. Enter the new password as if you were logging in. When creating the password refer to the information in section 2.8.2Password guidelines and role-based access control **(Attention – data security! If you do not enter a password, the current password will be deleted and login is possible without password)**
3.	Navigate to the second entry box and enter the password again.

Step	"Changing (own) password" action
4.	After completing the entries, click on Accept new password. After the new password has been checked, it will be valid immediately and the display will change to the logout screen. Please ensure that you remember your password. If you decide you do not wish to activate the new password, click on Discard new password. The entry will be discarded and the original password will still be valid. The display still changes to the logout screen.

	A status message is displayed briefly to notify you that the change has been made or, if applicable, the reason why the change has not been made. Red text indicates that the password has not been saved.

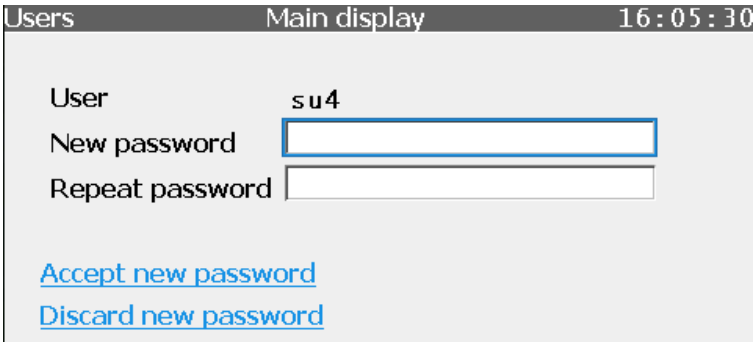


Figure 7.33: Users main display for changing the password

With the appropriate parameterization, you can additional / alternative protect GasLab Q2 against unauthorized access by operating whis closed SSW.

Step	"Logout" action (from the device/on the operation panel)
1.	**The Users main display** contains always an action to **log out** if a user is logged in. If you are not logged in yourself, you can agree with the user who is logged in to log them out. Please note that parameter changes by the user you log out will be discarded unless they have been saved.
2.	Select Logout or Logout remote user and confirm your selection.
3.	The display changes to the login screen. No users are currently logged in.

	When you have finished your work, you should log out to make the device available to other users, and prevent changes being made by others using your user data.

7.3.12. System display (Logbook)

The device has 2 logbooks: the "**Logbook**" and the "**Audit trail**" in which events are saved as a history during operation.

	**The logbook (Logbook error list, see the figure below) documents / saves events and protocol the device operation in this way. Whenever an event begins or ends, the change of status is recorded in the logbook. The logbook cannot be deleted and contains up to 1,000 data records. When the logbook is full, the next entry will overwrite the oldest data record.**

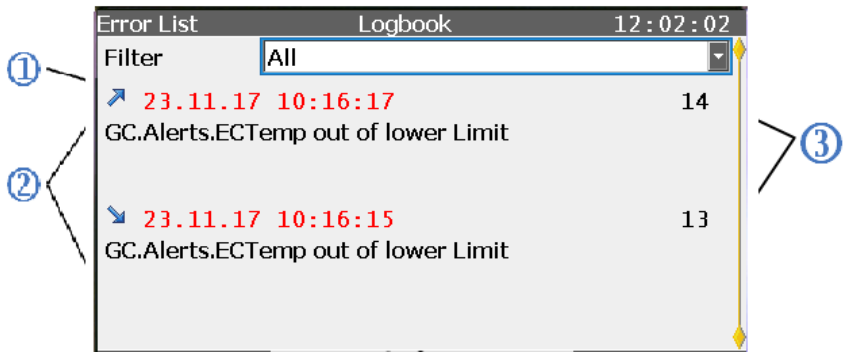


Figure 7.34: Error List – Logbook display

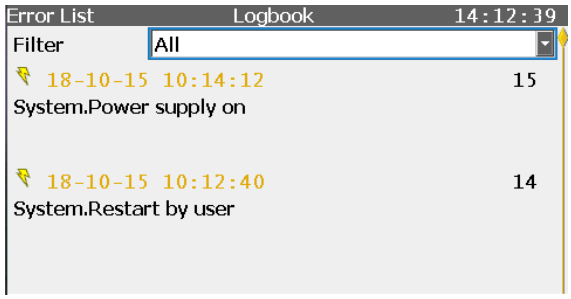
Item	Error Logbook details
①	**Filter selection** (as in the Error List main display)
②	**Section of the error display**: The small arrow before the date shows when the event began (tip downwards) or ended (tip upwards). The list is scrollable if the logbook contains more than 2 entries.
③	**Logbook entry's serial number**: Every event is displayed separately and numbered on the right-hand side.

See also the following table:

Identification	Meaning
↗	Event begins
↘	Event ends
<Black text>	Event of type Information
<Yellow text>	Event of type Warning
<Red text>	Event of type Alarm

Whenever changes occur or an event is included in or removed from the Error List main display, this information is recorded in the logbook.

	To analyze large archive sections, it is more practical to read the archives from the device using the Configuration and analysis software enSuite and save them to a PC. The data can then be viewed in a table and, possibly, in the form of a diagram.

Step	Action: Viewing the logbook error list on remote operation panel	
1.	Navigate via  to  and click on the symbol 	
2.		The entries are displayed in the same way as in the error list in the main display, see section 7.3.8 Error List – Main display (accepting / quit error messages).

The archive takes the form of a ring memory with 1000 data records. When the memory is full, the newest data record overwrites the oldest one. The archive content remains available in the event of a power failure or software update.

The header contains a time stamp with the precise calendar time at which the entry was generated and a serial (sequence) number. The main body contains the text with information as to why the entry was created and starts with the name of the software part which caused the entry.

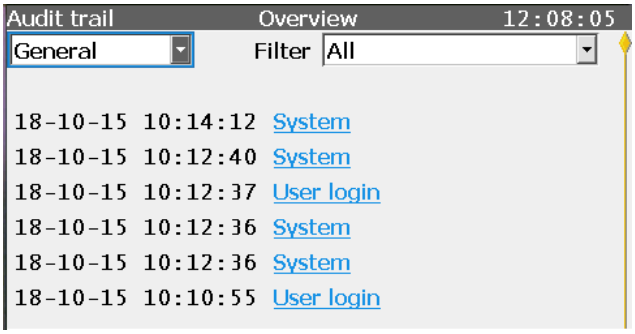
7.3.13. System display (Audit trail)

	**The audit trail is another protocol archive for documentation.** **It is part of the basic system and therefore available in all enCore device types.** **The contents are displayed in the current device language.** **As a result of the different types of archive data, a distinction is made between "General" and "Fiscal** **(Entries in the fiscal part of audit trail are only archived when the SSW is closed.)**

It is possible to choose between "**General**" and "**Fiscal**" in the left drop-down list.

The events recorded in the general audit trail can be displayed more clearly using a filter from the right-hand drop-down list.

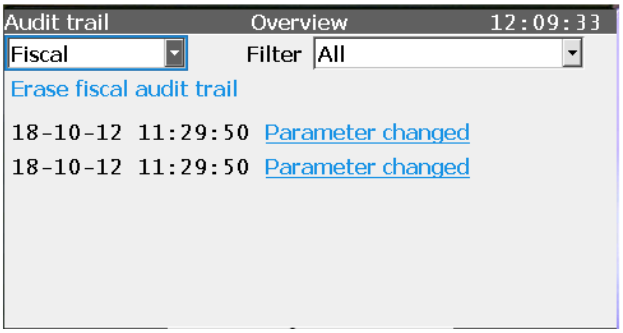
Figure 7.35:
General audit trail display



You can choose between "**All**" (filter not used), "**System**", "**Parameter change**" and "**User login**".

In the fiscal audit trail, parameters can be recorded which can also be changed when the security switch (SSW) is closed. Only if this switch is closed, will the actions be recorded; in all other cases, the archive will be empty. This archive is primarily relevant for billing purposes.

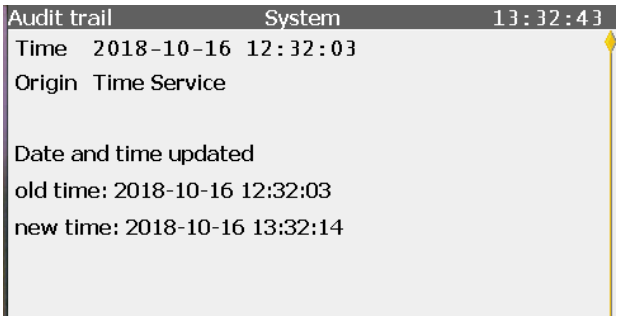
Figure 7.36:
Fiscal audit trail display



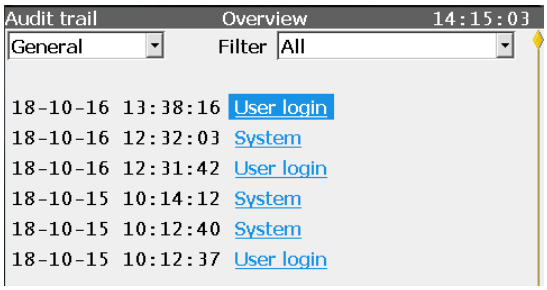
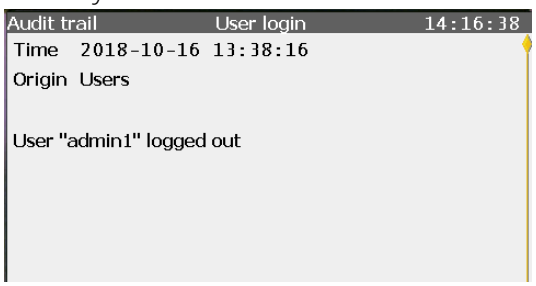
Activating the hyperlink next to the entry enables the user to view details of the entry in a new display. See example.

Details of the change include the date and time, old/new value or the user who made the change.

Figure 7.37:
Example of audit trail details



	The type and scope of the displayed data depends on the situation and the settings in enSuite. For further information ⇨ see enSuite online help. All the data in the audit trail is also saved in the logbook, which means that the entire recorded history is visible in it. The user cannot delete the entries.

Step	Action: Viewing the “General” audit trail	
1.	Navigate via  to  and click on the symbol	
2.		The overview (shown left hand side) will be displayed. You can scroll through the list. Two selection lists enable you to restrict the overview or choose between “General” and “Fiscal”.
3.	Click on the hyperlink after the entry whose details you wish to view. 	The detailed view for the entry will appear. The displayed details depend on the type of entry and the settings in enSuite and are displayed in the selected language (see enSuite online help > Basic system > System > Audit trail).

The audit trail has space for 1000 entries. In the general section, the oldest entry will be overwritten after 1000 entries have been created. If this space is occupied in the fiscal section (entries are only possible if the SSW is closed), no changes can made to the legally relevant parameters without opening the security switch (SSW). If the SSW is opened, the entries can be deleted using the displayed action to create space for new changes.

	A completely new set of parameters (if the SSW is open) is also entered in the audit trail. Each software part is listed with an appropriate note.

7.3.14. System display I/O (basic network settings / Inputs /Outputs)

	**The I/O – Overview display lists all the device parts available on inputs or outputs and enables the user to go to other sub-displays using hyperlinks.**

The hyperlinks and test mode function appear depending on the parameter set.

A login is required to use the functions. (Section 7.3.11 System display Users (Login/Logout / Password)).

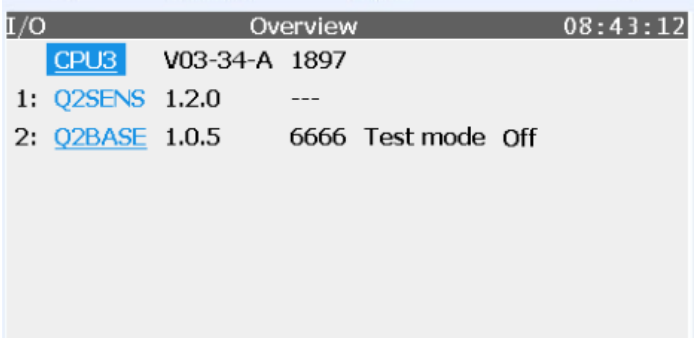


Figure 7.38: I/O – Overview display

Using test mode, you can apply test values to individual output channels, which are used instead of the original values. Hyperlink CPU3 is always available and enables the user to go to the Ethernet I/F display with the basic network settings. See figure.

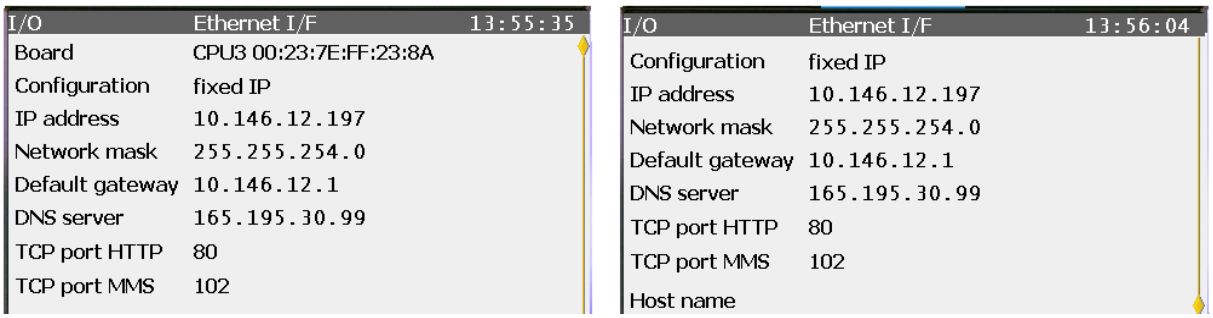


Figure 7.39: I/O – Ethernet I/F display

As the example above shows, this display lists the internal board (CPU3) with its MAC address (00:23:7E:FE:04:17). If a user with the appropriate authorization is logged in, the configuration (DHCP mode), IP address, network mask, default gateway, DNS server, TCP ports and host name can be changed. The number of entries which can be changed is also affected by the selected/pre-set settings.

	If the user is not logged in or does not have the appropriate authorization, data can only be read in this display.

If a user is logged in with the appropriate rights, the basic network settings can be changed in the **Ethernet I/F** (Ethernet interface) display, see the figure below.

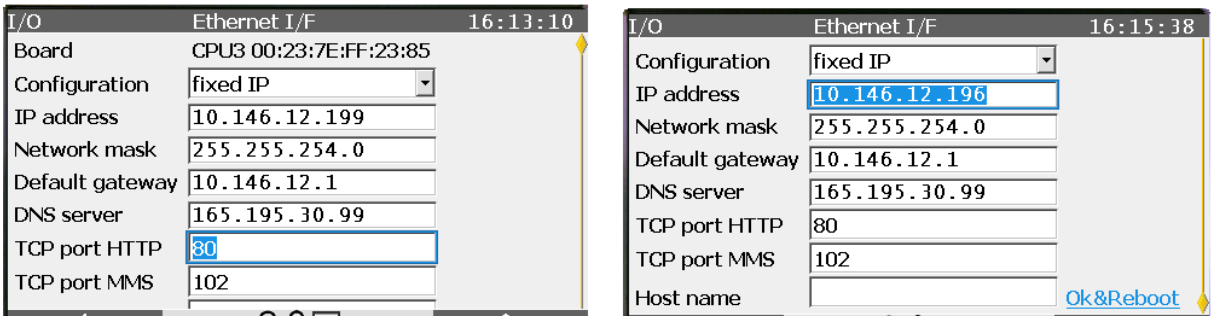
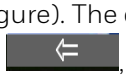


Figure 7.40: I/O displays with options to make an entry and restart

	The setting of the IP address and the basic network settings is not only via the operationn panel but also via enSuite. For more information, see section 8.4.5 Changing the IP address basic network and I/O settings and the enSuite online help, which also explains the various settings in more details

	**Do not change the configuration settings (DHCP mode).** **(Only relevant for service personnel.)** **Ne modifiez pas les paramètres de configuration (mode DHCP), car cette fonction ne concerne que le service!**

Step	Action: Viewing/Editing basic network settings
1.	**Log in** (⇨ see section 7.3.11 System display Users (Login/Logout / Password)) and navigate to "**System**" **I/O Overview** display and click on **CPU3**.
2.	Make a note of the settings and select the entry you wish to edit. If necessary, ask your system administrator which parameters must be edited. (When an entry is selected, the keypad will be displayed.)
3.	Use the keyboard to enter the values specified (by the system administrator) input box by input box.
4.	When you have made all the changes, you must restart the device using the displayed action **[Ok&Reboot]** (see figure). The edited data will then be used after the restart. If you exit the display using  , your changes will not be saved.

7.3.15. Display Q2 sensor values

	**The list of sensor values can be opened by clicking on this symbol.** **Generally, this display is only used for service purposes and for locating errors.**

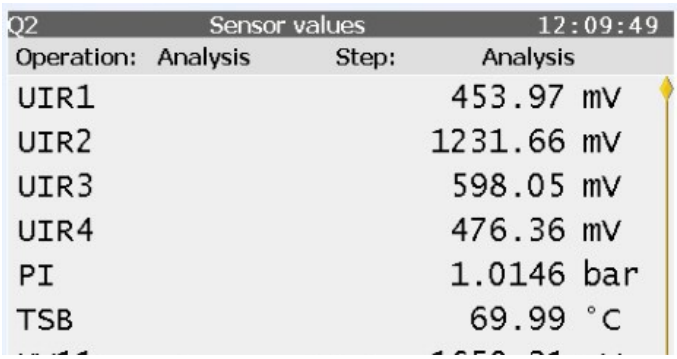


Figure 7.41:
Q2 sensor values display

A complete list of all sensor values is displayed in the following table:

Sensor signal	Use/Meaning	Sensor value range
UIR 1	For internal calculations only	Several 100 mV
UIR 2	For internal calculations only	
UIR 3	For internal calculations only	
UIR 4	For internal calculations only	
PI	Pressure (ambient + measuring unit [approx. 160 mbar])	Ambient-dependent
TSB	Temperature of sensor block	approx. 70°C ≙ 158°F ≙ 343K
UW11	For internal calculations only	Several 100 mV
UW12	For internal calculations only	
UW21	For internal calculations only	
UW22	For internal calculations only	
PU	Ambient pressure (internal monitoring)	Ambient-dependent
TP	Circuit board pressure (internal monitoring)	Ambient-dependent
PW1	For internal calculations only	Several mW
PW2	For internal calculations only	
TM1	For internal calculations only	Around 100°C
TM2	For internal calculations only	
TB1	For internal calculations only	Around 68°C
TB2	For internal calculations only	
TH1	Housing temperature (internal monitoring)	Ambient-dependent

7.3.16. Display Q2 control (calibration/verification/touch)

	**Clicking on this symbol leads to the following display which branches to functions “Calibration”, “Verification” and “Disable touch”.**

Calibration enables you to branch into other calibration sub-displays.

Verification enables you to start the verification and to go to other branches.

Disable touch interrupts the device operation for a time displayed as it runs down behind the link. This prevents, for example, errors with a limited time during inspections or service work.

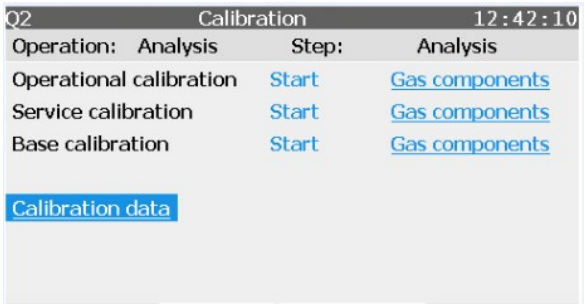


Figure 7.42: Q2 – Control display with sub-displays

	“Operational calibration” ⇨ see section 7.4.2 Operating mode: Operational calibration (manual) “Service calibration” ⇨ see section 10.2 Completing a service calibration Branches and functions of the verification process ⇨ see section 7.4.3 Operating mode: Verification (special mode) Displays and functions for “Base calibration” ⇨ not described (The base calibration is only carried out by Honeywell at the factory before delivery)

The **Calibration data display** lists internal instrument values and deviations from previous settings caused by the operating calibration

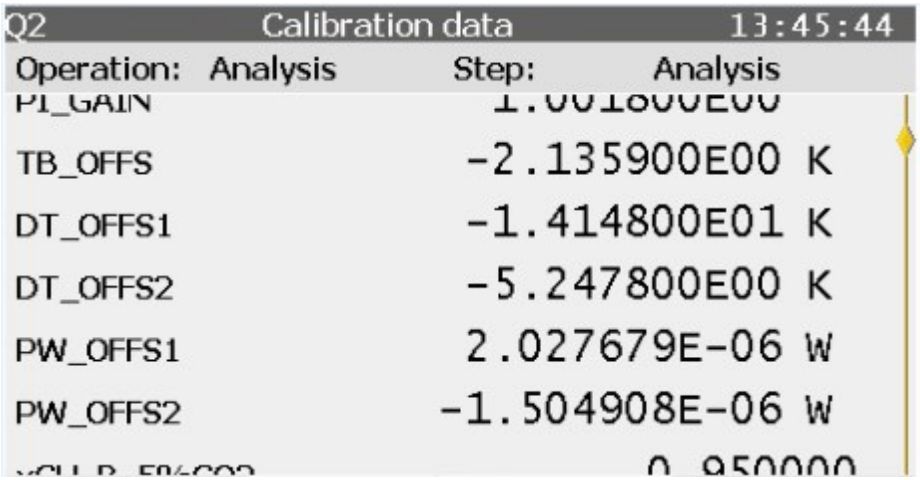


Figure 7.43: Q2 – Calibration data (Sub-display of Calibartion display)

The display of the calibration values is not required in everyday operation. It is for service purposes only and may help troubleshooting work.

In the **Gas components displays**
you can view the gas composition of all calibration gases used. The following figure shows an example of the operational calibration gas. If you have the appropriate rights, you can also make changes here, e.g. to the composition of the company calibration gas.

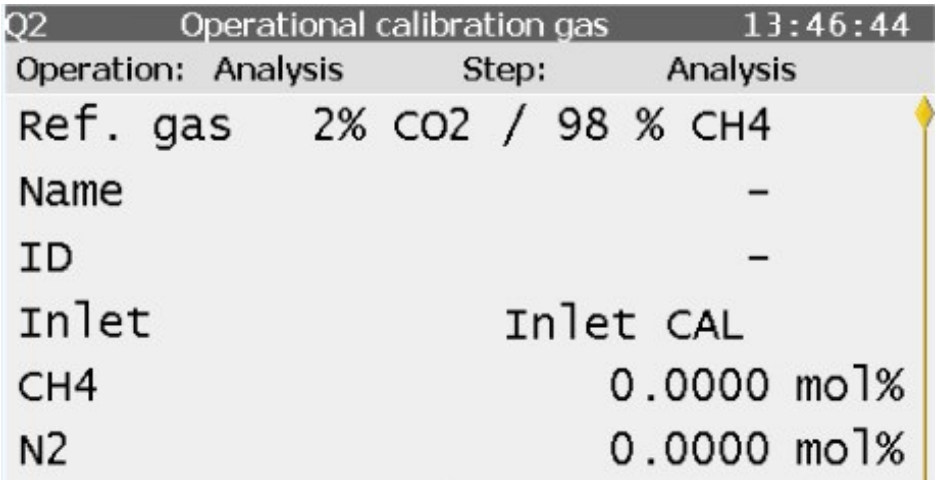


Figure 7.44: Q2– Gas components (Sub-display of Calibartion display)

The displays for the gas components are only required when the gases are changed and are explained in more detail in section 7.4.2 Operating mode: Operational calibration (manual).

7.3.17. Q2 main display (calculation standard)

	**This symbol takes you to the Q2 main display (display when the devices started set at the factory). Alternatively, you can use the button (home display bottom right).**

* The button will take you to the parameterized basic display, in delivery condition, this is the main display.

	If other displays are not used within a previously defined period (see section 8.4.8 Define basic display and edit display behavior), Q2 will automatically return to this display. New measurement results are always displayed here in a table.

The following figure shows the appearance of the display at the end of the start-up process with an extra line for the **temperature of sensor block (TSB)** and then for the start delay (seconds) during which the boxes for the measurement results will be filled with question marks.

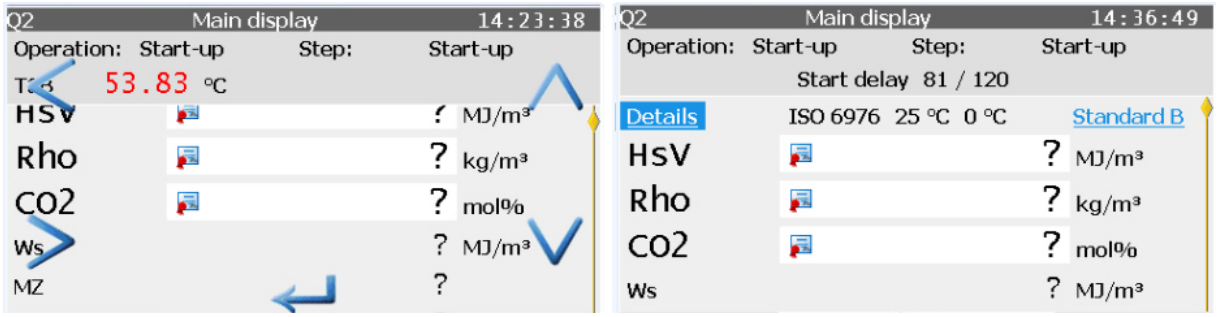


Figure 7.45: Q2 main display (during start-up)

After the start-up process has been finished, the measurement results boxes show values in black. If red entries are shown, an error has occurred. (Red entries only with the appropriate parameter settings ⇨ see section 8.4 Changing existing device settings (Parameterization))

	The appearance of the display depends on the parameterization. In addition to “Details”, the line above the results shows the current standard and the selected settings. Generally, this will be standard A. If parameterized (examples on the following pages) a link will appear to the right of it for the second available standard (standard B). In this case, you can switch between the standards using the superimposition keys.

On the right is an example of the appearance of the main display with the default parameter set.
The calculation standard (standard A) with the standard states is shown above the results in the center. A default calculation standard and the units are set.

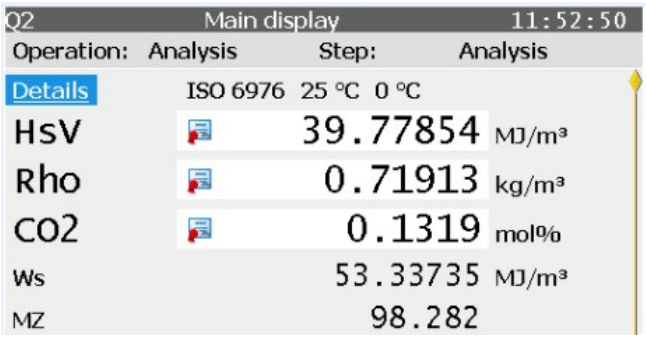


Figure 7.46:
Q2 main display (default parameter set)

The operating mode is specified under the name of the display next to "**Operation**". The user can adopt for operating modes. The current step being undertaken by the device is shown next to "**Step**". Standard operation comprises six steps. The following combinations are possible:

Operation	Step	Meaning
Start/Start-up (7)	Start/Start-up (22)	Device in starting phase (start-up)
Analysis (1)	Flush (19)	Clean the gas routes with measuring gas
	Analysis (18)	Normal measuring mode, recording measurements
Operational calibration (2)	Start (0)	Wait for confirmations before starting an action
	Flush (19)	Clean the gas routes with measuring gas
	Gas 1 (1)	Recording measurements, calibration gas
	End (14)	Wait for confirmations before ending or cancelling an action
Verification (5)	Start (15)	Wait for confirmations before starting an action
	Flush (19)	Clean the gas routes with measuring gas
	Verification (16)	Recording measurements/Verification
	End (17)	Wait for confirmations before ending or cancelling an action

Operations and steps are displayed as export values, for example, in a Modbus list, indicated by the figures in brackets (Modbus numbers) since the clear text is not output here.

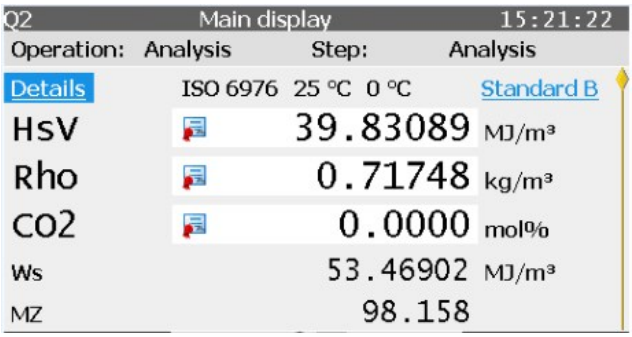
Further details of the executed "**operations**" and "**steps**", which may vary slightly depending on the software version, will be provided later in this document.

The states shown in the following can also be recorded outside normal operation using the Modbus numbers.

These only occur during the base calibration at the factory, during Honeywell service work or in the event of errors and are therefore not described in further detail here.

Operation	Step	Meaning
Idle (0)	Idle (20)	Device in idle state
Service calibration (3)	Confirm 2 (2)	Wait for confirmations by user
	Gas 2 (3)	Recording measurements, calibration gas 2
	Confirm 3 (4)	Wait for confirmations by user
	Gas 3 (5)	Recording measurements, calibration gas 3
	Confirm 4 (6)	Wait for confirmations by user
	Gas 4 (7)	Recording measurements, calibration gas 4
	Confirm 5 (8)	Wait for confirmations by user
	Gas 5 (9)	Recording measurements, calibration gas 5
	Confirm 6 (10)	Wait for confirmations by user
	Gas 6 (11)	Recording measurements, calibration gas 6
Base calibration (4)	Confirm 7 (12)	Wait for confirmations by user
	Gas 7 (13)	Recording measurements, calibration gas 7
	Confirm 8 (24)	Wait for confirmations by user
	Gas 8 (25)	Recording measurements, calibration gas 8
	Confirm 9 (26)	Wait for confirmations by user
	Gas 9 (27)	Recording measurements, calibration gas 9
	SAVE_CAL_DATA (28)	Save the calibration data
Error (6)	Error (21)	The device is not functioning correctly, see error list
	Step error/Failure (23)	

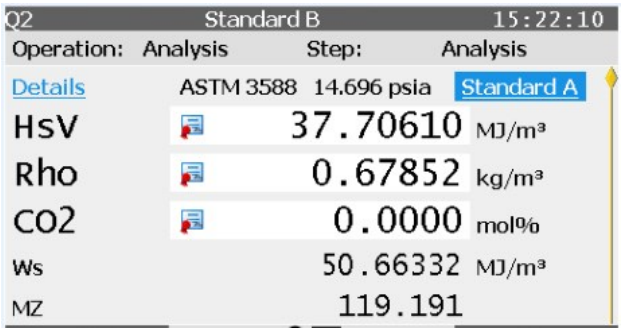
If parameterized, it is possible to display another standard and switch between the standards, therefore the appearance of the appropriate line varies, see following examples with 2 calculation standards.



In the center is the current standard with the standard states. In this example, it is standard A **ISO 6976 25°C 0°C.**

A link to the alternatively selectable standard appears to the right, in the example Standard B.

Activate the link using the superimposition keys, this will change the display as follows:



Text **Main display** changes to **Standard B**, and indicates that the figure to the side is displaying results using standard B.

In the middle of the second line the standard B with the standard states is now named in the example, it is **ASTM 3588 14.696 psia**.

To the right the link Standard A is shown, which enables you to switch back again.

Figure 7.47: Examples for the appearance of the main display with 2 calculation standards

	For information about changing or extending this setting, ⇨ see section 8.4 Changing existing device settings (Parameterization)

These control and information lines are followed by the measurement and calculation values (results).

	The values displayed are only valid if the system is in analysis mode and has not suffered an error. This means that no sensor alarm is active, and both "**Operation**" and "**Step**" read "**Analysis**". If the value is monitored, this is also shown clearly by a display in black text. The rule of thumb is: There is no alarm active if the status LED is permanently on.

The following is shown in the Q2 main display:

Displayed value (abbreviation)	Meaning (of the value abbreviation)/Physical quantity	Displayed result...
HsV (in large letters)	Superior calorific value; based on volume	... in the preset unit
Rho (in large letters)	Density at base conditions	
CO2 (in large letters)	Carbon dioxide	
Ws	Superior Wobbe index	
MN	Methane number	...Dimensionless

Calculated gas analysis with 10 components and the total of the C_2+ components		
Displayed value (abbreviation)	Meaning (of the value abbreviation)/Physical quantity	Displayed result...
CH_4	Methane	... in mol%
N_2	Nitrogen	
C_2H_6	Ethane	
C_3H_8	Propane	
nC_4H_{10}	n-butane	
iC_4H_{10}	Isobutane	
nC_5H_{12}	n-pentane	
iC_5H_{12}	Isopentane	
C_6H_{14}	Hexane	
C_7H_{16}	Total heptane	
C_8H_{18}	Total octane	
CH	Total of all hydrocarbons	
C_2+	∑ ethane + all higher hydrocarbons	
C6+	Hexane Σ + all higher hydrocarbons	

The first element that can be selected in the control and information lines is the **“Details” button**. It allows intermediate results to be viewed in another display.

Once again, the selection and activation is done using the superimposition keys.

The Q2 standard details display shows intermediate results for the selected calculation standard. The following examples show the appearance of the display after branching with details:

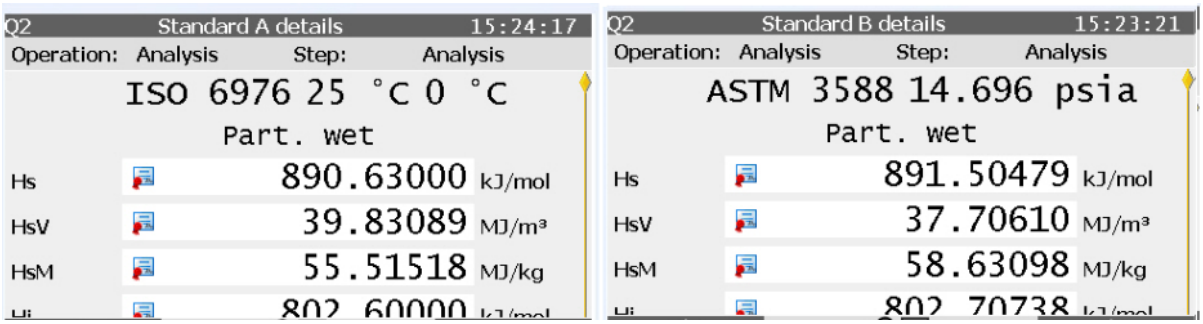


Figure 7.48: Q2 – Standard A details/Q2 – Standard B details

The line with the details of “**Operation**” and “**Step**” is also displayed here. The next line contains the calculation standard in double size. Values are calculated for partly saturated, dry and humid gas for the set reference status.

	The superior/inferior calorific value changes if the gas contains water vapor. Depending on the quantity, a distinction is made between dry and partially saturated or saturated (humid). Values for the partly saturated or humid gas are lower than for dry gas since water vapor and combustion gas components divide the volume. Specified water vapor saturation values in the superior/inferior calorific value results for three assumed states (dry/humid/partly saturated) are used in the calculation method. The actual water vapor content must be calculated, for example, from humidity or dew point measurements.

The following values can be found in the sub-display Details of the main display:

Displayed value (abbreviation)	Meaning (of the value abbreviation)/Physical quantity
Hs	Superior calorific value; molar
HsV	Superior calorific value; based on volume
HsM	Superior calorific value; based on mass
Hi	Inferior calorific value; molar
HiV	Inferior calorific value; based on volume
HiM	Inferior calorific value; based on mass
Zb	Compressibility factor at basis conditions
Ws	Superior Wobbe index
Wi	Inferior Wobbe index
d	Relative density
Rh	Density at base conditions
M	Molar mass (of the mixture)
MN	Methane number

	To see all the calculations, you must once again use the superimposition keys as the display is too long to be shown in full. You can only change to the details of another standard using the main display.

7.3.18. Display User archives

	**This symbol takes you to the main display of the User Archives AFB, which can be used by multiple devices, in other words, also by the GasLab Q2.**

The following figures and explanations are only examples, further information and the actual set-up takes place using the Configuration and analysis software enSuite.

The main display contains two drop-down list boxes. Using these, you can select

the **archive group** and then select the **archive channel**.

All the parameterized user archives in the enCore device are available.

After making your selection, you can go to a detailed display "**Values**" using the **Show values** link.

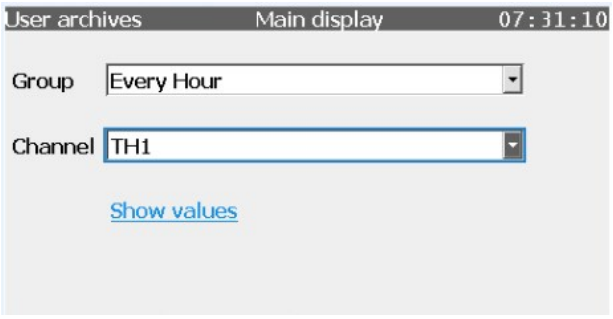


Figure 7.49: User archives main display

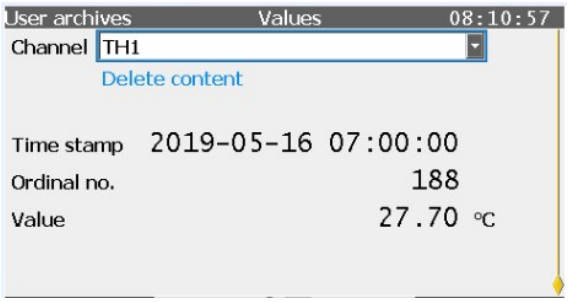


Figure 7.50: Values sub-display

The following functions and information are available in the displays:

Channel (switch to other group channels)

Delete content (not possible)

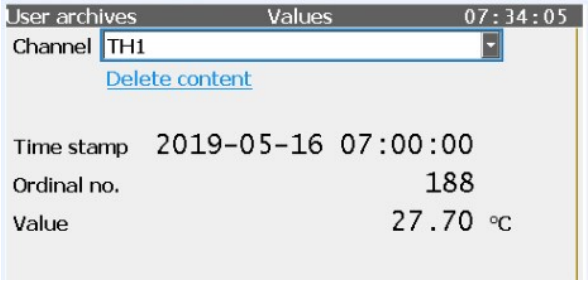
Time stamp (date of archive entry)

Ordinal no. (automatic identification number)

Value (archived measurement or calculation result)

It is also possible to delete the content of the archive. A login with the appropriate rights is required for this.

The archive can be cleared if the **Delete content** link is underlined, see the two examples



	Documents for the enCore flow computer (see www.docuthek.com) also contain information about this general data management.

7.3.19. Display Modbus

Modbus	**This symbol takes you to the main display of the Modbus AFB which can be used by multiple devices, in other words, also by the GasLab Q2.**

The following figures and explanations are only examples, further information and the actual set-up takes place using the Configuration and analysis software enSuite.

The **main display** provides an overview of all the parameterized Modbus areas of the enCore device in the first line. If there are no different areas parameterized (as in this example), the list will be empty. All the registers (for the selected area) will be listed in ascending order. As an option, you can open a detailed display for any register using the number displayed as a link (first column).

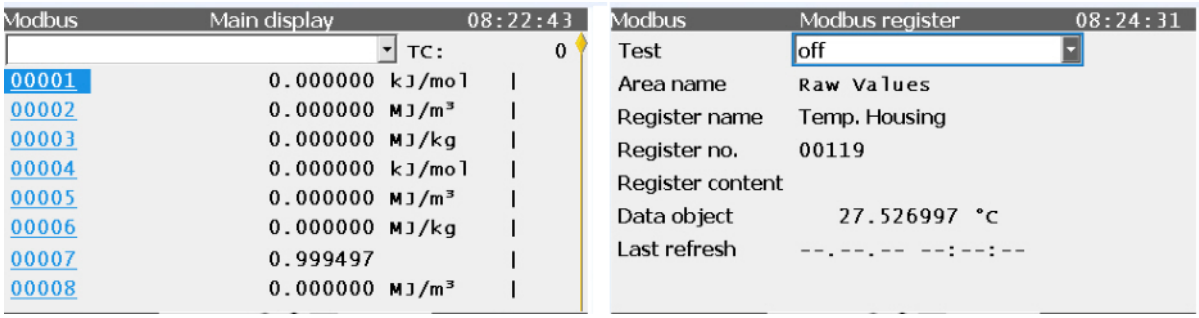


Figure 7.51: Example of Modbus displays

The second column on the main display shows the register content. The telegram counter **TC** at the top right of the screen counts the number of telegrams transferred. A symbol – **|** (vertical line) in the example – indicates for each import or export tab that the data in this register have been transferred successfully. Using the symbols **–** (dash), **** (backslash), **|** (vertical line) and **/** (slash), a sort of rotary hub is simulated which changes by one step each time when the individual register has been transferred successfully.

The following information is provided in the detailed **Modbus register** display:

Test on/off: Test function of the selected export register enabled/disabled
Area name: Name of the register section (parameter name)
Register name: Name of the register (parameter name)
Register number: Register number of the import or export register
Register content: Transferred value (hexadecimal)
Data object: Transferred value, formatted with unit
Last refresh: Date and time

	The required rights and/or a login are required to view or run all the functions. The documents for the enCore flow computer (see www.docuthek.com) contain additional information.

7.4. Operation and operating modes of GasLab Q2

The aim of this section is to explain more details of operation, operating modes and device functions. First of all, the observation of the device functions and normal operation are presented, which requires no or little action from the operating personnel. This is followed by operating instructions for more complex operating modes and functions, for example, calibration.

7.4.1. Operating mode: Analysis (automatic normal operation)

After connecting the power supply and reaching operating temperature, the measurement will take place every second in an endless loop in the continuous flow. The gas flow can be identified on the float flow meter. The **Q2 main display** will be visible on the device and on the remote operation panel. "**Analysis**" will be output as the operation and step on the display. Values will be displayed in black text. The two LEDs will be permanently lit.

Apart from intervention by the operator, the analysis will only normally be interrupted by the automatic operational calibration.

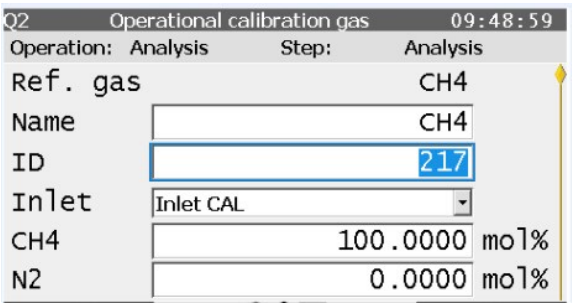
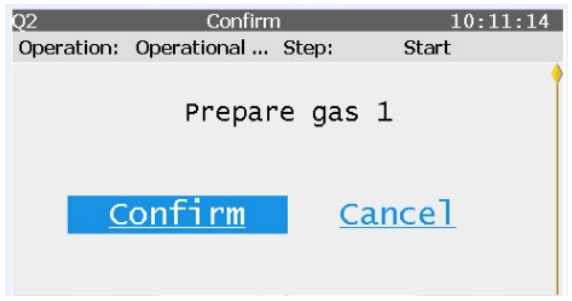
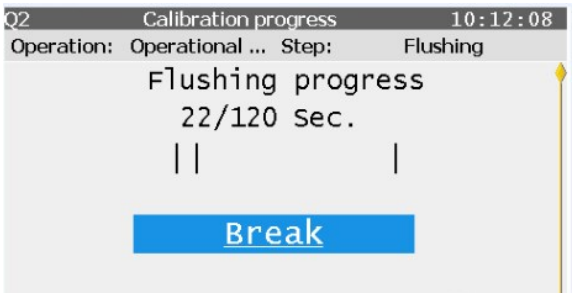
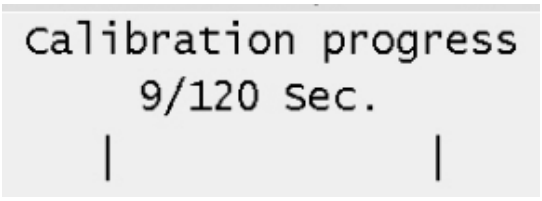
	GasLab Q2 must perform an operational calibration at least once per week. This normally runs fully automatically ⇨ see section 8.4.9 Setting or changing automatic measurements

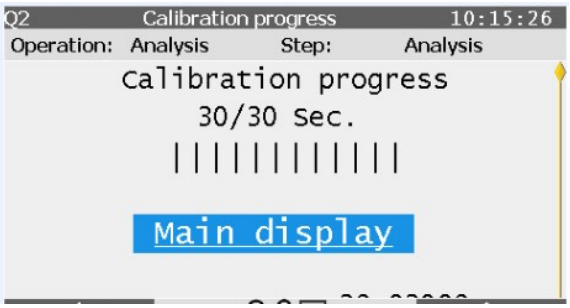
7.4.2. Operating mode: Operational calibration (manual)

In addition to the automatic operational calibration ⇨ 8.4.9 Setting or changing automatic measurements an operational calibration can also be performed manually. This only makes sense and is only possible as long as the sensors are in the measuring range.

If the device is in automatic normal mode, **log in as described in section 7.3.11 System display Users (Login/Logout / Password)** and complete the following steps:

Step	Action: Manual operational calibration
1.	Go to: Home  -> Q2 control ->  and select 
The following step is only required if the parameter set is changed or for a new calibration gas. If there are any discrepancies, please correct them ⇨**See also 8.4.9 Setting or changing automatic measurements**	

Step	Action: Manual operational calibration	
2.		Click on "**Gas components**" in the "**Operational calibration**" line. Check or correct the calibration gas mixture using the manufacturer's analysis certificate. **Entries and amendments (⇨ see 7.2.3 Entries and changes using the operation panel).** Figure 7.52: Operational calibration gas composition
3.	Click on "**Start**" in the "Operational calibration" line.	
Note: If an error occurs during the following steps, for example the pressure is inadequate, the display will jump straight to point 8. The message "**Calibration step failed**" will be displayed. Carry out step 8. Rectify the error and repeat the process from step 4.		
4.		If you are sure that the operational calibration gas (gas 1) is properly connected, click on "**Confirm**". Figure 7.53: Confirm operational calibration gas 1
5.		The process will now run automatically, the warning "**Operational calibration**" will be active during this time. First of all, the system is flushed with the calibration gas mixture. This will be displayed throughout the duration of the process. Figure 7.54: Calibration progress for flushing with calibration gas
6.		The operational calibration gas will then be measured. The duration of this process will also be displayed. Figure 7.55: Q2 calibration progress for gas 1

Step	Action: Manual operational calibration	
7.	If you want to cancel the process prematurely, you can end the calibration after point 4 by selecting "**Cancel**". The measurement device will then interrupt the calibration process. The system will be flushed with process gas and the normal operating state "**Analysis**" will be performed again. This is shown on the status line. You will be notified of the cancellation again by the "**Confirm**" button, clicking on which will take you straight to step 8.	
8.		After the display time has elapsed, the calibration will be finished and **analysis mode with measurements will be continued automatically**. Click on the displayed "**Main display**" button to view current analysis values from normal operation again. Figure 7.56: Manual calibration ended

	The last valid gas property values are held throughout the calibration time using measurement outputs. The parameters from the last successful calibration remain in use until a new successful calibration has taken place. Errors will be displayed on the device and documented in the "Error List". If necessary, contact Honeywell to arrange the appropriate action, for example a base calibration.

7.4.3. Operating mode: Verification (special mode)

This operating mode can be used for device control. Manual -- similar to the operational calibration in the previous section -- or automatic execution are possible, see 8.4.9 Setting or changing automatic measurements. A test gas of known composition is analysed for this purpose and the result is compared with the data of the manufacturer's analysis certificate of this gas.

	As a rule, the process gas input for this operating mode must be connected to the test gas in the gas line (calibration gas input also possible). During this special mode, the last gas quality values of the analysis mode are output via measured value outputs. The analysis data of the gas must be stored exactly, a deviation will result in invalid values.

The comparison can be carried out on the actual displays. Use the superimposition keys to navigate to the Verification display and select "**Deltas**" in the topmost line. The differences between the measurement results and the data saved on the manufacturer's analysis certificate are visible in this display (only if a measurement has been completed, otherwise "**?**" will be displayed).

The data for the test gas can be viewed by selecting "**References**" on the Verification display. You will also see the HsV and Rho values calculated from the gas composition and the displayed standard. If you are logged in and have the appropriate rights, you can also enter and edit the manufacturer's analysis certificate.

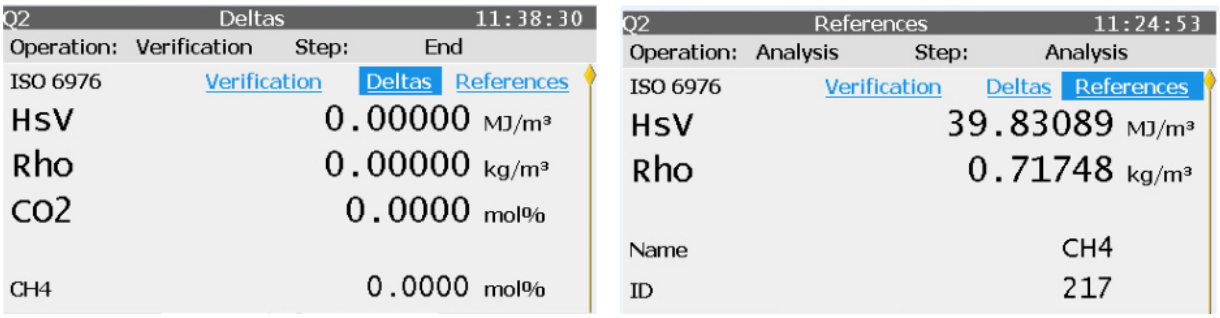
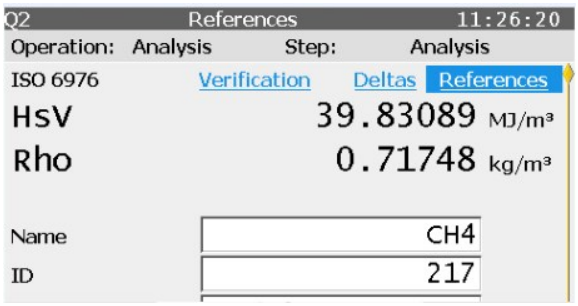


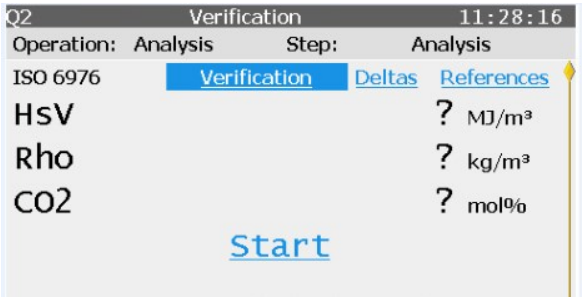
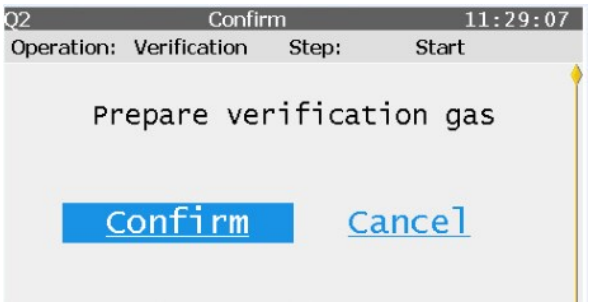
Figure 7.57: Q2 deltas and references displays

The calculated results can also be saved in an archive, for example "Test gas". However, this archive must first be created in enSuite.⇨ 8.4 Changing existing device settings (Parameterization)

If the device is in normal analysis mode, **log in to complete the task manually as described in section 7.3.11 System display Users (Login/Logout / Password).**

	The following can only be completed if the conditions defined in the Configuration and analysis software enSuite for the security switch (SSW) are satisfied. If you log out during the task, you will no longer be able to access the verification function using the operation panel. The last confirmed step will still be performed. Log in again to continue.

Step	Action: Manual verification	
1.	Click on: Home -> Q2 control -> Verification	
The following step is only required if the parameter set is changed or for a new test gas.		
2.	Activate "**References**" using the superimposition keys. Check whether the test gas mixture entered corresponds to the one used, if not, adjust it. ⇨ see section 7.2.3 Entries and changes using the operation panel) Figure 7.58: References with entry option	

Step	Action: Manual verification	
3.	On the display shown to the side, activate "**Start**" using the superimposition keys (after re-activating "**Verification**" if step 2 has been completed) Figure 7.59: Q2 – Verification display	
4.	The analysis (current measurement) will no longer be updated or will be stopped. The device waits for a confirmation entry. Figure 7.60: Q2 – Confirm (test gas) display	
5.	Change the gas at the parameterized input **(process gas (PG) or calibration gas input (CAL),** Parameterization see section 8.4.9 Setting or changing automatic measurements Connect the cylinder with the test gas to the inlet via a cylinder pressure reducer. Open the test gas cylinder and set the pressure between 0.15 MPag ≙ 1.5 barg and 0.3 MPag ≙ 3 barg. **Obey all the safety information for working on gas connections.** ⇨ 2 Safety and warning information ⇨ 10.3 Connecting and replacing gas cylinders	
6.	After you have connected the gas, accept the prompt from step 4 using "**Confirm**" (or cancel the process using "**Cancel**").	
7.	After confirmation, the device will be flushed with the test gas and then the measurement will be started. See figure. As the display is too long to show all the information at once, you can scroll using the cursor keys. The information for the last or current measurement is shown on the display in the bottom section below "**Start**" or "**Stop**".	 Figure 7.61: Display for "Verification in progress"

<table>
<tr><th>Step</th><th colspan="2">Action: Manual verification</th></tr>
<tr><td>8.</td><td>The measurement will now run for the time previously set in enSuite (see section 8).

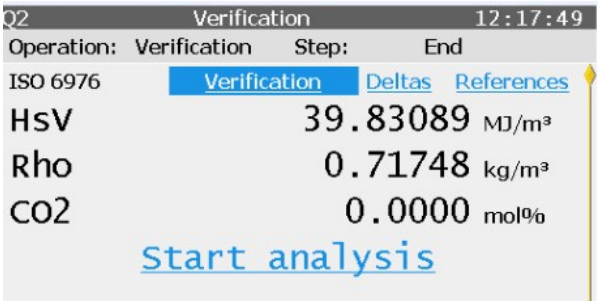
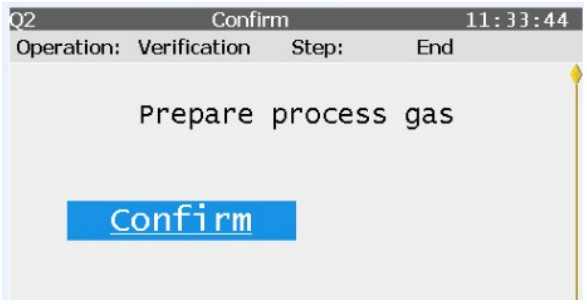
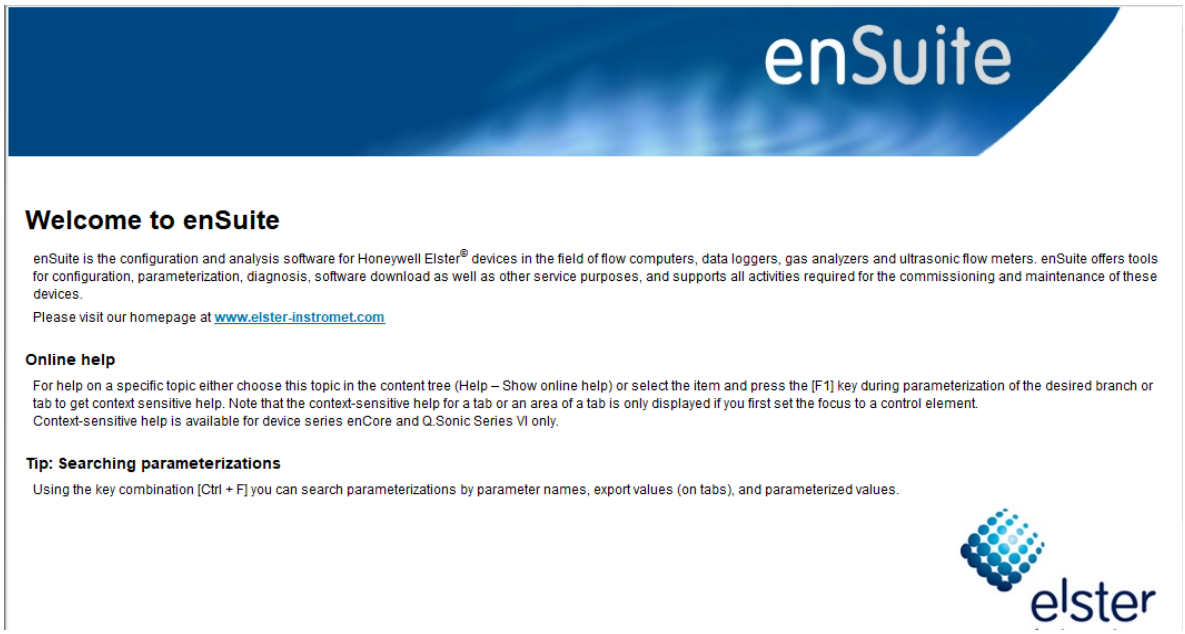
You can end the verification prematurely by selecting “Stop”. You will then jump to step 9.
After the end of the time or if there is no test gas pressure, you will be requested to return to analysis mode.
Select “Start analysis”.</td><td> 

Figure 7.62:
Display for the end of Q2 verification</td></tr>
<tr><td>9.</td><td>You will be requested to restore the original gas connection.

(The message “Prepare process gas” will appear depending on the actual input used.)

Figure 7.63:
Q2 – Confirm (process gas) display</td><td> 
</td></tr>
<tr><td>10.</td><td colspan="2">Restore the original connection correctly.
Obey all the safety information for working on gas connections.
Conduct a tightness test.
⇨ 10.1.10 System tightness test</td></tr>
<tr><td>11.</td><td colspan="2">After you have connected the gas, accept the prompt from step 9 (see figure above) using “Confirm”.
The device will revert to analysis mode, and the verification is ended.</td></tr>
</table>

8. Configuration and analysis software enSuite



In addition to on-site operation on the GasLab Q2 instrument screen, you have the option of accessing the instrument using a computer via the **enSuite configuration and analysis software.**

enSuite also offers you the possibility to carry out configurations, parameter settings, instrument settings and diagnoses. This PC software is also used for control or archiving purposes and supports other Honeywell devices in addition to the GasLab Q2.

The software chapter is therefore primarily aimed at measurement technicians and explains the operation and parameterisation of the measuring instrument in this way. We assume that the device has already been properly installed mechanically and electrically as well as in terms of communication.

An overview of the software is given and the first connection after switching on the power supply is explained. Finally, the details of the software for operation and parameter adjustment of the instrument follow.

	Training and courses Honeywell offers courses and training to make it easier for you to use the measuring instruments and to take advantage of all the individual possibilities that the device offers. If you are interested, please contact Honeywell. Contact data details can be found at the beginning of this document.

8.1. The PC-Software-Concept

In the following, the software concept and enSuite are briefly introduced and the installation is described. Further details of the software can be found directly in the **enSuite online help**. Please also observe the other notes in this chapter before working with the GasLab Q2 via PC.

.

	Always use the current enSuite version for your work from the download area (see next pages). To access all device versions.

The basic steps that are always necessary when working with enCore devices and the corresponding enSuite PC software are described. It is therefore recommended to read this section completely before you start using the device for the first time. It starts with an overview and the installation of the enSuite software on the computer.

8.1.1. The software blocks (AFBs/SFBs)

GasLab Q2 is based on a Honeywell product platform called **enCore**. Both the hardware and software have a modular design. The software blocks consist firstly of the basic functions such as the I/O coupling or the connection of digital protocol interfaces provided by the basic system with its SFBs (**S**ystem **F**unction **B**locks).

Secondly, the software blocks consist of application-related functions provided by the various AFBs (**A**pplication **F**unction **B**locks). This modular principle enables every device to be tailored perfectly to individual requirements.

The illustration shows this principle.

Figure 8.1: enSuite blocks
(basic system with SFBs and AFBs)

The device software in every device consists of the following parts:

- the basic system which contains various basic functions (SFBs) and
- a number of application-related functions (AFBs).
  One AFB for the device-specific properties which is always included bears the name of the device, in other words Q2.

8.2. Installation Start and Data Connection

8.2.1. Installing enSuite

If you do not wish to use the default parameter set, you should change the parameter set before or during the start-up procedure. **enSuite** will help you do this.

One example of these discrepancies is the use of gas properties not stored in the device for the verification or calibration.

You can download the installation program of **enSuite** from the Software Downloads section of the website:

www.elster-instromet.com/de/software-downloads.

	This site also contains a file describing the installation procedure and the minimum system requirements.

Complete the installation as specified on the website. Ensure that there are no special characters in the file path, otherwise it will not be possible to transfer files to a device.

	**If enSuite is already installed on your computer (parameterization device), ensure that you have the latest version.** **Also ensure that no data are overwritten by a new installation (backup copy/changing the storage location).** **Si enSuite est déjà installé sur votre ordinateur (appareil de paramétrage), assurez-vous de disposer de la version actuelle.** **Assurez-vous également qu'aucune donnée ne sera écrasée par la nouvelle installation (copie de sécurité/changement de lieu de sauvegarde).**

	No restart is required after completing the installation and the shortcut symbol shown here will appear on your desktop.

	For non-fiscal operation, the enSuite configuration and analysis software also allows communication via a network interface using the Modbus TCP protocol.

8.2.2. Starting enSuite; the first steps

Start enSuite either via the enSuite program symbol on the desktop or via the Start menu (Elster group of programs).

The software's user interface will appear once it has been opened. At the top, there is the menu bar and below it is the button bar.

If necessary, you can change the language via the options dialog (**Tools – Options**, tab **General**) as shown in the following figure.

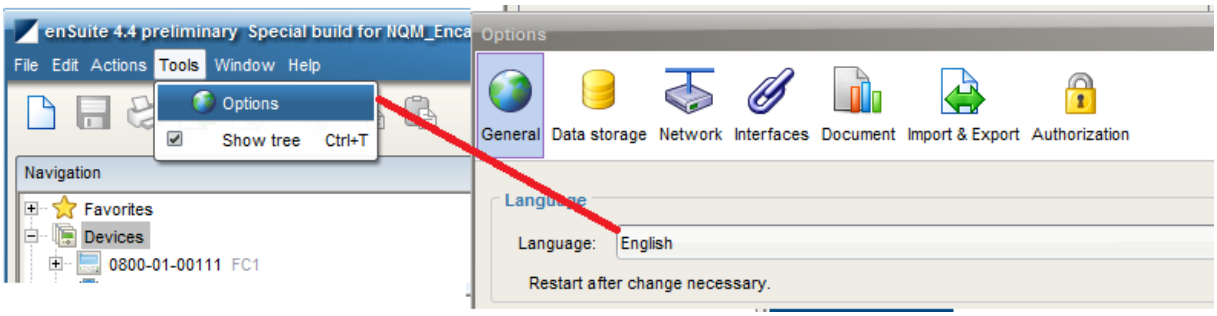


Figure 8.2: Change language in enSuite

Set the language you require using the drop-down menu. enSuite then has to be restarted. A note and / or a link will be displayed the bottom right of the window. The symbol reminds of the pending restart.

The rest of the interface is split into window areas. The communication is established using these input and output windows.

It is possible to detach some windows or window areas from enSuite and display them separately.

Open the context menu in the header or tab of the area you want to detach and select "**Float**" or "**Float Group**" or drag the item line to a free area of your desktop using "**Drag and Drop**".

The individual windows can then be resized to a desired size.

To do this, hold down the mouse button and drag the window edges or use the corresponding functions from the context menu. Use "**Dock**" or "**Dock Group**" to reintegrate the window. Closing the window with **X** also removes the detachment.

EnSuite remembers the position of the windows from previous applications.

	The "Reset windows" function (see menu bar under the window) enables you to restore the default state.

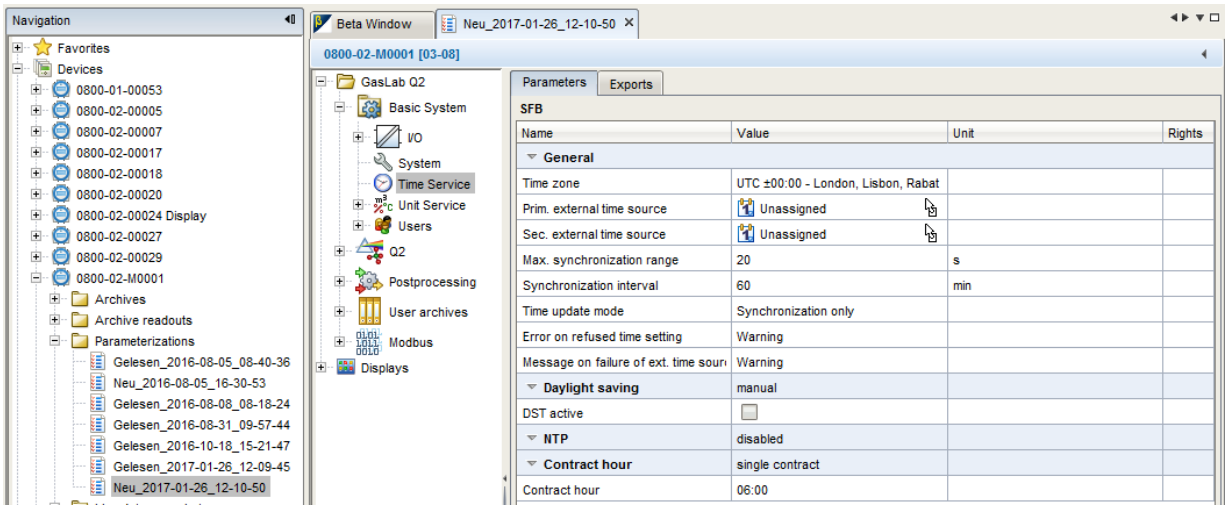


Figure 8.3: Example of navigation window and parameterization window

One of these windows is the Navigation window. The upper half of the navigation window is designed with a fixed data structure, just like an application-oriented file manager. The top hierarchy levels include among others the already mentioned levels **Devices** and **Connections**.

The view of the data structure in the navigation window can be changed; by default, you only see the currently selected branch. You can navigate to a lower level by double clicking, or a higher level by pressing the button.

The navigation window is normally located on the left-hand edge of the screen. It can be hidden so that a greater working area is available. The navigation window is then displayed once again after clicking on the Navigation button on the left-hand edge of the enSuite window. If you simply move over the button using the cursor, the navigation window is temporarily displayed.

The lower half of the navigation window shows which actions are executable in the current context. If, for example, an unconnected device is highlighted, then only the actions **New parameterization** and **Connect** are executable. If a currently connected device is highlighted, then the entries **Disconnect** and **Read out parameterization**, along with a number of other actions which are only possible in the event of an active data connection, are possible here instead of Connect. All possible actions are also provided in the context menu (right mouse click). By clicking on one of the actions, it is then started and opened in a new editing window.

	More information about the interface is provided in the **online help**. You can activate the general online help via the menu item **Help – Show online help**. Open the context-sensitive help directly from the desired branch in the parameterization window with **[F1].**

By using the "**Info**" line or (About) in the help menu, you can view license and other software information about enSuite, as shown in the next figure.

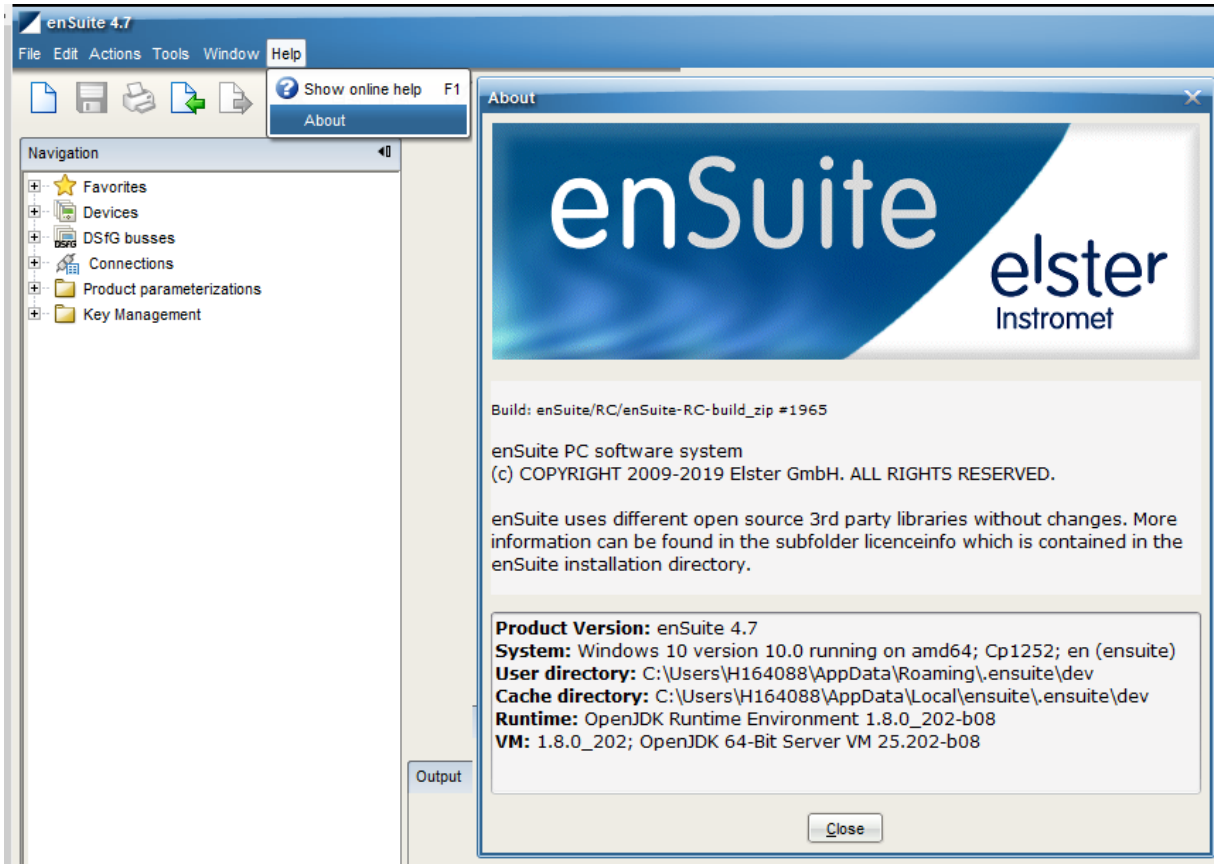


Figure 8.4: enSuite license and software information window.

	Use the online help to obtain an overview of the basic enSuite functions. It includes information for setting the inactivity timeout and the automatic logout. The sub-sections below provide more details of this information and are easier to understand with this background knowledge.

8.2.3. General connection options to the enCore device

A data connection between computer and device be established either directly via a USB cable or via TCP/IP computer network. The communication between enCore device and enSuite is carried out via MMS and is secured via TLS since Basic System 03-39-A. The enCore device uses a self-signed certificate to authenticate itself to enSuite every time an MMS connection is established. The certificate is normally created once when the enCore device is put into operation and is announced to enSuite during the first MMS connection. .

- **Connect enCore device locally via USB**
  Connect service PC and enCore device using a USB cable. Since Windows 10, enSuite can communicate with the enCore device via USB without driver installation.

	The USB connection (see Figures 6.2) cannot normally be used with the Q2, as a device opening is required.

	**Since in particular mobile devices are designed to use as little energy as possible, communication problems can occur. We recommend to deactivating the USB energy saving settings for battery and mains operation under Windows** **Comme les appareils mobiles, en particulier, sont conçus pour consommer le moins d'énergie possible, des problèmes de communication peuvent survenir. Nous recommandons de désactiver les paramètres d'économie d'énergie USB pour le fonctionnement sur batterie et sur secteur sous Windows.**

► Open the Windows **Control Panel**.

- ► Make sure that for **View** either option **Small icons** or **Large icons** is selected.
- ► Open the **Power Options**.
- ► Click on the actions **Change when the computer sleeps** – **Change advances power settings**.
- **In dialog** Power Options **open node** USB settings **–** USB selective suspend setting **and deactivate the following settings:**
  - On battery
  - Plugged in

	Use mainly the TCP/IP data connection (interface in the connection box). Both the PC and the device must be connected to the same network. The IP addresses may need to be adjusted to ensure a perfect TCP/IP connection.

- **Connecting the enCore device via TCP/IP**
  The Device is mounted in an accessible computer network. Cable type according to Category 5 (cat 5) Connect the service PC and enCore device with a cable.

8.2.4. Establish a connection to the enCore device

The connection to one or more devices can be made in various ways, for example select one of the following symbols on the button bar shown in the table.

	**Actions – Search device** (alternatively press the [F3] key)	Searches for all accessible devices and establishes the connection. All devices which were unknown up until now are entered in the enSuite database. This option is recommended for all initial connections established with one or more devices.
	**Actions – Connect**	Establishes the connection to a specific device. The device must be contained already in the enSuite database and selected in the navigation window under the **Devices** branch (identification via serial number).

The first icon contains a search function, e.g. for connecting devices (new devices) that are not yet available in the database. After a first connection the individual devices are identified and stored in the enSuite database by their serial number; for such devices, the second symbol can be used.

In both cases, a dialog to select the connection path then appears once the option is activated

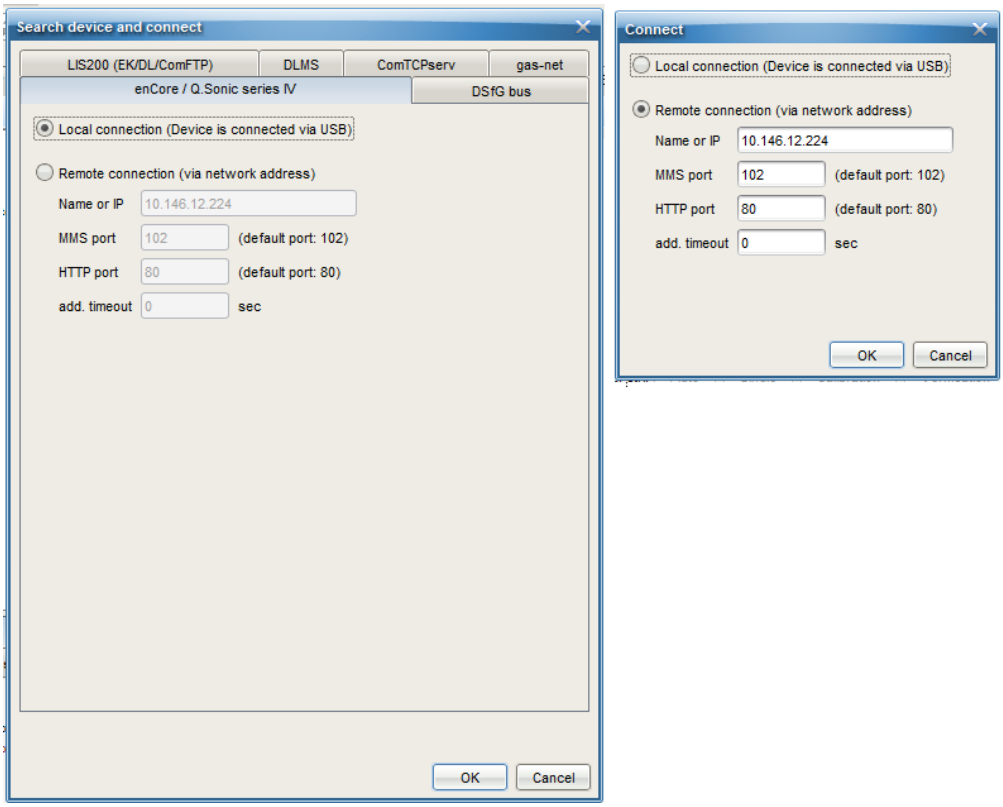


Figure 8.5: Dialogs **Search device and connect** and **Connect** (examples)

	The dialog "**Search device and connect**" also allows the selection of other device types. For proChain GC select the type as shown in the figure above

- To establish a USB connection, select **Local connection**; this can only be used when the instrumentation section is open, see section 6.1.3 Opening and closing the hardware parameter guard (SSW). After selecting confirm with **[OK].**
- For a TCP-IP connection, select select Remote connection - in this case, the network name or IP address of the enCore device is required. This can be found on the I/O display under CPU 3 on the device. You can access the display via Home and System. If necessary, adjust these settings as described in Chapter 7. After selecting and filling in the fields, confirm with **[OK].**

See also the following example to establish the **first connection with a device not registered in the database**

1. select the corresponding function e.g. in the **navigation window** or on the button bar
2. enter the connection data in the dialog, (see next figure) and confirm with **[OK]**

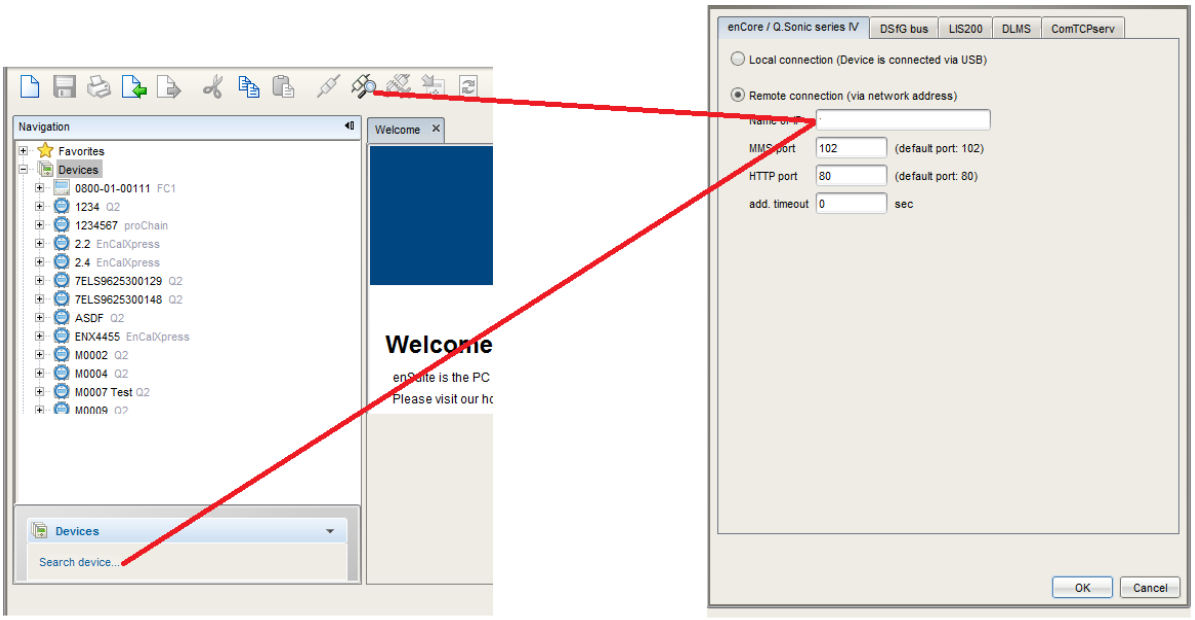


Figure 8.6: Find and Connect Device (enSuite Window)

If it was not possible to establish the connection, an error message will be displayed.

There may be several causes of this error, for example the device is switched off or is still starting up.

The entered address was incorrect, or hardware errors have occurred. See also chapter 9 Possible malfunctions and troubleshooting.

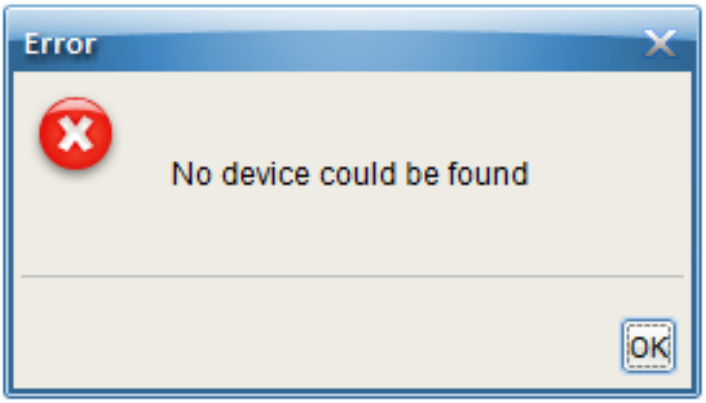


Figure 8.7: Connection not established

	Since Basic System 03-39-A the **enCore device** tries to authenticate itself with its self-signed TLS certificate. Depending on the pre-set device system time and the time zones used, the certificate will only become valid or unrestrictedly usable after a certain time has elapsed. In this case a note is displayed.

In case the certificate is unknown to enSuite, enSuite will not establish a connection and will display the certificate for validation.

This is always the case when the device is connected for the first time.

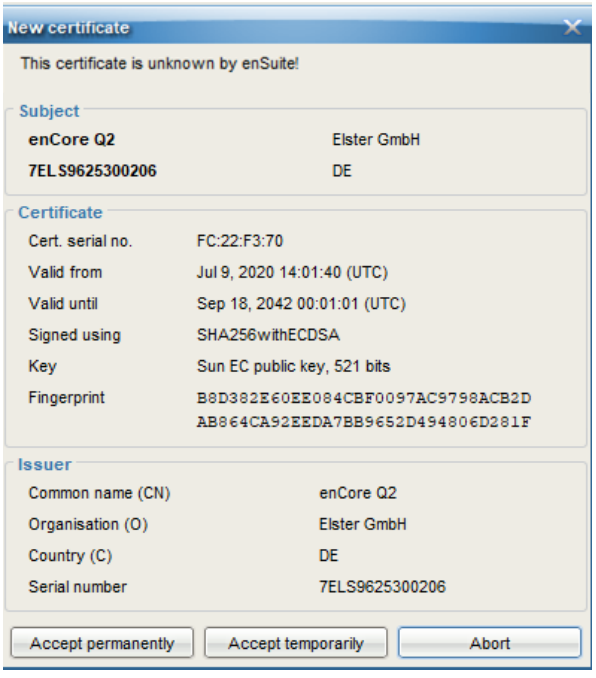


Figure 8.8: Certificate is unknown – example first connection establishment

In case the certificate does not match the saved one, enSuite will also not establish a connection and display the certificate for validation.

This is always the case if the device authenticates itself with a new certificate.

Click the "**Stored certificate**" button to display the previous certificate and compare it with the current one.

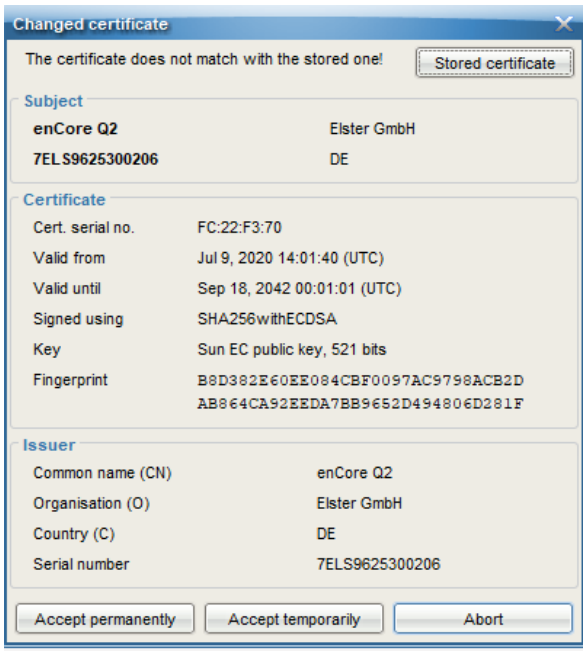


Figure 8.9: Changed certificatet

► **Check the validity of the certificate. You have the following options:**

Check the certificate on the device on site
Open the certificate information via the basic display of the device: **Info – <device serial no.>**, **Certificate**
Compare the fingerprint and enSuite information under the **Subject** with the information printed on the device.

Remotely verify certificate **(Without a connection, you won't be able to compare the fingerprint, so...)**
...first check the information on the device in the section **Subject** of the dialog
If the information is correct, establish a temporary connection to the device, as described below

- **If you trust the certificate (for example, because the fingerprint matches), select [Accept permanently].**
  In this case, enSuite saves the certificate in the database. Each time a connection is established, enSuite compares the received certificate (in the background) with the saved one. As long as both certificates match, enSuite trusts this connection and establishes the connection. Only if the device's certificate changes, e.g. because a user has newly created the certificate, will enSuite display the new certificate information. You can also view the previous certificate information here.

- **If you are unsure whether you trust the connection (e.g. because you are not on-site), select [Accept temporarily]**.
  The current MMS connection will remain, but enSuite will not save the certificate in the database. The next time a connection is established, a security query will appear again
  .
- **If you do not trust the certificate, select [Cancel].**
  In this case, the MMS connection is interrupted.

As soon as the connection is established, you can readout and parameterize the device etc. and compare the **fingerprint** of the temporary accepted certificate.

- Since a temporary connection exists, call the Remote operation panel action.
- Open the certificate information from the basic display of the device:
  Info – <device serial no.>, certificate
- In enSuite, open the output window via **Window – Output**.
  Here all transferred certificates are linked with the time stamp of the transfer.
- Open the corresponding certificate with Show certificate.
- Compare fingerprint and subject information of enSuite and device with each other.
- If both matches, you can permanently save the certificate in enSuite by reconnecting to the device and **[Permanently accept]** the certificate.

As long as both certificates match, enSuite trusts this connection and establishes the connection. Only if the device's certificate changes, e.g. because a user has newly created the certificate, will enSuite display the new certificate information.
After this first connection, has been established, enSuite will enter the device and the connection details in the parameter tree. In the enSuite **navigation window**, all devices with serial numbers which are contained in the database are listed under the **Devices** branch.

Connected devices can be identified by the green dot during the data connection in the symbol in front of the serial number.

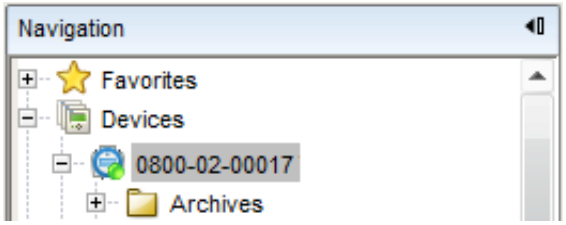


Figure 8.10:
Connected devie in navigation window

With respect to devices for which a connection has currently been requested but has not yet been established, the device symbol is marked under the Devices branch with a yellow dot .

In addition, all devices for which a connection has been established during the current enSuite session are listed under the **Connections** branch. These entries are retained until enSuite is closed, even if the respective connection is disconnected.

	If you make any changes to the network settings on a device to which a connection has already been established via enSuite, when you attempt to make the new connection, you will be asked whether you wish to save these changed settings. **Click on "Yes" in this case.**

The individual devices are identified in the enSuite database via their serial number (ID). In addition, an individual name can be added to the serial number. To add an individual name to this **device ID**, highlight device and select **Properties** in the context menu. Then enter the name in the dialog. Example: Adding an individual device name.

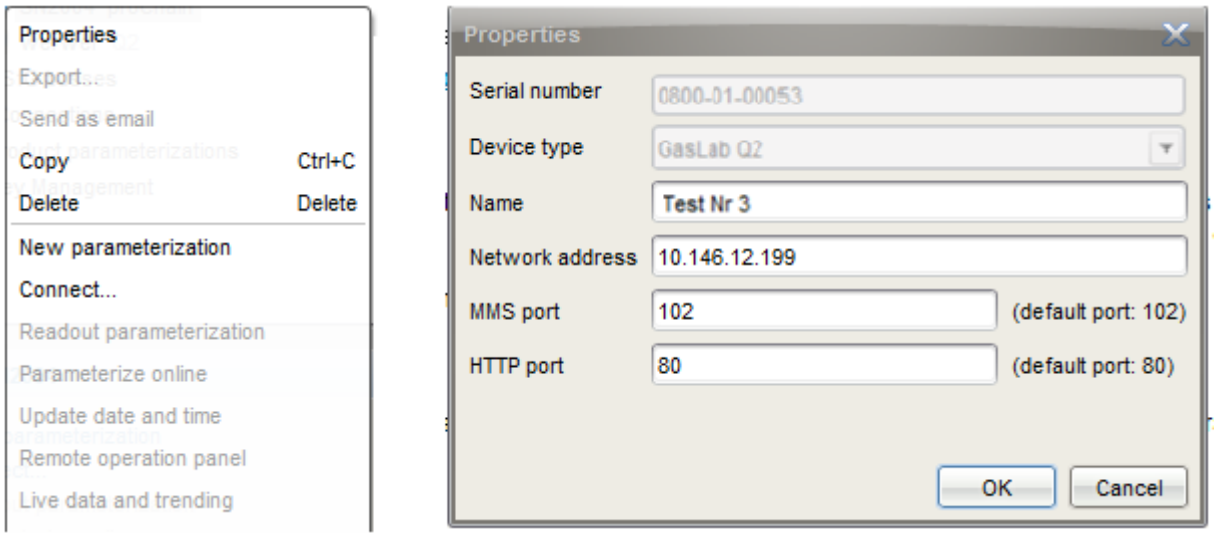


Figure 8.11: Context menu and properties (enSuite window)

	As soon as the connection is established, you can and should read out the parameterize of the device, more information in the next sections. All the steps to make device connection are explained in detail in the "**enSuite online help**". Follow these instructions.

8.2.5. Disconnecting the device and Connection errors

The disconnection of one or more devices can be done in different ways, e.g. with the adjacent icons of the button bar.

	**Actions – Disconnect from all devices** (or press the [F4] key)	Terminates all active connections.
	**Actions - Disconnect**	Terminates the connection to the selected device in the navigation window.

The **context menu** or the lower part of the **navigation window**, also offer the disconnection.

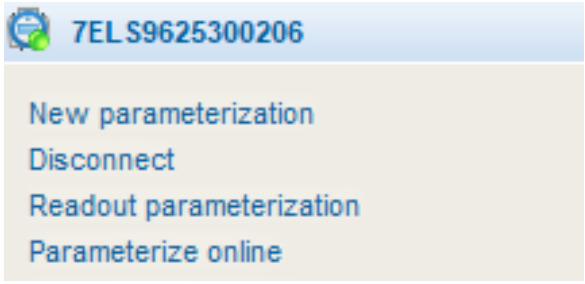


Figure 8.12:
Disconnect in navigation windowr

The connection can also be disconnected by suddenly appearing events, for example a power failure in the device or a wire break. In these cases, the disconnection will be displayed in a dialog window.

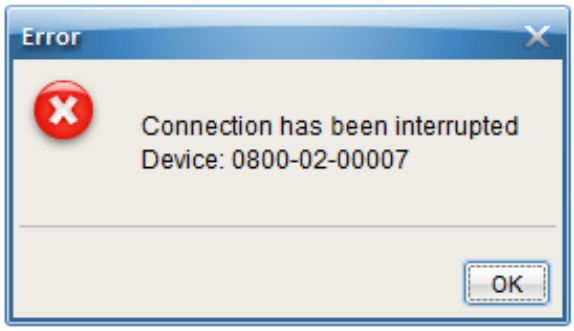


Figure 8.13:
Connection has been interrupted

	In addition, a planned automatic disconnection takes place when a new parameter set is uploaded. See section 8.4 Changing existing device settings (Parameterization) for more details

The disconnection of all devices is always done if enSuite is closed!

8.2.6. Read-out parameterization

There must be an active data connection to the device (⇨ sections 8.2.3 and 8.2.4) before the parametrization can be read-out from the device.

	Read the parameter set after making any changes. Save every changed parameter set as a backup separately for emergencies and, if necessary, export it to an external PC/external data medium. **enSuite will not automatically back up the parameter set!**

If a connection exists, proceed as follows:

1. Highlight the device in question in the navigation window either under the **Devices** branch or under the **Connections** branch.
2. Select the action **Read out parameterization** in the lower section of the navigation window or open the context menu and select "**Readout parameterization**". A dialog "**Save as**" will appear.

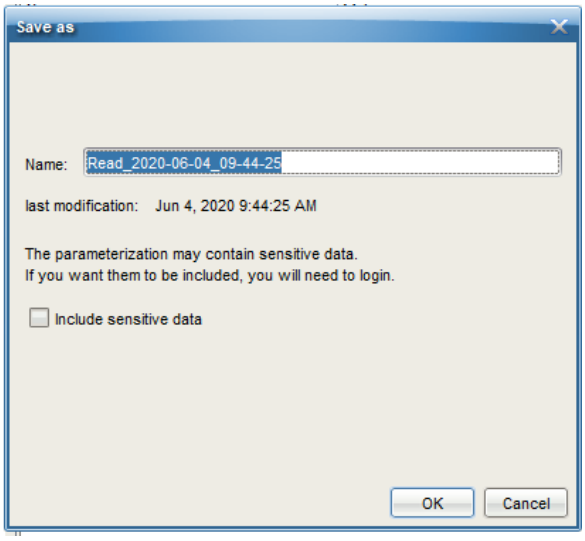


Figure 8.14: Save as dialog

3. If necessary, you can now change the displayed name by overwriting it. Then press **[OK].**

	Some devices transfer sensitive data, for the Q2 it is not nessesary to mark the checkbox. You can confirm with **[OK]**. If the checkbox is selected a login dialog will appear after pressing **[OK]** button. See section 8.3 User management and login for more details about login.

8.2.7. Saving, and exporting the parameter set

Enter a name for the file in the "**Save as**" dialog. The read parameterization is then stored under this name under the **Devices – <Serial Number/Name> – Parameterizations branch.**

Change the suggested name, for example to “Default_parameters_YYYY-MM-DD” (always include the date so that you can identify the backup copy).

Check that the parameter set has been saved correctly in the navigation window. A file must now exist with the selected name. See the following example:

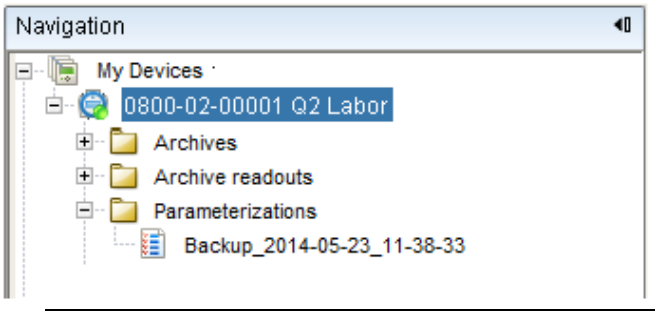


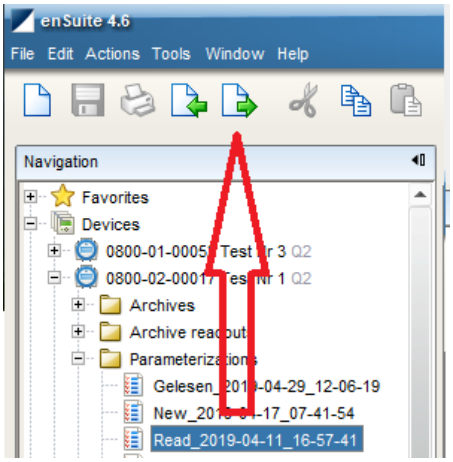
Figure 8.15:
Example of saved parameter set

Certain parameters are set to defined values as default. You have now backed up these values. Do not make any more changes to this file which can be used as a restore and backup file in an emergency.

You can also export selected files using the symbol in the enSuite window or the export function in the context menu to make yourself independent of your current enSuite installation.

Click on the marked symbol as in the example shown here and follow the dialog boxes.

As soon as the file(s) has/have been exported, it/they should be saved with a defined name as backup copies on the PC hard drive or externally.



	Always read the current parameters from the device after making any changes, changes to parameter sets which have already been saved in enSuite will be saved using the old name, in other words, **the original file will be overwritten**.

STOP	Do not change any parameter sets filed for documentation of backup purposes as you will lose the original content. Ne changez pas des paramètres enregistrés à des fins de documentation ou de sauvegarde, car vous perdrez le contenu original.

After double-clicking on the file, enSuite will open the parameterization window and show the parameter set. See the online help for more information about this window.

8.2.8. Viewing the parameterization of SFBs and AFBs

To establish which SFBs, AFBs and settings the device uses or with which ones it was delivered, read the unchanged parameter set as described above and display the tree structure in the parameterization window.

This view shows the components of the “enSuite modular system” used in the device in the delivery state on the left-hand side.

These folders and sub-folders contain the default parameters unless you have made some changes.

The various parameters will be displayed on the right-hand side of the window when you select the corresponding block.

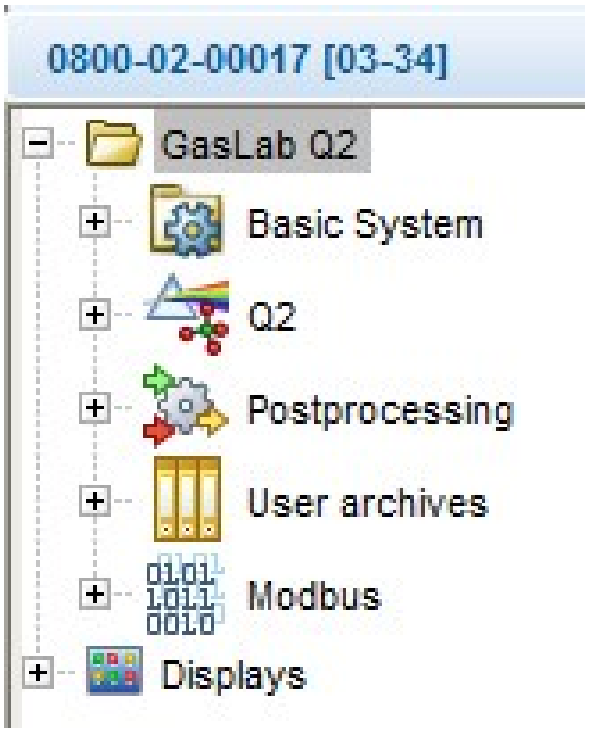


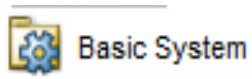
Figure 8.16: Example of a device tree structure

	The rule of thumb is that: the default parameter set is visible in the parameterization window the first time the parameters are read. The meaning of the various software parts and parameters is described in detail in the online help. If some of the elements shown in Figure 8.16 are colored orange, there is a conflict with the approval file, see section 8.4.10 Fiscal parameters and optional using approval file (Select approval)

	Tip to transfer parameter or modbus tables into other programs: For parameter tables select the whole table with (Ctrl-A), copy it (Ctrl-C) and then paste into a different program like EXCEL. For the Modbus-Table select the whole table (Ctrl-A) on the overview page to get a list of all register numbers grouped by area, or open the register array of an area, open all registers to see all the details and then copy it (Ctrl-C) and paste into a different program like EXCEL.

The following is a brief description of the SFBs and AFBs:

Basic system (SFBs)

	**This SFB contains the basic functions such as time service, user management or I/O functions. Also refer to the software concept at the start of this section and the online help.**
	**Do not change the configuration settings. (Only relevant for service personnel.) Always make a note of the current / changed network settings on the device. Without this information, you will be unable to establish any connections.** **Ne modifiez pas les paramètres de configuration. (Ne concerne que le personnel de service). Notez toujours les paramètres réseau actuels ou modifiés de la machine. Sans ces informations, vous ne pouvez pas établir de liens.**

	**The Q2 AFB contains the preset parameters for this specific device such as calculation (standard), correction factor, base calibration, service calibration, operational calibration, verification and limit values.** **The flush times and composition of the calibration gases are also stored and set there. These parameters are explained in the online help.**

	**The Modbus, Postprocessing and User Archives AFBs are used for calculations, archiving and data communication.** **Their configuration has not been finalized on delivery. They must be adjusted retrospectively and can essentially be freely selected.** **The online help contains all the information required for these software components, including those used in other enCore devices.**

The Modbus AFB allows communication, for example, if TCP/IP has not been configured for the data transfer or data exchange. It has its own operating manual, which you can download from the Docuthek (www.docuthek.com). The online help contains all the other information you require.

	**Displays** **This folder contains all the displays** **(see also Home display, section 7.3 Displays and functions).** **Displays protected as default can be identified by "padlocks".** **You can adjust the other displays and create new ones. Further details are described later in this document.**

In the left part of the parameterization window, the register tab **Parameter** shows the tree of the current parameter structure, as shown above. The root stands for the device itself, the top level consists of the currently contained software blocks. The basic system is always contained in the device software; AFBs, however, can be added or deleted.

If the tree root (i.e. the device name) is highlighted on the left-hand side, then you will see all available AFBs for the device in the **Configuration** tab. Of each AFB, both the version and the number of instances already used by the device are stated for this purpose.

The AFB composition can be freely configured. Restrictions base on the resources already in use. Most AFBs can be used several times.

You can add a new AFB to the AFB compilation or delete an AFB.

In order to add an AFB, highlight it in the right-hand part of the window in the **Configuration** tab and click on **Add AFB**.

	If a newly added AFB is labeled in **bold orange** in the parameter window, you then need to click on the **Make compliant** button again in the Configuration window ⇨ 8.4.10 Fiscal parameters and optional using approval file (Select approval) Any blue labeling means therefore that the changes have not yet been saved.

In order to delete an AFB, highlight it in the left-hand part of the window and select **Delete AFB**.

Attention: It is possible that the parameterization is no longer valid when an AFB has been deleted. In such cases all parameter branches and parameters which contain references to the deleted AFB that are no longer valid are labeled in **red**.

8.3. User management and login

Like all enCore devices, the GasLab Q2 has a user management system. In principle, a parameter can only be changed and used in the device if the user is entitled to do this and the position of the security switch (SSW) allows it.

	**In the delivery state, the preset standard login works for all users without password. The administrator should therefore first determine the authorizations and passwords.** **Dans l'état de livraison, la connexion standard prédéfinie fonctionne pour tous les utilisateurs sans mot de passe. L'administrateur doit donc d'abord déterminer les autorisations et les mots de passe.** ⇨ **8.3.2 Assigning or changing a password using online parameterization**

EnCore devices differentiate between rights at parameter level and at system level. Rights at parameter level can be assigned in a differentiated way for individual parameters or parameter areas of an application.

Rights at system level determine which system settings of the device may be changed. This includes, for example, changing the device time.

	Details of the user management system are available in the Docuthek (www.docuthek.com) under "**enCore ZM1, BM1, MC1, FC1 – basic system with SFBs**" and in the online help.

Various situations are explained in the following use cases.

For working on protected settings, a login prompt will automatically appear when you start the action. To log in, you will require a **user name** and **password** which the system operator, acting as the administrator, or the super user of the profile will have prepared for you. Please request these data.

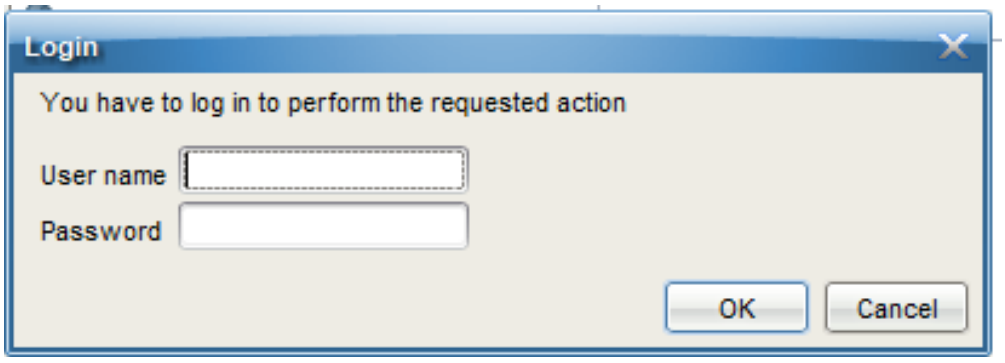


Figure 8.17: Login dialog window

8.3.1. User profile management

	The **administrator** and **super user** of a profile have the right to manage the other users in that profile, in other words, they can add new users, delete existing ones or change user names. The relevant parameter set must be opened offline for this purpose. See section 8.4 Changing existing device settings (Parameterization)

Example: To change the name of a user, mark the required name in the list (**Basic system >> Users >> User profile**, **User list** tab) and then click on the Edit symbol [...]. The "Edit user" dialog will appear.

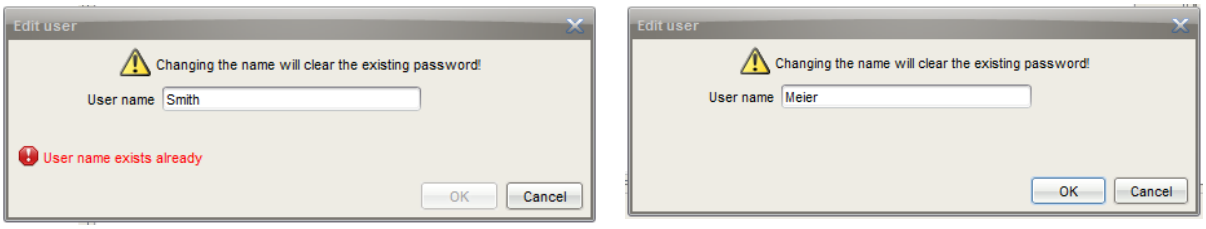


Figure 8.18: Edit user dialog (example)

Enter an admissible change in the dialog, obeying the instructions in it. If your entry is valid, the **[OK] button** will be enabled and you can conclude your change by clicking on it.

	The old password will be deleted, as stated in the warning. The changed user will be saved in the parameter set with a blank password. **Comme indiqué dans l'avertissement, l'ancien mot de passe est supprimé. L'utilisateur modifié est paramétré avec un mot de passe vide.**

Save your changes in the parameter set and **transfer the changed parameter set to the device**. The user can then log in and carry out actions with these rights. You should then assign a (starting) password either using online parameterization (see the following information) or the operation panel described in section 7.3.11 System display Users (Login/Logout / Password).

	If you are logged in as an administrator, you will have all device rights. All the factory settings can be changed, even inadvertently. Take the appropriate care with your work. **Si vous êtes connecté en tant qu'administrateur, vous disposez de l'ensemble des droits sur l'appareil. Tous les préréglages effectués en usine peuvent être modifiés, même accidentellement. Effectuez vos travaux en prenant les précautions adéquates!**

8.3.2. Assigning or changing a password using online parameterization

Connect to the GasLab Q2 and select "**Parameterize online**" (see section 8.4.3 Changing the device parameter set in the connected device (online parameterization) for further information). A login prompt will appear in which you must log in as the administrator or super user (for example, SU3). Click on "**OK**".

You can only log in if no other login is active on the device.

The parameter set will be read after the login. Open the user management in the basic system and select the appropriate user. Double-clicking on the user will open the following dialog box (see figure).

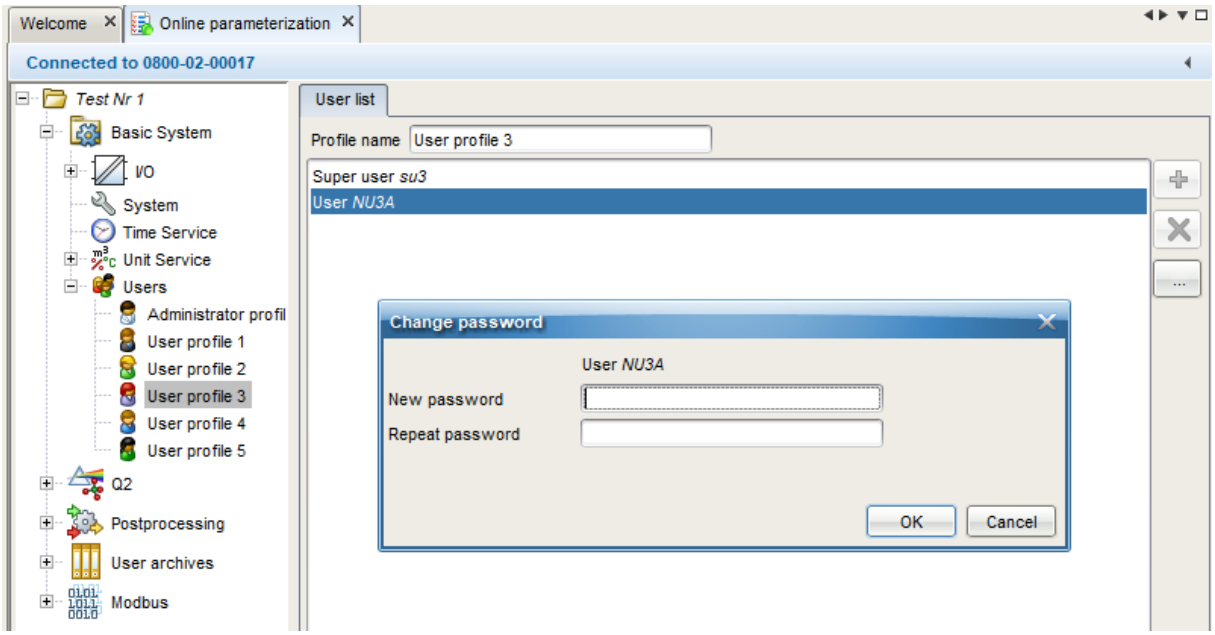


Figure 8.19: Change password dialog (online parameterization)

Enter a legal password in both boxes in the dialog, obeying the instructions in the dialog. If your entry is valid, the **[OK]** button can be selected, and you can conclude your change by clicking on it. The new password is now active. After you have selected **OK**, you can break the connection.

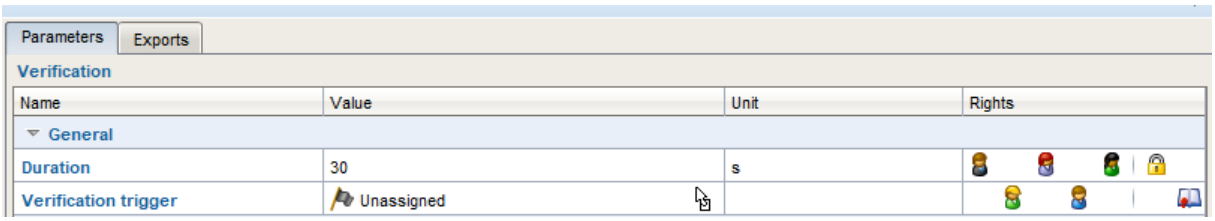
	Assigning or changing own password could also be done on the devce or with the help of the remote operation panel. See section 7.3.11 System display Users (Login/Logout / Password).

When carrying out any online work on the device, please note that an automatic logout will take place after a defined period of inactivity. (Further information about this inactivity timeout can be found in section 8.2.2 Starting enSuite; the first steps.)

You will also be logged out when the connection to the device is disconnected e.g. by reboot.

8.3.3. Viewing setting and change access rights

Requirement: The parameter set is displayed in the parameterization window in enSuite. "**Edit user rights**" has been selected in the "**Configuration**" tab. On the right-hand side of the parameterization window, you can see the appropriate parameters in the "**Parameters**" tab. see following example.



The symbol bar is divided into two and consists of the following:

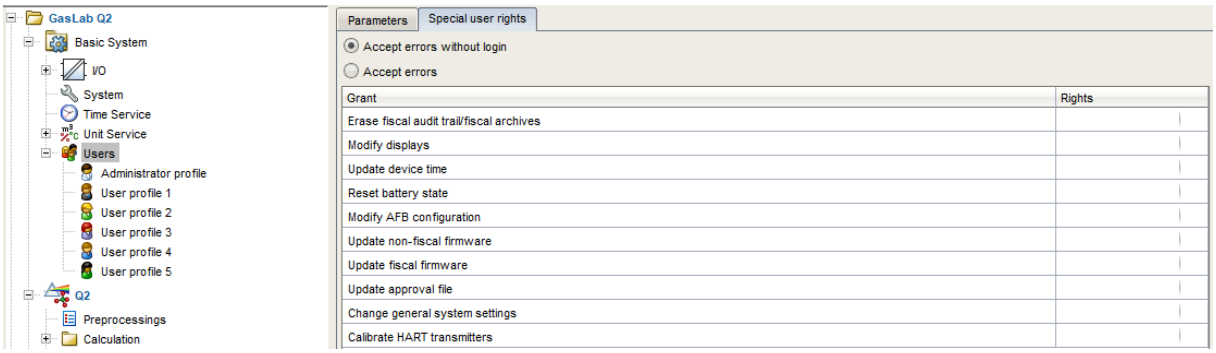
Buttons 1 to 5: rights for user profiles 1 to 5  . Each button has a unique symbol assigned to it. The sequence corresponds to the position of the profiles in the user management. As soon as a symbol has been enabled, the associated profile has the corresponding right.

There is no symbol for the administrator profile, as it must always have access rights.

Buttons 6 and 7: fiscal security settings  . Button 6 is the symbol for protection by the security switch (SSW) and button 7 is the symbol for the fiscal audit trail. Button 7 is only displayed at parameter level. As soon as a symbol has been enabled, this security setting will be valid.

	Rights are managed using symbols, and where rights or security settings have been allocated, a symbol will be displayed. Only the administrator has access rights if no symbol is displayed in the buttons 1 to 5.

Only the administrator can change the setting by clicking the icons or empty fields and then commit his changes to the device. Changes not made by the administrator are rejected by the device after transmission. The lines only serve as information display to all other users. The administrator can define further user rights on the following page:



8.3.4. Viewing position of the security switch

Some settings must be protected as mentioned above for fiscal measurements.

This is done using a physical connection (jumper) inside the device, known as the security switch (SSW), compare section 6.1.3 Opening and closing the hardware parameter guard (SSW)

Independent of the use in fiscal measurements, the administrator has the possibility to place further device settings under this protection.

You can view the setting using **online parameterization**. According to 8.4.3 and the online help of enSuite).

After opening the online parameterization, select the elements as shown in the figure.

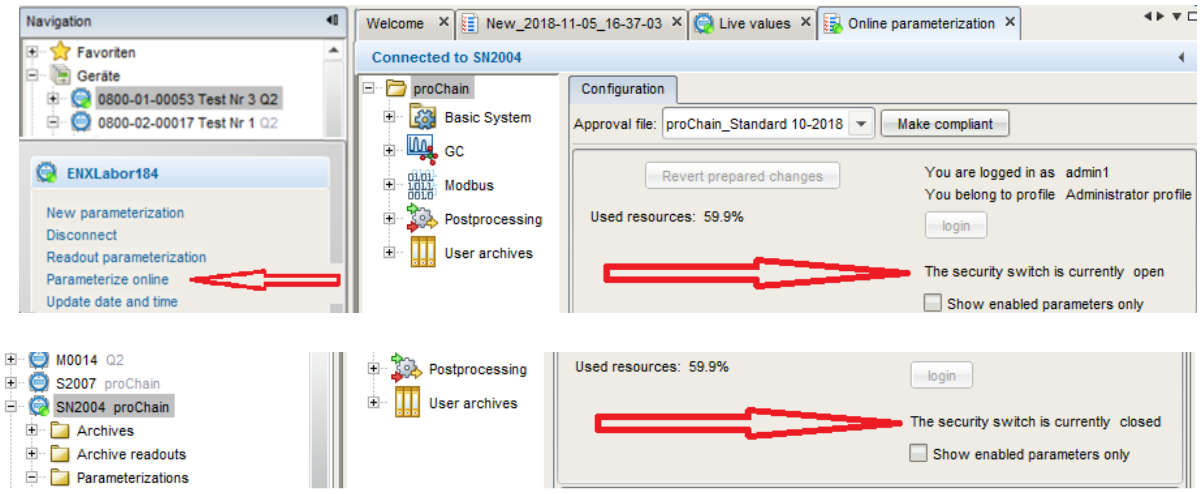


Figure 8.20: View the SSW position (open and closed)

	**On delivery and in “non-fiscal operation”**, this connection is open. When the switch is closed, the text "**The security switch is currently closed**" is displayed.

8.3.5. Access rights dependent restricted editing options (virtual login)

In addition to the official access rights, a user authorization is also required to change parameters. The user must log in as a member of a user group by entering a password.

An administrator can in principle make any changes, however the conditions of the applicable approval must be considered, e.g. it may be necessary to open the security switch. (⇨ section 6.1.3 Opening and closing the hardware parameter guard (SSW)).

	The parameters that a user can change depend on the user group that he/she belongs to and, potentially, whether it is allowed to open the security switch or not. For offline parameterization, enSuite offers the option to restrict the editing possibilities so that only changes can be made that an individual user is permitted to make. This is referred to as a **virtual login**.

Example: A parameter set may be transferred to the device and refused at the end of the transfer. The device checks the requirements and rights before saving the parameter set. It is therefore also possible to change parameters in advance without the appropriate rights.

To prevent this, you can filter the parameter lists using the "**Use virtual login**" function.

Requirement: You have selected **offline parameterization** (see section 8.4.1 Changing device parameters offline (Offline parameterization)), the parameter set is open, and the topmost folder is marked. You will then see the possible selections shown below in the "**Configuration**" tab in the right-hand section of the window.

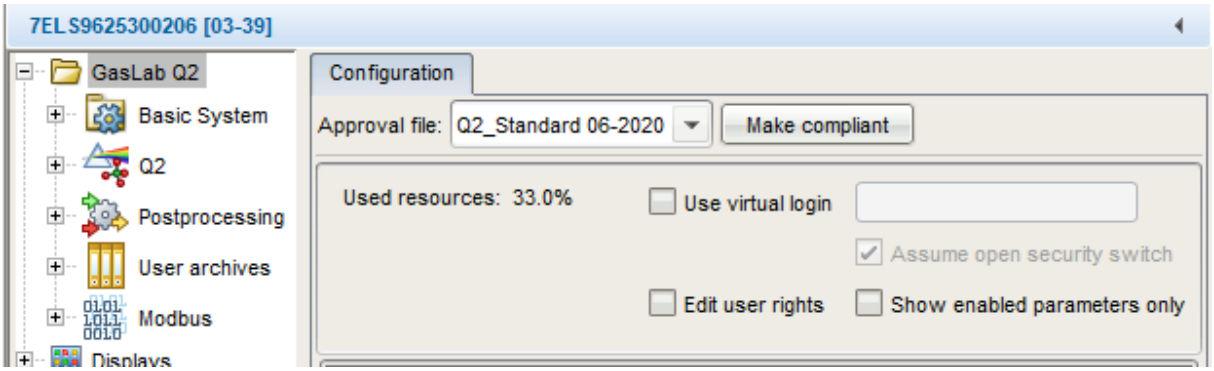


Figure 8.21: Use virtual login

- If you deactivate the option **Assume open security switch**, then all parameters under security switch protection can no longer be edited either.

Non-editable parameters are listed in gray in the parameter lists and are labeled with the symbol. By using the option **Show enabled parameters only**, you can achieve that any such parameters are not displayed at all.

	Activate the online help in enSuite to find out more about the required settings. The figures below in this document generally assume that this function is used with the name “**SU3**”.

Example: If you use the virtual login as described above as user **SU3** and check the box “**Show enabled parameters only**” and then select “**Time Service**”, you will only see a gray box under Parameters.

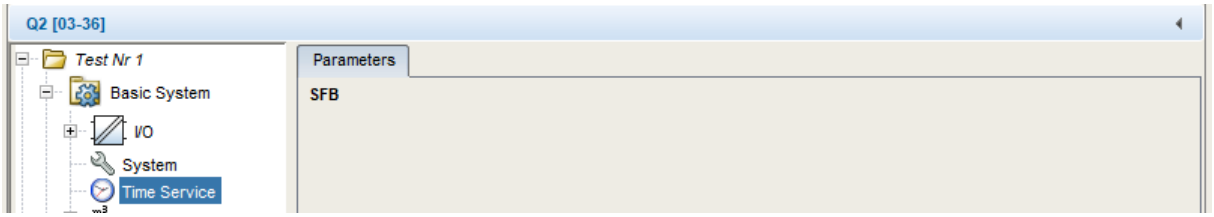


Figure 8.22: Virtual login in use

To display all the parameters again regardless of their access rights, disable the checkbox “**Use virtual login**”. You will now see the existing setting options under Parameters.

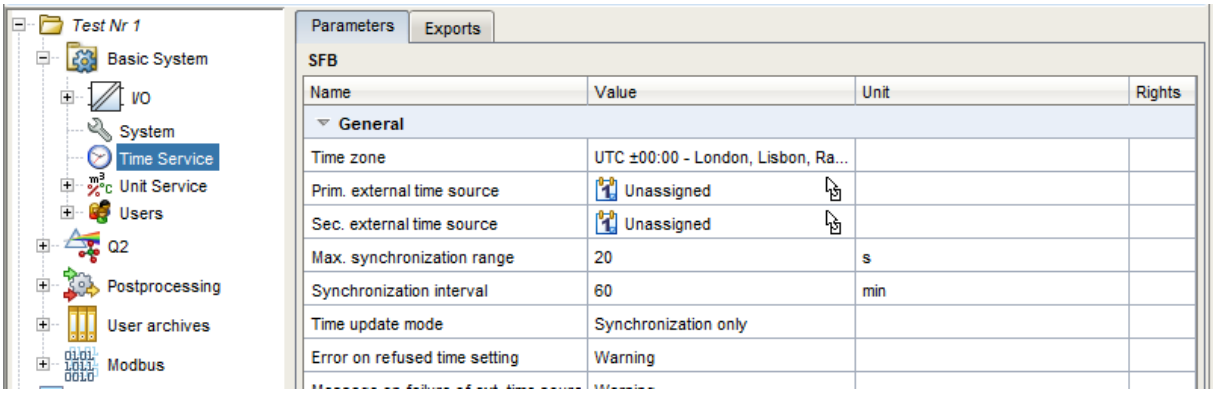


Figure 8.23: Parameters with out virtual login

If you were to make changes as user SU3, the device would reject the parameter set after the transfer.

8.4. Changing existing device settings (Parameterization)

There are various types of parameter sets in the enSuite database (**see online help for more information**). This information for general use only refers mainly to editing the default parameter set.

	On delivery, the device will always have a default parameter set (called device parameter set or device parmererization). This only must be adjusted if necessary.

The following table outlines the differences between offline and online parameterization the most two kinds of changing parameterization you can use:

Offline parameterization	Online parameterization
Editing the device parameterization without being connected to the device. The parameterization is transferred to the device in a second step.	Changing of parameter contents during an existing data connection to the device.
The options available for editing the parameterization are in principle available. Whether a parameterization can be accepted or not after installation is decided by the device whilst taking into account the access rights of the logged in user and the condition of the security switch.	It is necessary to log in to the device in order to start editing. Only changes that the logged in user is allowed to make are possible. In addition, the condition of the security switch is also taken into account.
The edited device parameterization must be saved in the enSuite database prior to being transferred.	The saving of the edited parameterization as a device parameterization in enSuite is optional.
Changes of the AFB configuration possible.	No changes of the AFB configuration possible.
In addition to changing parameter *content*, changes of the parameter *structure* are also possible (e.g. by activating functionalities or adding process boards).	Only the content of parameters which already exist may be changed.
Restarting the device after installing the parameterization.	No restarting the device.

If you change the factory settings, please note that you must always be logged in when making or transferring the changes and you are bound by the user management restrictions.

Only parameter changes which the logged in user is permitted to make are possible. Parameters which cannot be edited are displayed in the parameter lists in grey and marked with the symbol, or in some cases will not be displayed depending on who is logged in.

	Displays (see bottom left section of the parameterization window) The structure of the displays on delivery is described in this documentation. If you have the required rights, you can use the display editor to modify the device displays. See the enCore manuals for further information.

Furthermore, a distinction is made between **offline** and **online parameterization**. These terms and the differences are explained in the **online help** and further details are also given below.

	**Any change runs the potential risk of the device being set incorrectly.** **Chaque modification cache le danger d'un mauvais paramétrage de l'appareil.**

The **user and rights management** of enCore devices makes it possible to define in detail which changes users may make. This is the responsibility of the administrator, who in turn has unrestricted access to the device.

To reduce the risk of incorrect changes which may render the device useless, the administrator should block actions which are not required by other users during normal operation. For example, these include editing the **approval file, Configuration AFB and both non-fiscal and fiscal software**.

These actions are listed in the basic system under "**User SFB**" in the "**Special user rights**" tab. The rights can be set there.

	This applies to all changes, even if they are not specifically mentioned below: Select the parameter to be changed from the parameter tree. Activate the input field and press **[F1]** to obtain information and change aids.

More information in the following section.

8.4.1. Changing device parameters offline (Offline parameterization)

Requirement offline parameterization: the parameter file you wish to open has been read and saved as described in sections 8.2.6 Read-out parameterization and 8.2.7 Saving, and exporting the parameter set is opened in the navigation window by double-clicking.

The parameterization window is displayed. See the online help for more information about this window.

	Several parameterization windows may also be opened in different tabs. You can distinguish them by way of the tab label – the parameterization name is stated here (saved name or identification of the device for new parameterizations and parameterizations which have not yet been saved).

	**Do not use any parameter sets stored in the archive or as a backup to make changes since the original content will be lost. Instead, always read a new parameter set as described.** **N'utilisez aucun ensemble de paramètres stockés dans les archives ou comme sauvegarde pour effectuer des modifications car le contenu original sera perdu. Lisez plutôt toujours un nouveau jeu de paramètres comme décrit.** ⇨ 8.2.6 Read-out parameterization ⇨ 8.2.7 Saving, and exporting the parameter set

This type "**edit existing device parameterization**" takes place in the following steps*:

Step	Content/Action
1.*	Edit the device parameterization, save the device parameterization. Attention: The device parameterization is saved under the old name, i.e. the original file is overwritten.
2.	Transfer the changed parameter set to the device with the matching serial number.

* If you are using a new parameter set or a product parameter set from other devices for step 1, please consider that this is only a template and that all the relevant parameters must be adjusted on the device before the parameter set is transferred to the device in step 2. If you fail to do this, the device may react in an undesirable manner.

	All the parameters for editing are subject to the user management restrictions and can only be changed or transferred to the device with the appropriate rights and with the SSW in the appropriate position.

The parameter set also called parameterization is changed or edited in the parameterization window of enSuite (see the figures below). The online help describes this window and the parameters in detail.

On the left side of the window the software modules are displayed in the so-called parameter tree. The top level shows the device name; in the lower level you see the basic system and the AFBs. The tree levels can be opened by clicking on the + prefix.

If the selected level contains parameters, you can see and edit these parameters on the right-hand side of the window. In the **Parameters tab,** the parameters of the individual parameter branches are listed in tabular form and offered for editing. For more complex functionalities there is sometimes a more convenient editing dialog in a separate tab.

Depending on the situation, the values of the parameters can be changed freely or a selection list with the corresponding options appears. Likewise, some functions can be switched on and off by marking check boxes. See the following examples:

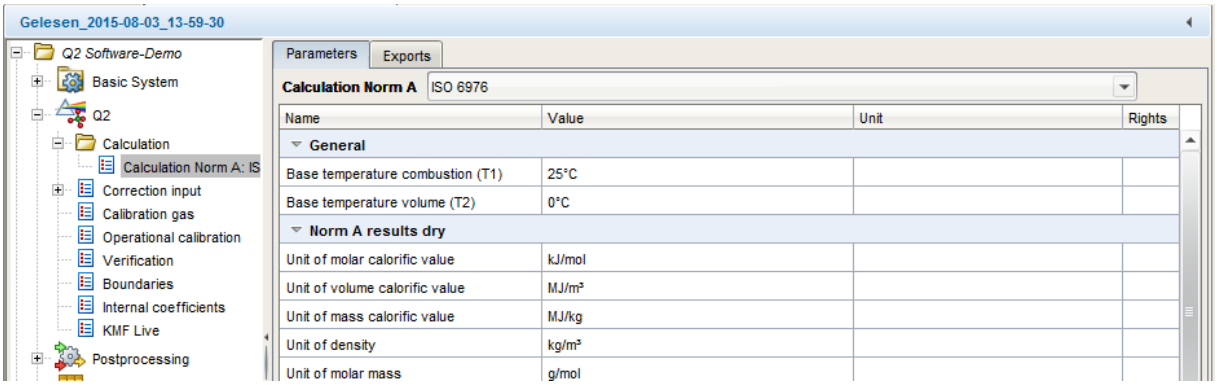


Figure 8.24: Example of left- and right-hand sections of the parameterization window

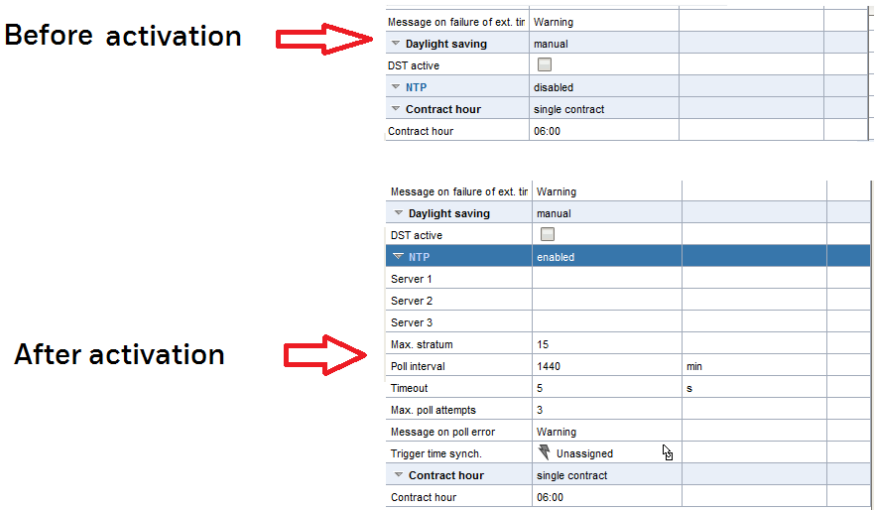


Figure 8.25: Example of reactions in the param. window after using a drop-down box

	New functions or changed methods require additional parameters, which are then provided in a new sub-path for editing. Such structural changes in the parameter set are only possible in offline editing.

There are different types of parameters. Some of them can be switched. Some are displayed in separate windows, for example under Export values. These are required partly because the function groups of the device share their values via the parameter set. It must be ensured in every edited parameter set that the cross-references are correct.

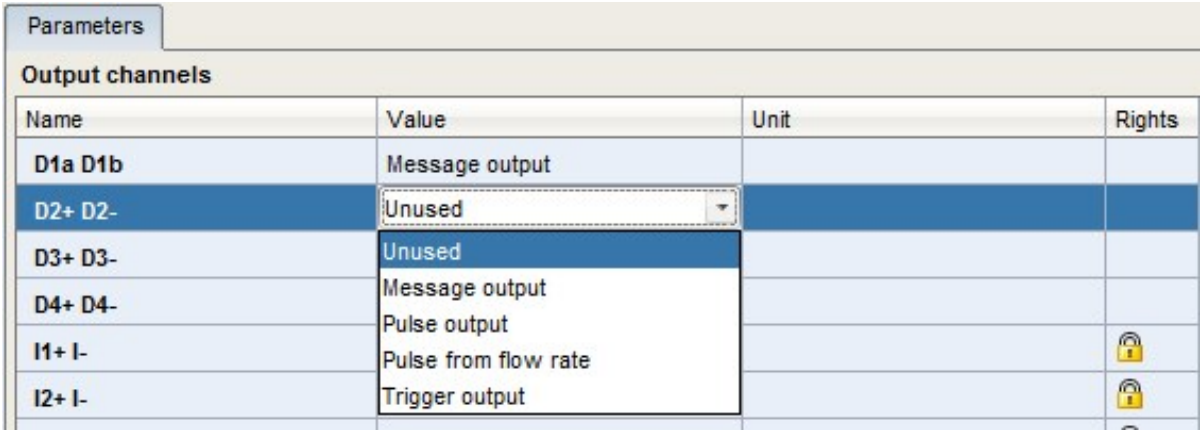


Figure 8.26: Example of switchable parameters

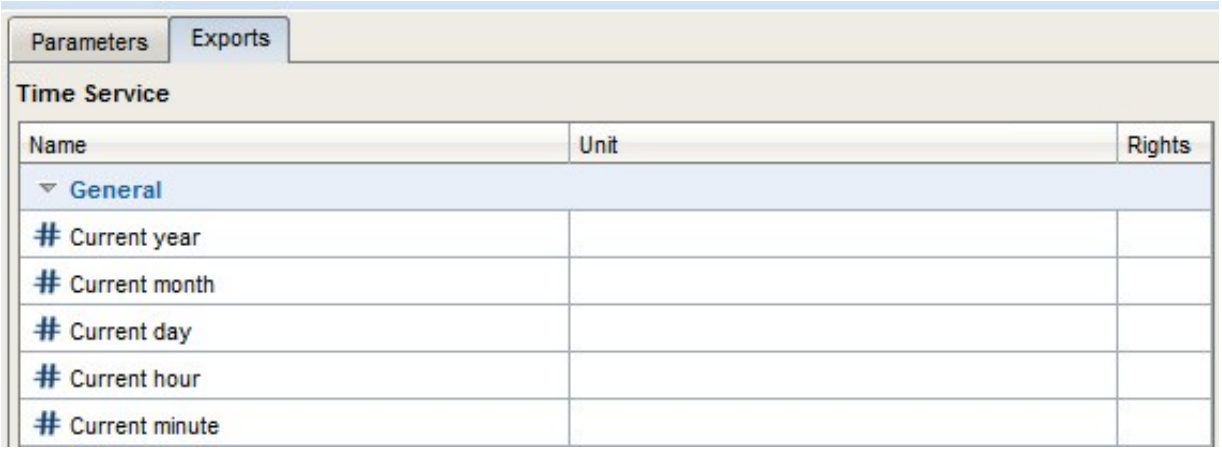


Figure 8.27: Example of export values in the Export values window

	Whether the parameter type can be switched, depends on the actual parameter. More details of the parameter types, units and windows are given in the online help.

During editing, the program makes use of color-based signs in order to identify the status. If the parameter label is **blue**, this means that the parameter was edited but the change has not yet been saved. Any superordinate branches are also blue at the same time. A **red** parameter label indicates that changes have been made and the **parameterization is not yet valid**. The parameterization can be saved, but it cannot be transferred to a device.

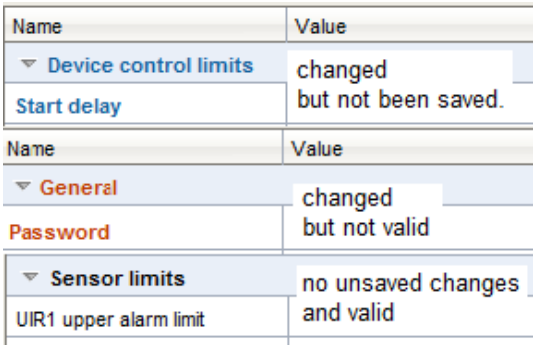


Figure 8.28: Example of parameters during editing

	If you delete or make a major change to a value in a parameter set and the value is used in a different context, all the links to this value will be invalidated and will be automatically deleted. You will receive a message about this process so that it is obvious which links have to be recreated.

Instead of changing a read-out parameterization, you can also adapt a new parameterization from the templates, as described in the next section. Then transfer the parameterization to the device. The procedure and further parameterization tips are also described in the next section.

8.4.2. Create a new device parameter set (Offline parameterization)

Instead of changing a read-out parameterization, you can also adapt a new parameterization from the templates. Proceed as follows (the steps are basically the same as before)

Step	Create new / default device parameterization
1.	Highlight the device
2.	Select the action **New parameterization**.
3.	**In the appearing dialog**, if possible, select the option "**Copy from product parameterization**" to use a product parameterization as a template using the selection menu, otherwise or alternatively select "**From scratch**" (no template) to obtain a largely unedited template (parameter tree) for your device.
4.	Edit the device parameterization according to the following instructions in this text or use the online help to obtain additional information. **(Remove all unused AFBs from the parameter tree. Set unused input or output to "Unused" in the parameterization)**
5.	**Save the device parameterization using a suitable name.**

.

	You can sometimes select operating modes or add or delete functions in the **All Parameter** tab as well. Example: Converting the operating mode of a board channel, e.g. for changing from "not used" to "message input". New functions or changed operating modes require additional parameters which are then made available for editing in a new subordinate branch. Any such structural changes to a parameterization are only possible using offline parameterization.

The tabular listing of parameters in the parameter window has several columns. The name of the parameter (**Parameter name** column) depends on the selected language. You can see the current value of the parameter in the **Value** column; here, changes can be made.

You can distinguish between different types of parameters:

- **Selection of one of several options**
  Example: Selection of one of several calculation methods
- **Name**: Entry of character string for identification purposes
  Example: Name of a temperature sensor, e.g. serial number
- **Constant**: Entry of numerical constant
  Example: "Housing heater target temperature" as a limit value for the monitoring of temperature
- **Import value**: Assignment of an export value (result of another functionality)
  Example: Assignment of the time event **Every hour** of the time service as trigger

The function blocks of the enCore software provide results which can be further processed by other function blocks. These results are called **Export values**.

	Value window – Export values There is a window with a tab for export values in the parameterization interface of enSuite. All export values are sorted here according to function blocks and made available in a tree. The structure here is identical to the parameter tree structure in the parameterization window. The window is normally located on the right-hand corner of the screen. It can be hidden so that a greater working area is available. The window is then displayed once again after clicking on the Values button on the right-hand corner of the enSuite window. If you simply move over the button using the cursor, the value window is temporarily displayed.

The **export value name** is derived from the tree structure. The **export values** in the value window are identified by a symbol. This symbol shows at a glance to which physical quantity the value belongs. Examples:

Symbol	Physical quantity
	temperature
	pressure (absolute or gauge)
	volume (volume at base conditions, volume at measurement conditions)
	energy
	heating value

	If a parameter is an import value, i.e. the assignment of an export value is expected, then, within the corresponding **Value** field, the symbol for the physical quantity is shown on the left-hand side and the drag-and-drop sign on the right-hand side.

	The assignment of an export value to an import parameter only works if the physical quantity is matching. You can assign a value by dragging onto the parameter from the value window using drag-and-drop. A stop sign ⃠ appears if any such assignment is not possible (e.g. because the physical quantity is not matching). Alternatively, you can also open the selection list directly at the parameter value and select the desired value. However, this list contains all export values that match the physical quantity. As a result, the drag-and-drop method is clearer for more complex parameterizations.

There are parameters for which either the use of a constant or an import value is possible. For certain parameters, it is also possible to select the option **Not used**, e.g. for unavailable input values or in order to disable a monitoring routine (by choosing **Not used** for a limit value).

	The possibility of **switching the parameter type** (import value or constant or not used) depends on the respective parameter. If several options are possible, you can open a context menu by right clicking on the parameter name. You can select the desired option here.

Alongside the **Name** and **Value** of a parameter, the associated physical unit is displayed in the **Unit** column for values that correspond to a particular physical quantity. Under normal circumstances, the default unit is used for the physical quantity in question. This is highlighted in the display with an asterisk *.

	**Change units** If you click on the unit of a parameter in the Unit column, a list then opens in which you can select another unit if required. The default units for specific physical quantities can also be edited. This is carried out centrally under **Basic System – Unit service – Default units**. You can find out more information on the Unit service SFB in the Online Help and in section 8.4.7Changing units and adjusting display formats in the Unit Service SFB

Further practical tips for editing parameterization:

- **Parameterize input channels**
  Parameterize the measurement devices that are connected to the digital channels. The operating mode typically needs to be selected initially for the respective channel under Basic System – I/O – <Board name> – <Channel name>). The associated parameters can then be edited.

- **Define protocol channels**
  The CPU and or certain process boards provide digital protocol channels. These are intended for the connection of measurement devices via digital protocol or for communication via Modbus (in conjunction with the Modbus AFB). Only the basic communication parameters are specified when defining a protocol channel. You can then edit the associated parameters.

- **Define Pre-processing operations**
  in the Postprocessing AFB. Create messages or implement a strategy e.g.in the event of errors and/or for fixed substitute values.

- **Assign the desired export value**
  to each required input value of the AFB or SFB. This export value is typically provided by another SFB or AFB. You must take care to ensure that the source of the value is correct.

- **Check or edit all options and constants.**
  For certain constants, such usage can also be switched off via the context menu by choosing **Not used**.

	You can activate the associated Context-specific online help in order to find out information regarding the importance/meaning of individual functionalities and parameters. Simply highlight the parameter or parameter tree and press **[F1]**.

When all the required changes have been made, save the parameterization  .

Only saved device parameterizations can be transferred, and only to the device with the matching serial number.

After it has been saved, the symbol  will turn gray and the lines will be displayed in black.

The saved valid device parameter set can now be transferred to the device with the appropriate serial number.

Step	Action: Transfer parameterization to the device
1.	Establish the data connection to the appropriate device (⇨ see section 8.2.4 Establish a connection to the enCore device).
2.	Highlight the desired device parameterization in the data structure of the navigation window.
3.	Select the **Transfer parameterization to device** action (for example in the context menu).
4.	Log in using the login dialog with your **user name** and **password** which appears.

The parameter set will be transferred.

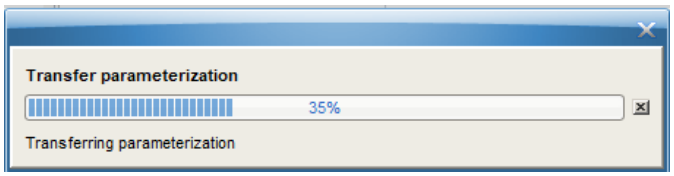


Figure 8.29:
Transfer parameterization

There are typically a number of parameters which are protected by the security switch (SSW), e.g. in order to meet the requirements of an approval. If the new device parameterization is likely to bring about changes to such parameters, but the security switch is closed, then the message **Device could not be parameterized** appears following the transfer.

The device does not restart however; the old parameterization is still used.

If the parameters are not protected by the SSW or if this is open, the changes will be transferred, and the device will restart.

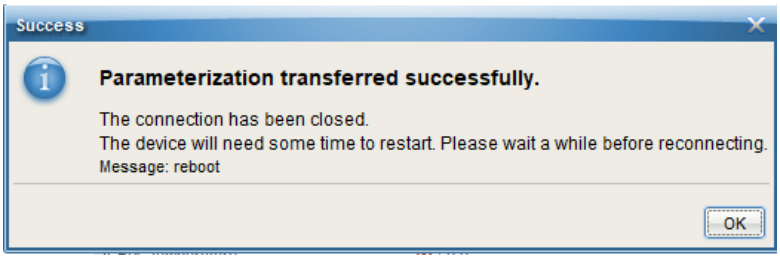


Figure 8.30: Parameterization transferred successfully

The restart will disconnect the device and the user will be logged out automatically.

The device will now operate using the transferred settings after you have re-enabled the required operating mode. These new settings will remain in use even after the device is switched off and on again.

8.4.3. Changing the device parameter set in the connected device (online parameterization)

Online parameterization means that the content of certain parameters is changed directly during an existing data connection to the device **(data connection⇨ see section** 8.2.3 General connection options to the enCore device**)**. This method, also described in the online help, is suitable for minor changes.

Step	Action: Changing device parameters in the connected device online
1.	Establish the data connection to the device and Highlight the device in question in the navigation window either under the **Devices** branch or under the **Connections** branch.
2.	Select the entry **Online parameterization** in the lower section of the navigation window.
3.	Log in with your **user name** and password using the login dialog that appears.
4.	The parameterization is read; the parameterization window then opens up for editing purposes. (The elements of the parameter tree will be displayed in black.)
5.	Make the change. Editing methods are in principle the same as for the offline editing (see hints sections before) but no changes may be made to the AFB composition or the parameter structure. Only parameter changes that the logged in user is permitted to carry out may be made. The following applies additionally in the event the security switch is closed: Parameters labeled as cannot be changed, parameters labeled as may only be changed provided the fiscal audit trail is not full. Non-editable parameters are listed in gray in the parameter lists and are labeled with the symbol . After entering the edited value, the edited parts of the parameter tree will be highlighted in **green**. This indicates that the parameter was edited but the change has not yet been transferred to the device. Any superordinate branches are also green at the same time.
6.	Activate the **Transfer parameterization to device** button . Once the transfer is completed, the parameter label is then **blue**. This indicates that the transfer was completed but the edited parameterization has not yet been saved in enSuite.
7.	You can and should save the changed parameter set in enSuite. Use the diskette symbol to save the current status. (Once they have been saved, the values will again be displayed in black.)

Then click on the topmost folder in the parameter tree, select the tab as shown and check your login status. **Log out** by closing the online parameterization window.

If you have been logged out by other users, you can complete additional tasks in the online parameterization by using "**Login**".

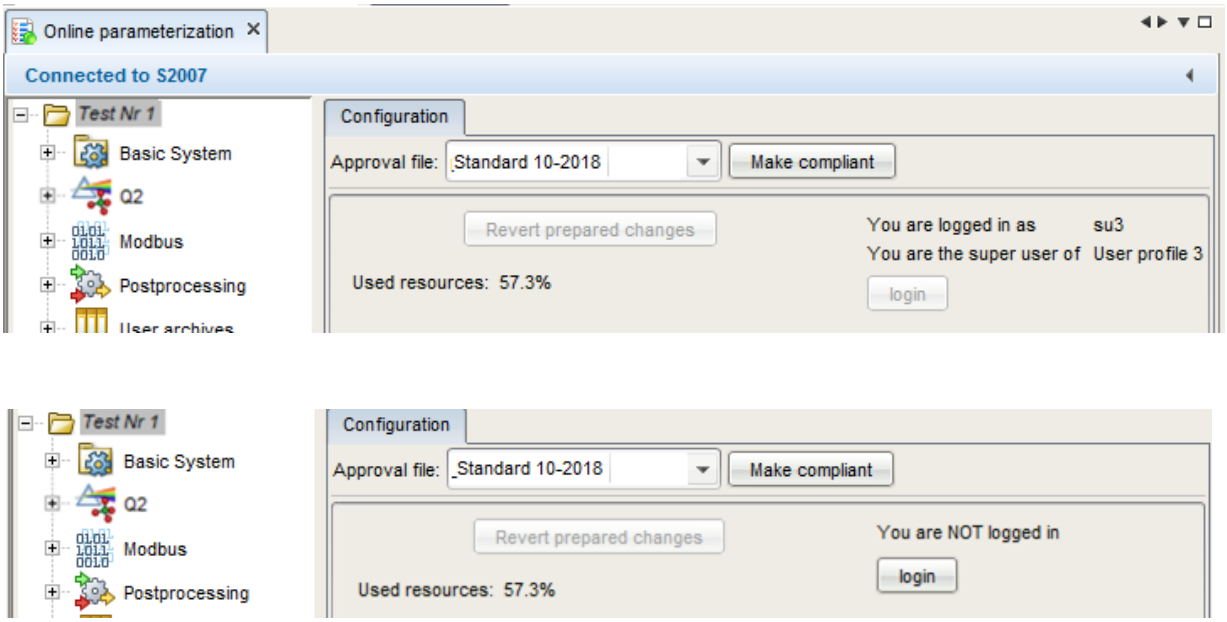


Figure 8.31: Online parameterization login and logout

8.4.4. Product and device parameterizations

Two different types of stored parameterizations are provided in the enSuite database:

A **Product parameterization** belongs to an enCore product class (e.g. enCore FC1, GasLab Q2, proChain GC) and may be used as a template when creating a parameterization for a specific device. By using **File – New**, you can then create a new product parameterization.

A **Device parameterization** belongs to a specific device with a fixed serial number. A device parameterization can only be transferred to the device with the matching serial number.

A device parameterization may be obtained, for example, when reading an existing parameterization from a device (⇨ section 8.2.6 Read-out parameterization). Alternatively, you can create a completely new device parameterization (either based on a product parameterization or without a template) for a specific device in the enSuite database after selecting the action **New parameterization**.

You can save a device parameterization as a product parameterization so that it is available as a template for parameterizations for other devices.

8.4.5. Changing the IP address basic network and I/O settings

As mentioned, the connection is usually established via the IP address of the device. The IP address is part of the existing parameter set. This information used to establish the first connection is given on the device and in attached documents.

After this first connection, has been established, enSuite creates the device and the connection data in the parameter tree (shown in navigation window). After "**readout parameterization**" you can change the settings (offline) on the following page:

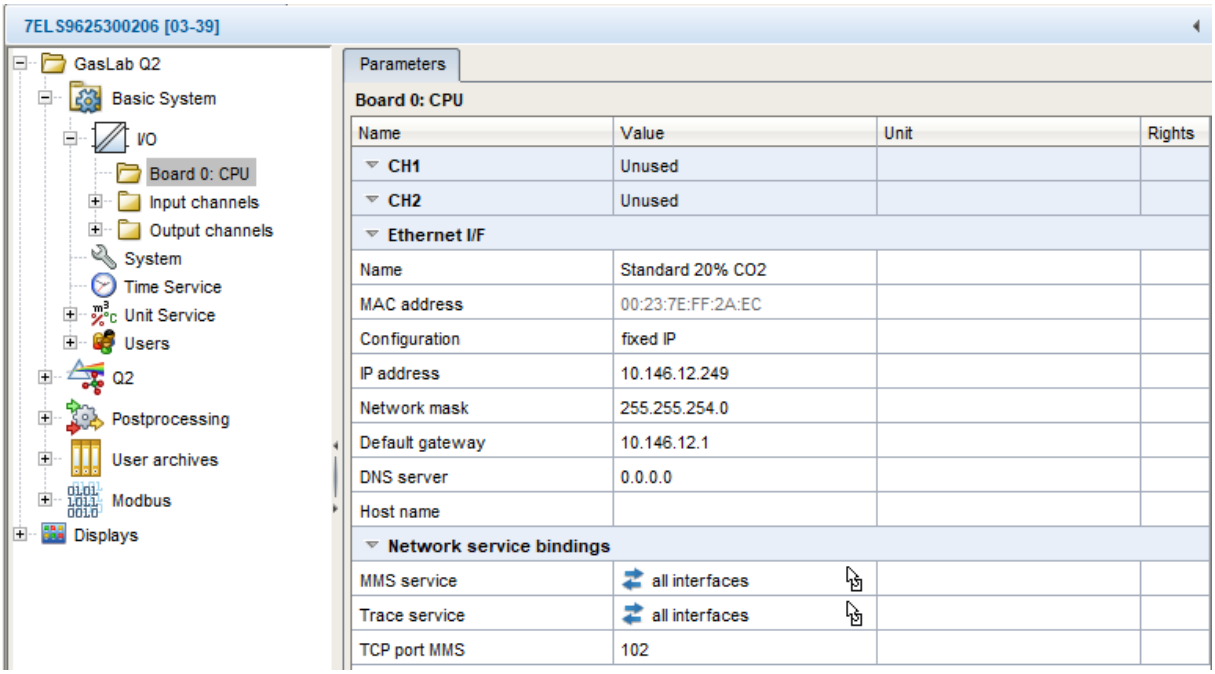


Figure 8.32: I/O Settings in enSuite

	**Do not change the network settings without consulting the IT administration.** **Note all changes and show them on the device or its documents!** **Ne modifiez pas les paramètres du réseau sans consulter l'administration informatique - notez toutes les modifications et affichez-les sur l'appareil ou dans des documents!**

Change or activate the following I/O interfaces (the parameters open after clicking the folder) for communication and data exchange with other devices.

	Refer to the information in the online help which contains more details required to define all the parameters for the following settings.

Ethernet settings

For data communication, connections via Ethernet are mainly used. Go to parameter branch: **GasLab Q2 – Basic system – I/O – Board 0: CPU.** Fill in your changes, proceed like explained in the online help.

Serial interface RS485

These connections include, for example, other measuring instruments, devices for final processing and evaluation, PLC systems, etc. Go to parameter branch **GasLab Q2 – Basic system – I/O – Board 0: CPU.** On the "**Parameters**" tab: Set the type of CH1 (terminals TB4-1 to TB4_3) or CH2 (terminals TB4-4 to TB4-6) from "**Unused**" to "**Protocol channel**".

Digital inputs

There are two electrically isolated inputs supplied by the device. Go to parameter branch **GasLab Q2 - Basic system – I/O – Input channels** and set the type from "**Unused**" to "**Message input**" or "**LF pulse input**".

Digital outputs

There are two outputs (electrically isolated passive output circuits). Go to parameter branch **proChain GC – Basic system – I/O – Output channels** set the type from "**Unused**" to to the desired function offered in the pop-up menu e.g. "**Message output**" or "**Pulse output**".

Analog outputs

Four common galvanically isolated active output circuits ("common ground" / short-circuit proof) with 0 or 4 to. 20 mA are available. Go to the parameter branch **"GasLab Q2 – basic system I/O - output channels "**and set in the register card the type of **current output** for the relevant channel (in the range I1+ I-, I2+ I-, I3+ I- or I4+ I-). For the **Current Range** parameter, set the desired current output range: - 0 to 20 mA or 4 to 20 mA**.**

8.4.6. Setting time-related values and actions in the Time service SFB

Apart from date and time, which are independent of the parameterization, you set all other time-related values and time-controlled actions in the **Time service SFB** of the device parameterization. The online help provides information on the parameters required for adjustment.

	The system time can be compared via the device's network using the Network Time Protocol (abbreviation: NTP) to (high) precision time servers. Activate this parameter and proceed as described in the online help to use this function.

In the Export values window, the SFB provides time-related events of type signal in **Basic system – Time service – Timer events**. The proChain GC generates these events based on the system time and the (parameterized) start of the day.

They can be used as input signals for time-controlled actions in other SFBs or AFBs. More information about the options and settings for time-controlled actions or timer events is provided in the **online help**.

Further settings:

Daylight saving: The time can be switched from standard time (≙ "winter time") to daylight saving time and vice versa in accordance with the regional rules of the European Union, the USA or Mexico (central zone), or on a user-defined basis in accordance with the POSIX standard for time zone information. Alternatively, you can change the time manually on the enCore device or via an external time source (**Prim. external time source**/**Sec. external time source**).

Parameterizing daylight saving in enSuite

► **Open the branch** Time Service**. On the** Parameter **tab, use the drop-down menu** Daylight saving **to determine the rules the switch should follow. Select the relevant entry:**

- **manual**
  The time can be changed manually in the operation panel of the enCore device, via the online parameterization, via an event message or via the daylight saving time information from an external time source.
- **by region** The time is changed automatically based on the predefined rules for the region.
- **user defined** The time is changed automatically based on a user-defined **Posix TZ string**.

Depending on the settings selected, the associated parameters will be displayed.

Time-controlled actions: The enCore device provides following time-related events of a signal type in the export branch **Basic System –** or standard time **Time Service – Timer events**:

- **Every second / Every <2, 3, 5, 10, 15, 20, 30> seconds**
- **Every minute / Every <2, 3, 5, 10, 15, 20, 30> minutes**
- **Every hour / Every <2, 3, 4, 6, 12> hours**
- **Every day (at midnight)**
- **Every Sunday (at midnight)**
- **Every Monday (at midnight)**
- **Every month (midnight on 1st)**

Special case: Trigger for a longer cycle duration is activated first

Event signals in a second rhythm are formed relative to a full minute and event signals in a minute rhythm are formed relative to a full hour. **For example:**

Every other minute e.g., 12:02:00 ... 12:04:00 ... 12:06:00 ..., etc.

Every 3 minutes e.g., 12:03:00 ... 12:06:00 ... 12:09:00 ..., etc.

This means that immediately after the device is restarted and until a cyclic event signal is first triggered the time depends on the boot time and may be shorter than the associated cycle. This special case can only occur once immediately after the device is restarted.

Example: If the enCore device is switched on at 12:02:30 and the signals **Every other minute** and **Every 3 minutes** are used as triggers, at system time 12:03.00, the signal **Every 3 minutes** is formed and only subsequently at 12:04.00 is the signal **Every other minute** formed.

Export values based on the system time in the export branch Basic System – Time Service – Contract hour: <single contract/two contracts>**:**

(initial contract or single contract)

- **Contract hour (numeric)**
- **Every day (at contract hour)**
- **Every Sunday (at contract hour)**
- **Every Monday (at contract hour)**
- **Every month (at contract hour on 1st)**

(second contract – optional)

- Contract **hour 2 (numeric)**
- **Every day (at 2nd contract hour)**
- **Every Sunday (at 2nd contract hour)**
- **Every Monday (at 2nd contract hour)**
- **Every month (at 2nd contract hour on 1st)**

Parameterizing contract hour in enSuite: A gas day lasts 24 hours and by default begins at 06:00. If another contract hour is contractually agreed to, you can adjust the default. Optionally, the enCore device can manage a further contract with another contract hour.

To change the default open the branch **Time Service**. On the **Parameter** tab, select one of the following entries from the drop-down menu in the **Contract hour** area:

- single contract – ***default***
- **two contracts**

If you have selected **two contracts**, the parameter **Contract hour 2** will also be displayed.

- Select the time for the contract hour for the first or single contract from the drop-down menu **Contract hour** – *default* is **06:00**.
- Where applicable, select the time for the start of day for the second contract from the drop-down menu **Contract hour 2** – *default* is **08:00**.

The enCore device provides various contract hour specific events in the export branch **Basic System – Time Service – Contract hour: <single contract/two contracts>**.

8.4.7. Changing units and adjusting display formats in the Unit Service SFB

The Unit Service SFB manages physical quantities and their respective units in the enCore devices. It contains all physical quantities that are typically required. The pre-defined units are based on the SI-System and the conventions and rules of the NIST.

Features of default units are:

- **Identified with an asterisk (*).**
- **Used as a pre-assigned value**
  The associated default unit is used as a pre-assigned value if you, for example, allocate a physical quantity to an input or output channel first. Alternatively, you can select another unit from the set of units for a physical quantity in a targeted manner for parameters or export values You can change units of parameters on the **Parameter** tabs and units of export values on the **Export value** tabs.
- **Automatically updated**
  If you change a default unit, the new default unit will automatically be updated in all of the parameterization for all of the values which use this default unit.
- **Displayed twice**
  A unit which is defined as a default unit is displayed twice in the set of units for the physical quantity to which it is allocated: once as a default unit and once as a "normal" unit. It is therefore possible to use the "normal" unit for individual parameters or export values and therefore avoid the unit being automatically adapted due to a change in default unit.

Every physical quantity is allocated a precise unit or set of units in enSuite. Of these, one unit is defined as a default unit. A display format is preset for each combination of physical quantities and physical units. Default units and display formats can be parameterized.

In each parameterization, there are values for which you can select the desired physical unit in enSuite. There are also values for which the physical quantity must be indicated first. For example, in the case of a measurement via the input channel, the physical quantity depends on the type of measurement device connected. In other cases, the physical quantity is fixed but the unit may need to be adapted for the display or the further processing of the value.

As soon as you change the unit for a value, this measurement will be displayed in the amended unit. A measurement will automatically be calculated in the new unit.

Step	**Changing default units in enSuite**	
1.	**Open the branch Basic System – Unit Service**	The tab **Parameter** lists all physical quantities in the area **Default units** which are typically used by enCore devices. The column **Value** displays the default unit currently allocated to each physical quantity.
2.	Mark the corresponding row.	The drop-down menu in the **Value** column contains all pre-defined and user-defined units for this physical quantity.
3.	Select the desired unit and save your changes.	As soon as you save your change, the unit selected is set as the default unit across the entire parameterization for this physical quantity. Parameters which use this default unit automatically use this new default unit. There are two entries for this unit in the drop-down menus: there is one entry as the default unit **<Unit> *** and one as a "normal" unit **<Unit>**.

Example:

The default unit for the physical quantity **temperature** is degrees Celsius (**°C**). To allocate the unit Fahrenheit as the default for temperature (**°F**) mark the **temperature** row. In the **Value** column, in the drop-down menu select the entry **°F**.

As soon as you save the change, Fahrenheit (**°F**) is the default unit for temperature values.

If you need an additional unit not provided as a standard for a physical quantity, you can easily define this based on a pre-defined unit. A user-defined unit is useful for example if you...

- ... need various display formats or unit symbols for a unit. In this case, the value itself is not converted, just displayed in a different way.
- ... want to use a unit based on a decadic factor – a single, ten, hundred times the value etc. – for counter values and for example want to derive the unit centimeters from the unit millimeters.

A user-defined unit is defined from a pre-defined unit by indicating a gradient and an optional offset. To do this, the gradient and offset for the linear conversion of a value in the pre-defined unit to the value in the user-defined unit must be determined.

The formula is as follows:
Value in user defined unit= gradient × value in predefined unit+Offset

Step	Creating a new unit in enSuite
1.	Open the branch **Basic System – Unit Service – User-defined units**. Click the Add symbol on the **Parameter** tab. The area **Unit <x>** is added to the table.
2.	In the parameter **Name** enter a unique identifier – *default* is **Unit <x>**.In the area name, the name entered is displayed instead of the **<x>**: **Unit <Name>**›
3.	In the parameter **Symbol** enter a unique symbol.
After saving this, identify the user-defined unit with a **Name** and **Symbol**. They are displayed together in the drop-down menu in the format **<Name> (<Symbol>)** – in contrast to this, in the case of pre-defined units only the symbol is displayed**.**	
5.	In the parameter **Physical quantity** enter the physical quantity for which you want to add a new unit.
6.	In the parameter **Derived from** enter the pre-defined unit from which the new unit is to be derived.
7.	In the parameter **Gradient m** enter the factor by which the value in the pre-defined unit is to be multiplied to convert to the new unit**.**
8.	In the parameter **Offset n** enter the offset which is added during the conversion (optional).
9.	In the parameter **Format string** enter the representation format for the user-defined unit on the device

In this parameterization, the new unit is available in the set of units for the physical quantity indicated.

	User-defined units cannot be derived from the default unit Please note that you can only derive a user-defined unit from a "normal" pre-defined unit (<Unit>) but not from the default unit (<Unit *>). Since a default unit is always also available as a "normal" unit for a physical quantity, select this entry in this case

Example

The units meter (**m**) and millimeter (**mm**) are pre-defined for the physical quantity **Length** as a standard.

► **To define the unit centimeter (**cm**), parameterize the following values:**

Name	**Centimeter**
Symbol	**cm**
Derived from	**m**
Gradient m	**100**
Offset n	**0**

The new unit **Centimeter (cm)** is available in the set of units for the physical quantity.

Deleting a user-defined unit by marking the row Area <Name> and clicking the Remove symbol .

Please note that the user-defined unit will also be deleted even if it is being used in the parameterization.
This will render the parameterization invalid; invalid references will be indicated in red font as usual so you can correct the references manually.

Adjusting display formats of physical quantities

Display formats determine how values of a physical quantity are displayed in the device in the associated unit. Display formats are defined for each combination of physical quantity/physical unit by means of so-called format strings. They enable decimal and exponential representation. The format for a decimal representation determines, for example, the number of places before and after the decimal point.

Notation on the exponential representation:
In the exponential representation, each numerical value x is represented with two values, with the mantissa m and the exponent e: x = m × 10e

The mantissa m is a rational number. In the normal representation, the mantissa only has one significant figure before the decimal point.
The exponent is a whole number.

A number is displayed in the exponential representation on the device in the normal representation and in the format: <m>E<e>

The exponent is displayed with at least two digits in the device. Where necessary a leading zero (0) is added.

Example: In a standardized exponential representation, the value 0.0000123456789 is 1.23456789x10-5 and is represented in the device as **1.23456789E-05**.

Display formats for pre-defined and user-defined units can be parameterized. You can easily determine the format string using graphical operation elements. Alternatively, you can also manually adjust the format string. You call the format string depending on whether you change a pre-defined or a user defined unit:

To change the display format for a *pre-defined* unit open in branch **Basic System – Unit Service** the tab **Display formats**.

- Select the physical quantity from the drop-down menu for which you want to change the display format of a unit. The table lists all associated (pre-defined) units with format strings. Mark the row showing the desired unit.

To change the display format for a *user defined* unit open the branch **Basic System – Unit Service – User defined Units**.

- On tab **Parameter** select the user defined unit or add a new unit. Mark the **Format string**.

Continue with further steps (the same for pre-defined and user defined units).

The control elements will be displayed in the lower area of the tab so you can change the display format. The live values of the format strings are preset.

To display the value in *decimal notation* on the device select the checkbox **Decimal notation**. Adjust the representation of the figures before the decimal point:

- **To only show the significant figures before the decimal point, select** All significant digits**.** This setting is typically used for measurements.
- To limit the number of figures before the decimal point, select the maximum number **<1 to 12> digits before the decimal point**.
- To add leading zeros, select the checkbox **Show leading zeros**. This setting is typically used for counters.

Adjust the representation of decimal places:

- To only show whole numbers, select the checkbox **No digits.**
- To display a fixed number of figures after the decimal point, select the relevant checkbox and the desired number of **digits**. Filling zeros will be added where applicable.
- To display the value in *exponential notation* on the device select the checkbox **Exponential notation (normalized)**.

Regardless of the representation selected your changes will be implemented in the **Format string** column immediately as a format string. If necessary, you can restore the pre-defined display format at a later point using **[Restore default]**.

8.4.8. Define basic display and edit display behavior

Normally the displays do not have to be edited. However, if you have the appropriate rights, you can do the following (navigate in enSuite to the point indicated):

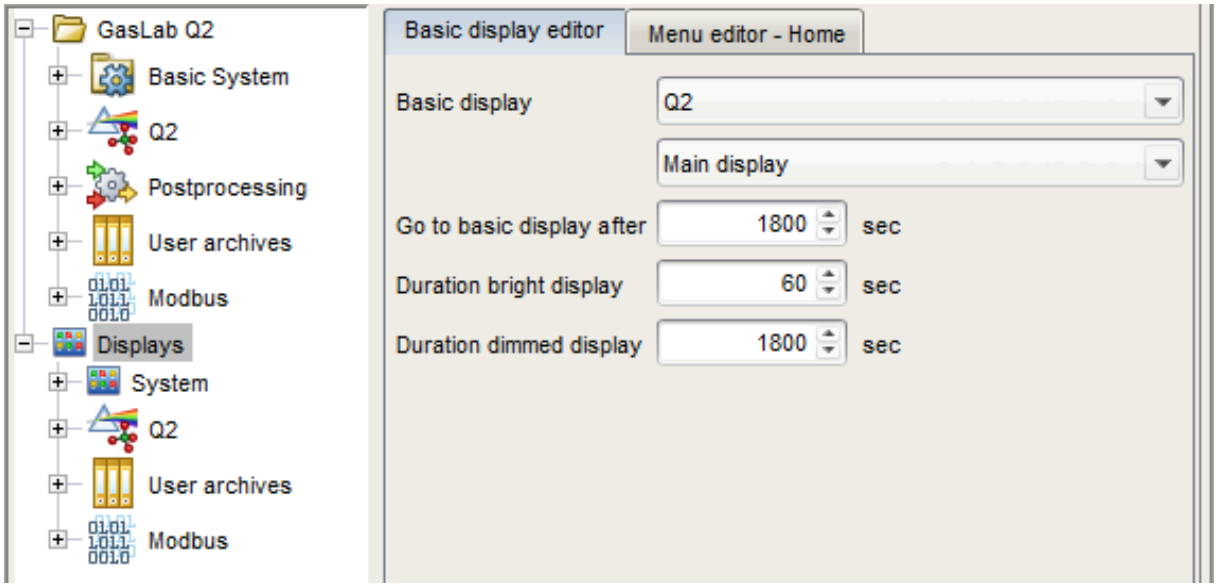


Figure 8.33: Editing the display

On the right-hand side of the parameterization window, there are various settings and options available in the Basic display editor tab.

- **Basic display**
  Using the 2 selection menus you can define which display or sub-display the device shows first when it is switched on or restarted. You can define the AFB in the first selection menu. The second menu is to select any sub-displays.

- **Go to basic display after**
  Here you can define after what time the system quits the current display and returns to the basic display. Do not make this time too short since after a break in editing above this time, you will have to reopen the previous display, making your work more difficult.

- **Duration bright display**
  If a bright display is not used for a lengthy period, it will dim. You can define the time after which it will dim here.

- **Duration dimmed display**
  If a dimmed display is not used for a lengthy period, the screen will be shut down. You can define the time after which it will shut down here.

The device displays are also listed on the right-hand side of the parameterization window in the Menu editor – Home tab. If you have the appropriate rights, you can use the context menu and the symbols on the right-hand edge to make various changes to settings.

8.4.9. Setting or changing automatic measurements

To ensure the accuracy of measurement, the measuring instrument is continuously checked and corrected during operation. This is ensured, among other things, by **automatic operational calibration** once a week and is shown on the display in the top line.

	With the factory parameterization and the commissioning settings, the operational calibration runs automatically without any additional intervention.

Prerequisite for the automatic calibration, which takes a few minutes, is that the operational calibration gas (mixture of methane + CO_2) is permanently connected to Q2 and is at the correct pressure. The calibration starts with the purging time for this gas mixture, which ensures that the unit is filled exclusively with this gas. When calibration is complete, the measuring unit is purged with process gas and then automatically continues the analysis.

	**During commissioning, the purge times, the gas compositions of the calibration gas and, if necessary, the calibration cycle must be adjusted** **Lors de la mise en service, les temps de purge, les compositions du gaz d'étalonnage et, si nécessaire, le cycle d'étalonnage doivent être ajustés**

After reading out the current parameterization, you will find the present settings for operational calibration under the path shown in the picture. This covers the majority of applications. Nevertheless, it may be necessary to adjust some parameters. These changes are easier to carry out when using enSuite than on site at the device.

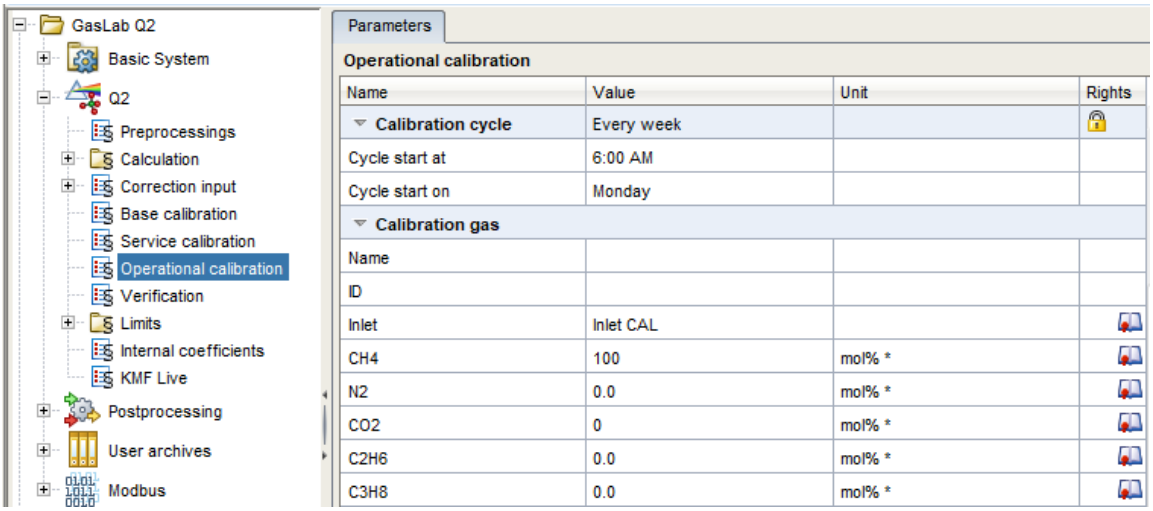


Figure 8.34: Operating Calibration Gas Settings

For example, the exact composition of the calibration gas mixture according to the manufacturer's certificate of analysis must be checked with enSuite or on the instrument and changed if necessary, as shown in the picture above. The preset flushing times must also be adapted to the local conditions.

Change the settings using the instructions in the **enSuite online** help and section 7.4.2 Operating mode: Operational calibration (manual). The device also offers further possibilities to modify the automatic operating calibration, e.g. changing the day of the week and time of calibration. Proceed according to the instructions in the **enSuite online help**.

	Changing the time-controlled trigger (interval, day, time) makes sense, for example, if there are two measurement devices since otherwise both devices would be calibrated at the same time and it would not be possible to access either of the two measurements during this time. An automatic operational calibration may also make sense after certain events and, for example, be triggered when input signals are received or after a restart.

If the calibration fails, the situations and procedures specified in section 7.4.2 Operating mode: Operational calibration (manual) also apply.

The automatic verification (test gas measurement) can be used for instrument control. Similar to the operating calibration described above, the settings in the following enSuite path must be adjusted:

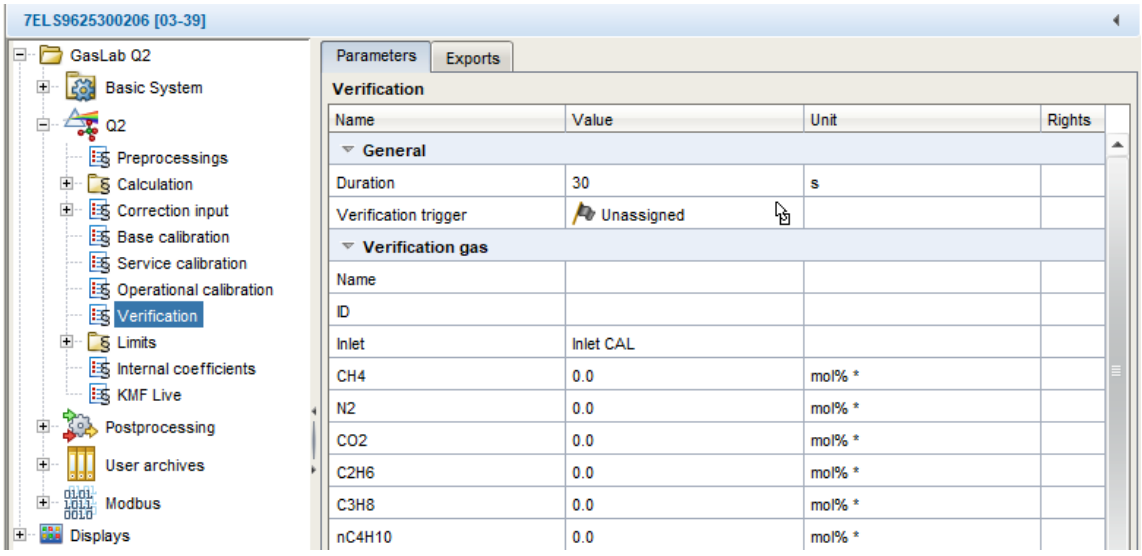


Figure 8.35: Automatic Verification Settings

In addition, an automated 3-way valve must be installed in the gas flow .

Furthermore, the prerequisites and instructions explained in section 7.4.3 Operating mode: Verification (special mode) apply.

	The annual service calibration usually not automated requires an additional different gas mixture ⇨ 10.2 Completing a service calibration (setting analogous to the above examples in the parameter Service calibration)

8.4.10. Fiscal parameters and optional using approval file (Select approval)

For devices, which are intended to be used in legal metrology, the approval specifies which parameters are legally relevant. The editing of such parameters must be specifically protected or logged.

	There are two different types of access rights for legally relevant parameters: Can only be changed if the sealable security switch is open Can also be changed if the security switch is closed, provided the fiscal audit trail is not yet full. The change is logged in the fiscal audit trail.

If the device is operated in accordance with a valid approval, then the following conditions need to be met in the parameterization:

- The access rights for legally relevant parameters must be set in line with the approval.
- The software versions of the fiscal software components must comply with the approval.

In order to ensure compliance with these conditions, please proceed as follows:

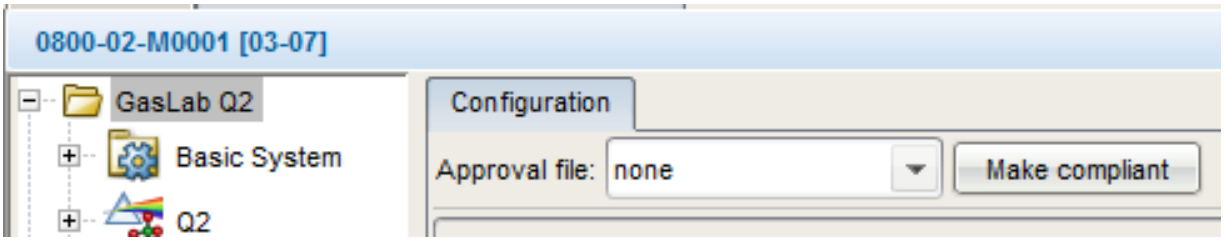


Figure 8.36: Configuration – selecting the approval file

1. Select the approval to be applied in the **Configuration** tab, using the drop-down list. All parameters and parameter branches whose official access rights (i.e. or) deviate from the selected approval are now labeled in bold **orange**. A **blue** label indicates that official access rights have been newly added.

2. Now click on **Make compliant**. By doing this, the access rights for legally relevant parameters are set in line with the selected approval. The orange labeling is replaced by a **blue** one as the changes have not yet been saved.

3. Check the listing of AFBs in the **Configuration** tab. If an AFB is still labeled in bold **orange** here, then this means that a software version was selected here which does not comply with the approval. Select the correct version which is in line with the approval. (Versions in line with the approval are listed in black, and versions which are not in line with the approval are listed in orange. Versions that are not compatible with the current Basic System appear in red.) Then click on the **Make compliant** button.

4. Save the parameterization . The blue labeling of parameters and parameter paths then disappears.

This action does not make any changes to the values of parameters. After the changes are saved, all the colored markings will disappear. Transfer this compliant parameter set to your device to use it for fiscal measurements.

	Approval file within enSuite / the device There are various national approval files which define the fiscal parameters which must be monitored and the corresponding values in enSuite. There are also files which allow this protection mechanism to be used for non-fiscal operation as well. A special official approval file transferred and contained in the device's software determines which approval should apply for the device. It is possible to replace the approval file in the device via software configuration.

During operation, the device checks whether the official access rights and the fiscal software component versions match the requirements of the approval file in the device. The selection in enSuite is used solely for support purposes during parameterization.

On the remote operation panel, you can see an identifying string for the approval file in the Info (system) display. If both the official access rights of the parameterization as well as the fiscal software component versions are in line with the approval file, then this text is black; the text is red in the event of any deviations.

Security switch and fiscal audit trail may also be used for devices that are not to be operated in accordance with an official approval. In such cases there are prepared unofficial "approval" files, including a file without any official access rights whatsoever.

All the AFBs available for the device will be listed in a table in the bottom section of the tab. They can be used with the appropriate rights to expand the configuration AFB. See the **online help** for further information.

	If this protection is disabled, "**none**" (see figure) will be displayed. after "**Approval file**".

8.4.11. Restoring the parameter set to factory settings (importing data)

If the device no longer produces acceptable results due to several incorrect settings, it may be necessary to restore an older parameter set or the factory settings.

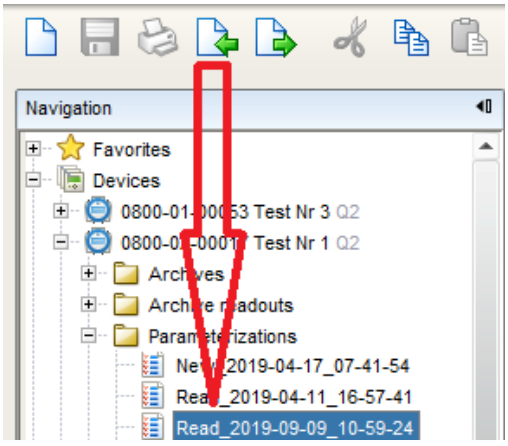
	**This procedure deletes all current settings in the device and should only be used as a last option in an emergency. If in doubt, contact Honeywell. Before doing so, save all data that is still required on an independent system. A backup must also be available.** **Cette procédure supprime tous les réglages actuels de l'appareil et ne doit être utilisée qu'en dernier recours en cas d'urgence. En cas de doute, contactez Honeywell. Avant de le faire, enregistrez toutes les données encore nécessaires sur un système indépendant. Une sauvegarde doit également être disponible.** ⇨8.6 Using enSuite functions in device operation.

Step	Work: Restore default setting in the device
1.	Start the enSuite configuration and analysis software.
2.	Back up all the relevant device data to an external data medium or computer.
3.	Upload the backup parameter set created as described in section 8.2.7 Saving, and exporting the parameter set to your PC. (If the backup is still in your enSuite installation, this item can be omitted)
4.	Connect to the device.
5.	Transfer the backed up (default) parameter set to the device.
6.	The device will restart and then continue to operate with the settings from the backup file.

Import data

You can import selected files (backups) using the icon above the red arrow (see image on the right) in the enSuite window. Click on the icon and follow the dialog boxes.

Once the file has been imported, it will appear in the **navigation window** under the parameter tree of the device, as shown in the example on the right.



	**Do not forget to adjust the calibration gas properties if you are no longer using the same calibration gas cylinder as when the device was delivered.** **N'oubliez pas d'ajuster les propriétés du gaz d'étalonnage si vous n'utilisez plus la même bouteille de gaz d'étalonnage que lorsque l'appareil a été livré.**

8.4.12. Changing the software configuration (Update / Downgrade)

As with all products, the GasLab Q2 is subject to changes and additions from time to time. In this section the software update from the basic system version 3-08-A to version 3-34-A is described as an example.

The terms firmware and software are used synonymously.

As the instrument software consists of different modules, exchange these modules **individually or together** with the newer current module versions when updating the software. These software modules include the basic system, all available AFBs and the optional approval file which defines the official or protected access rights.

In the case of a downgrade, the modules are exchanged for older software modules, but this is a special case. The version specification for software modules is structured as follows, for example:

The version number for software modules consists first of a major version number, then a minor version number and at least a version letter (e.g.: 03-33-A).

The major version number must match for all software modules within a device.

The minor version number is incremented if the parameter structure is different, but the module version is still compatible with other software modules with the same major version. A differing version letter indicates that the software changes are minor, and the parameter structure has not changed.

For all following steps, you always need all current software versions. The SSW of the device must be open, and you must log on as administrator.

Attention!

All security settings will be lost if you work as the administrator with the SSW open!

A software update may render the device useless if the installed version does not satisfy the following requirements.

Refer also to the information on the specified websites and contact Honeywell if you are in any doubt.

Attention!

Tous les réglages de protection sont perdus si vous travaillez en tant qu'administrateur avec un contacteur d'étalonnage ouvert!

Une mise à jour du logiciel peut rendre l'appareil inutilisable si la version installée ne remplit pas les conditions suivantes!

Respectez également les instructions figurant sur les sites internet indiqués et adressez-vous toujours à Honeywell en cas de doute.

Requirements:

- The software versions are independent from each other. Q2SENS-FW:1.2.0 is essential for the update described here.
  (See 7.3.5 Info display (Software Status))
- The current software version must not be too old for the update. The basic system requires version 3-08-A or newer.
  (Perform the check described in section 8.6.8 Use "Live data tab" to view the Software status)
- The number of base calibration gases must also be correct.
  (**Check by reading the existing parameter set and comparing the entries with a new parameter set**).

	You can use the change history of a new software version to check whether the new functions, improvements, bug fixes and resolved security problems are relevant for your enCore device. The change history is available for software releases on the Elster-Instromet website since 2020 as a PDF file in the download area of the respective device type. . www.elster-instromet.com/en/software-downloads

enSuite ensures the compatibility of the software modules. The exchangeable software modules include the basic system (with its SFBs), all available AFBs as well as the optional approval file that defines the access rights, e.g. for devices in fiscal use.

For all following steps you always need all current software versions. The Elster-Instromet website www.elster-instromet.com/en/software-downloads contains the latest software releases for the Elster gas appliance series. Download the required version from the download area onto the service PC and unpack it.

In most cases, a **new enSuite version** is required for a device release. Please check the enSuite modification history on this website to find out which enSuite version is required or compatible. If necessary, download this version and reinstall it or update your existing installation. The current enSuite is available in the download area of the Elster-Instromet website: www.elster-instromet.com/en/ensuite

The exchange of software modules requires the user login and should also be prevented by the security switch (SSW), i.e. exchange is only possible with the switch open. Access rights should only exist for the administrator or a user profile with the same rights. When opening the seal switch, also observe the legal regulations of the respective country.

Only if all the above requirements are satisfied should you continue with the other points in this section. Proceed as described below.

- Download the firmware you require from https://www.elster-instromet.com/en/gas-analyzers in the Software Downloads section and save the files on your parameterization device. **Caution when saving the file.** It is not possible to use files if there are special characters in the file path.
- Check whether your enSuite version is still up to date and download the latest version if necessary from www.elster-instromet.com/en/software-downloads in the **Software Downloads** section and install it as described in section 8.2.1 Installing enSuite. .
- **Open the security switch in the device** (if nessesary)
- **Establish the data connection to the device**
  (in this case, M0004 is connected).
- **Highlight the relevant device in the navigation window** either under the Devices branch or under the Connections branch.
- **Read out all archive data and save this data** (to avoid data gaps in the archives as far as possible) In the lower area of the navigation window, select the action **Readout archives** and save the archives under the desired name.
- **Read out the current parameter set, save these data,** as original parameterization. See sections 8.2.6 Read-out parameterization and 8.2.7 Saving, and exporting the parameter set.
- **Read the parameter set again** for conversion after the update if the current parameterization is no longer compatible.
- Check carefully using the read parameter set whether the update can be used (**see requirements**).
- Select action **Software configuration** in the bottom section of the navigation window (see next figure).

Figure 8.37: Activate software configuration (navigation window)

The **Configure software** window shows a tabulator for all software modules that are currently included in the device (along with version number in the column **Current**).

It is also indicated (in the first colum) whether a module is **fiscal** or **not.** In the following example, **none (Elster)** is displayed for a nonofficial approval file. Legally relevant (fiscal) modules are intended for official measurements in accordance with a valid approval. The replacement of fiscal and non-fiscal software modules can be separately restricted by way of special access rights.

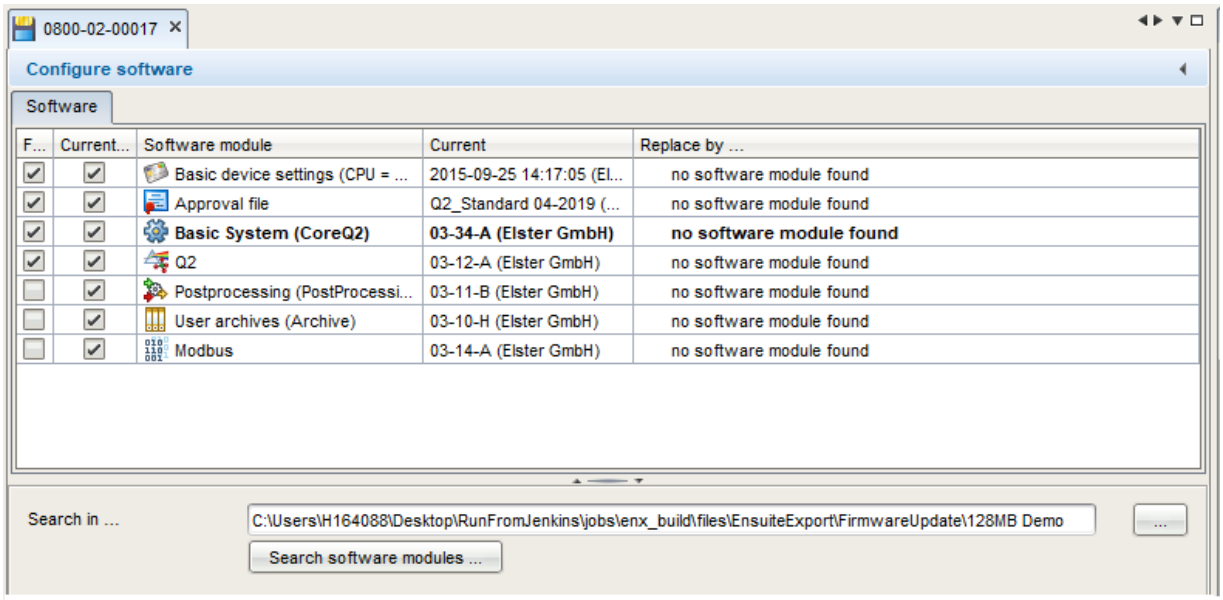


Figure 8.38: Window configure software

- In order to search for other versions and software modules which may be installed as well, select the directory in which the new software versions are located under **Search in....**Click on ... to select and define the path to the stored software package. (Attention! If there are German umlauts in the Search file path, it is not possible to transfer update files (including parameter sets) to a device).

- Now click on the "**Search software modules**" button. A search is now conducted in the specified directory for other software versions.

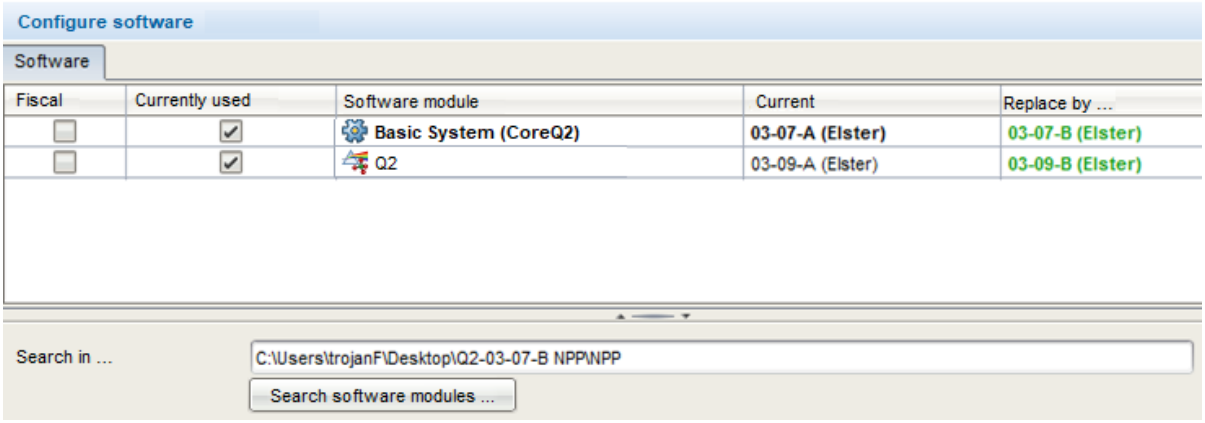


Figure 8.39: Exchangeable software

If newer versions of the searched software modules are found, then these are displayed in the **Replace by...** column and highlighted in bold **green**, see above. If not the text "**Don't change**" then appears.

Depending on the situation, you can select **additional software modules** via a dropdown menu that opens by clicking in these fields. You can exclude individual software modules from the update by explicitly selecting **do not replace**.

	In general, all the modules highlighted in green must be changed. We recomend to follow the automatic suggestion from the system for changing modules. Provided the old and new software modules only differ in terms of their version letters, then the original parameterization can continue to be used, even after the software download. If the version numbers differ as well, this means that the old parameterization is no longer compatible, although it can be easily converted.

Attention: Approval files do not have any particular versions, but rather they are identified by their name instead, none (Elster) in the example above. For a replacement of the current approval with a new approval file, it must be taken into consideration, to explicitly select the appropriate file. A click in column **Replace by ...** will open a dropdown menu.

- Once you have selected all desired replacement actions, click on the [**Perform software changes]** button at the bottom of the window.

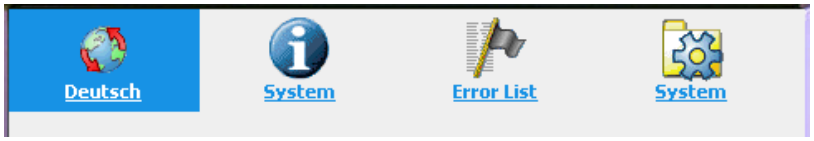
If you have not yet registered, you must fill in the login form with your **user name** and **password** and log in. (The login form is displayed automatically if needed). If authentication is successful, enSuite will list the modified modules before the transfer.

- Once everything has been taken into account, confirm the security dialog. enSuite will not transfer the modified software to the device until you confirm this dialog.

The software updates are now transferred to the device. The condition of the security switch is then examined. If this is closed, and if changes to the software configuration are prohibited in that case, then the procedure is terminated. Otherwise the device restarts.

	The replacement of software modules may be protected by the security switch. These settings can be found in the parameterization in the branch **Basic system – Users**, on tab **Special user rights**.

After the restart, only the basic settings will be on the device. At the same time, the appearance of the displays may change. The archives and parameter sets will have been deleted (see figure).



The device must now be provided with a parameterization again. To do this, the original parameterization must be transferred back into the device. It may be necessary to convert the original parameterisation. For further information on the conversion please refer to the next section, use the parameterization read out for this purpose at the beginning.

Procedure in brief:

- Establish a connection to the device with enSuite.
- Select the action Transfer parameterization to device.
- Authenticate in the login dialog.

After successful login the transfer starts. After successful transmission, the device restarts automatically and the real software update is finished.

For devices **in fiscal operation**, check in the **Info - Software Status display** whether the parameterization conforms to the approval file contained in the device. The display shows an identifying abbreviation for the approval file.

If both the official access rights of the parameterization and the versions of the legally relevant software modules conform to the approval file, this text is **black**, whereas the text is marked **red** in the case of deviations. With the hyperlink <Short term of approval file> you can obtain detailed information on the approval.

To ensure that the desired software modules have been transferred to the device, compare the version numbers in enSuite (**Configure Software window**) with the version numbers of the device.

To do this, switch to the **Home display** and open **Info - Software Status - < Basic System or Name of the official AFB**>. Here (among other things) the basic system and the used AFBs are listed with their version number.

Now close and seal the security switch (SSW) again, if necessary.

If errors which have no physical cause occur after the software update, the update was not completed correctly or the device software was unsuitable for this update after all.

You can attempt to reset the change using "**Restore previous state**" (in the "**Configure software**" window).

Then re-transfer the old, unchanged parameter set.

8.4.13. Convert original parameterization (optional))

Background: If, after the software update, the versions of the basic system in the device and the parameterization no longer match, the original parameterization is no longer compatible, but can be easily converted.

To ensure the compatibility of the original parameterization with newer software modules,

- open the parameterization read out for this purpose in the previous section for editing and mark the root of the parameter tree with the device designation in the parameter window.

On the **Configuration** tab page, you can see the software modules that can be parameterized, i.e. the basic system and all AFBs used in the parameterization with version information. (See figure).

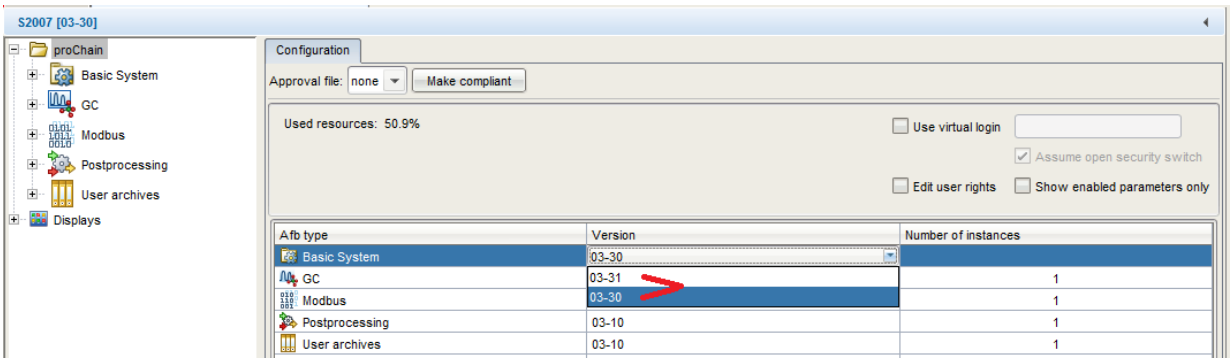


Figure 8.40: Possible Versions of Basic System

- Select the new version for the basic system in the **Version** column. enSuite searches for the versions of the AFBs that match the basic system and highlights them in green, similar to the example above (the other modules are adapted automatically).

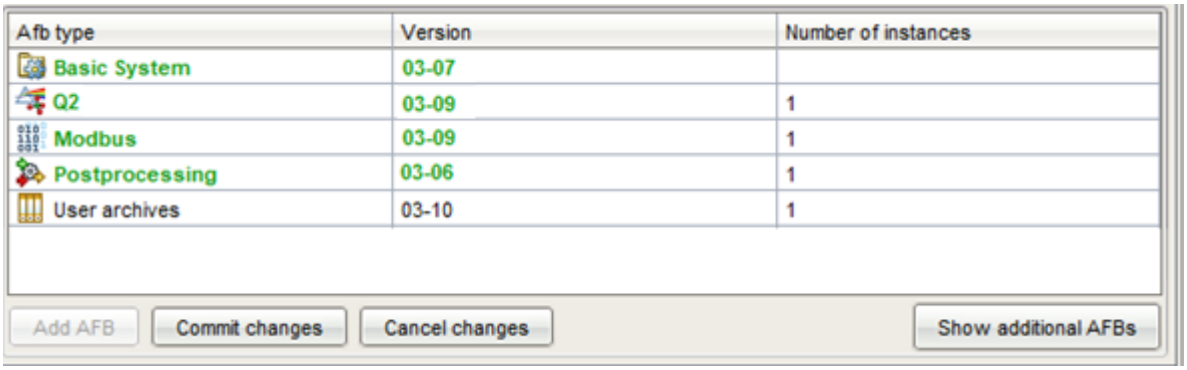


Figure 8.41: Change version of parameterization

- Click on **Commit changes**.
- Then check the parameterization for the changed modules for new parameters and edit the parameterization if necessary. It is also possible that individual AFBs are marked red. In this case the parameterization is invalid and must be reworked.
- Check the parameter set for unwanted changes caused by the update.

The new modules may mean that some functions are no longer included or are not automatically included. In this case, any invalid parameters or paths will be displayed in red/orange and the message "**Conversion error**" may appear.

If, for example, SFB Q2 I/O 03-01 was used before the update, the parameterized outputs will be reset to "**Unused**" after the update.

If necessary, revise or add the appropriate parts using your backups. For this purpose, use the values from the original parameter set in the same places within the new structure. **Always check all the lines.**

- Save the updated parameter set and close the window

The device parameterization can now be transferred to the device.

8.4.14. Special case: bugfix software

	The special thing about a bugfix software is that typically only one AFB is published. With this AFB only the revision letter is increased. No suitable enSuite is published, which means that your enSuite installation does not know the new device software. To enable the transfer of a bugfix software to the enCore device, you have to explicitly allow this installation in enSuite

Allow installation of a bugfix software in enSuite

- Open the menu item Extras – Options in enSuite.
- Select the **Allow bugfix installation** checkbox.

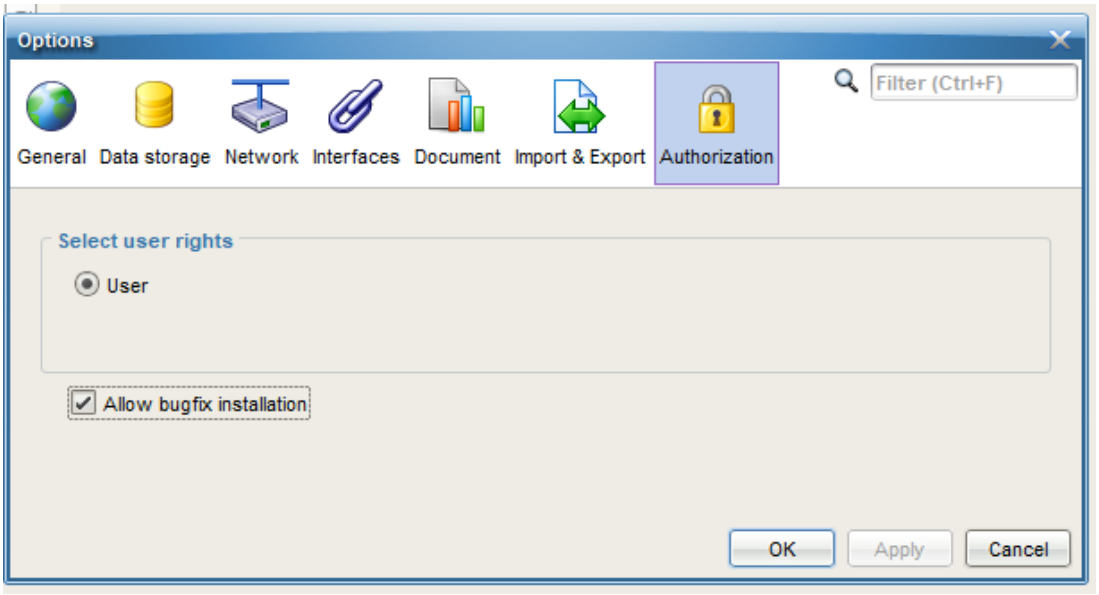


Figure 8.42: Allow installation of Bugfix firmware

As soon as you confirm the setting with **[OK]**, software modules with a revision change can be transferred to the enCore device.

8.5. Remote operation panel functions of enSuite

The so-called **remote operation panel** refers to a function that enables the remote control of enCore devices with your service computer. The remote operation panel is a copy of the local operation panel and is displayed in enSuite. The remote access can be done via Ethernet or USB connection. Since the basic system 03-39-A, the connection is established via MMS and secured via TLS.

8.5.1. Open and close remote operation panel

As soon as you are connected to a device (see 8.2.4 Establish a connection to the enCore device), the entries in the lower left corner of the enSuite interface are activated. If you select the "**Remote operation panel**" entry there, a graphic representation of the front of the device will appear in the middle of the enSuite interface. By mouse clicks in the areas of the 7 touch fields (see figure 7.1), the same operation as on the device is possible. The screen and LED displays are now synchronized with the device. At the same time, the physical local display is assigned a lock screen and local input is deactivated.

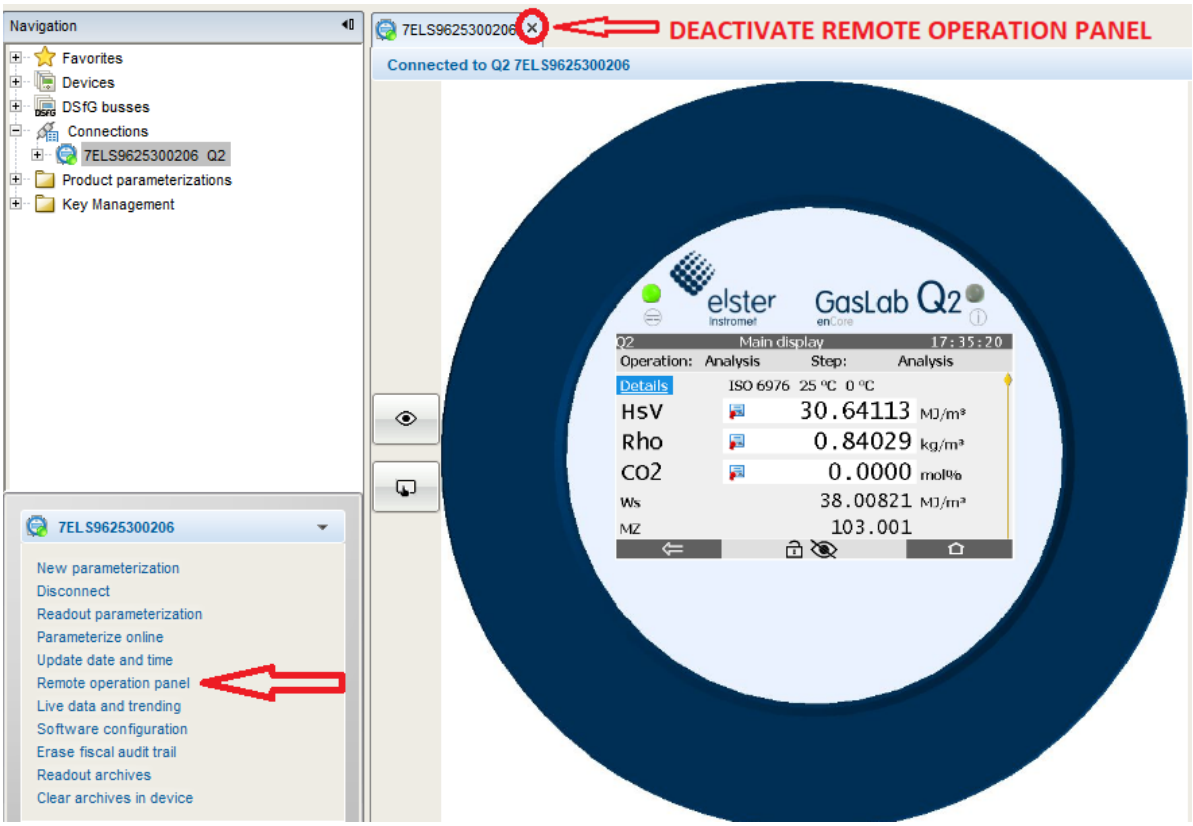


Figure 8.43: View of the remote operation panel via enSuite

	Tip: Detach the window from the enSuite frame see 8.2.2 Starting enSuite; the first steps and have the remote operation panel displayed enlarged, which makes it easier to use.

After **deactivating the function** by closing the window with the **X** in the first line (shown in the figure above), by disconnecting the device (see section 8.2.5 Disconnecting the device and Connection

errors) or **automatically after a few minutes without activity**, physical displays and local entries are reactivated. Also on the device, a local user can cancel remote access at any time.

	If a user uses the remote operation panel, it cannot be opened by another user. If the remote operation panel is closed, it can be used in another enSuite connection. Because the remote operation panel behaves like the real display on the devise, opening, closing, or connecting/disconnecting the machine does not change the login status.

8.5.2. Enabling the local device functions

The local display can be enabled, and the operation of the device can also be granted. This is useful, for example, if technical support is to be remotely located and you need to see the device display on the device at the same time. For this purpose, there are two toggle buttons to the left of the illustration of the device front that switch between the following positions each time they are pressed. See the following tables.

With the upper toggle button enable or disable the device display for a local user	
	**Current status:** **The local user sees a lock screen and the device cannot be operated locally.** Action: Click to activate the device display. If desired, you can now activate local operation on the device with the lower toggle button.
	**Current status:** **The local user sees same what is shown on the remote operating panel.** Action: Click to lock the device display for the local user, a lock screen is displayed instead. Any local control granted is also removed. No user interaction is possible on the device.

With the second toggle button give the local user control of the operation – this button is only active when the local device display is enabled:	
	**Current status:** **The local user cannot operate the device.** Action: With a click on the button, the local user gets the possibility to operate the device.
	**Current status:** **The local user can operate the device.** Action: Click to deny the local user access to the device.

The selected setting is also indicated by symbols in the middle of the footer or status line of the displays:

	The local user sees the lock screen
	The local user sees the actual display content and can operate the device.
	The local user sees the actual display content, but the device is operated from remote.

	If the local user is granted the view, the remote keyboard input is visible to the local user on the device display! Note that your input via the remote operation pane can be observed on the device display! Therefore, before entering sensitive data, such as your user password, undo the view by pressing the corresponding toggle button again.

As soon as a local user on the device opens the virtual keyboard for input with granted control, enSuite displays a lock screen:

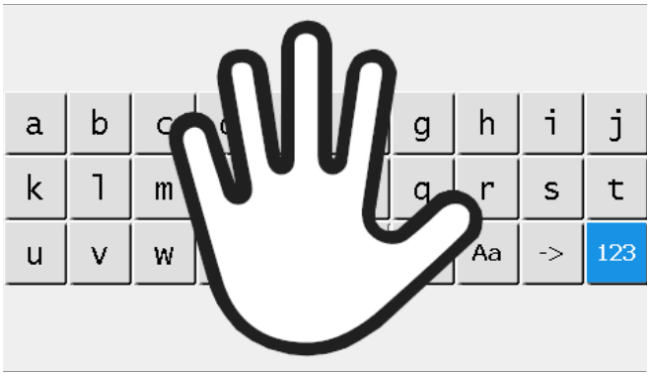


Figure 8.44: Lock screen on remote operating panel during local keyboard entry

	Local keyboard entries are never visible on the remote operation panel for data protection reasons.

8.6. Using enSuite functions in device operation

In normal operation, the device will operate autonomously. The user does not generally have to intervene. Nevertheless, there are situations which require contact to be established with the device. This may be the case, for example, if you wish to view or check the results live or export and archive data from the device memory before they are overwritten. In addition to the operation panel, enSuite generally provides the more convenient and comprehensive options for this purpose. The following describes how to use the device with enSuite.

8.6.1. Update date and time (system time action)

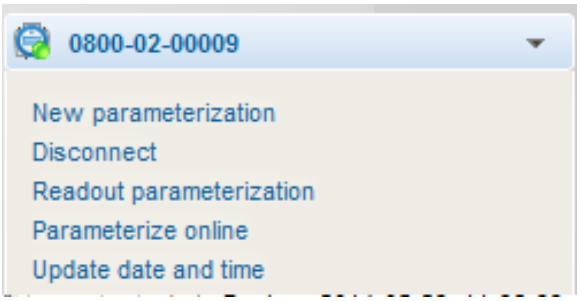
The system time is the combination of the device time and date. You can update it within the device in enSuite using the enSuite action. As part of this, the updated time and date will be transferred directly to the enCore device without changing the parameterization.

(You can only update the time zone, however, in the device parameterization).

You can either synchronize the system time with the local PC time or set this manually. You can also switch the daylight saving time settings in the associated enSuite dialog.

Prerequisites

- The user has the right to Update device time**.**
  (⇨see section 8.3.3 Viewing setting and change access rights)
- enSuite is connected to the enCore device via an active data connection.
  (⇨See section 8.2.4 Establish a connection to the enCore device).
- The security switch (SSW) is in the position as specified in the parameter set.
  (⇨see section 8.3.3 Viewing setting and change access rights).



Click in the bottom section of the navigation window on “**Update date and time**”

Log in using the dialog which appears.

Once you have logged in successfully, the **Update device’s date and time** tab will open.

Figure 8.45: Update date and time navigation window

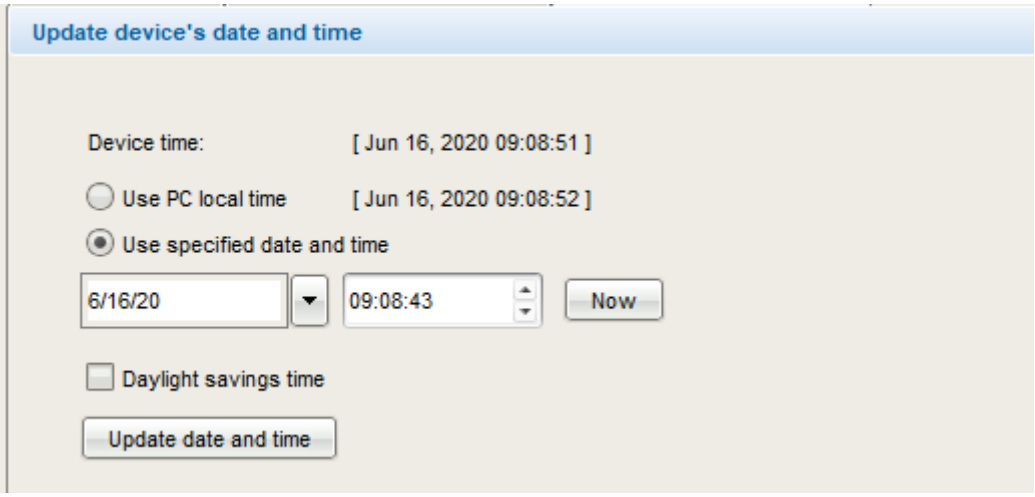


Figure 8.46: Update device's date and time tab

To synchronize the system time of the device to the PC time enable the option **Use PC local time** – the current PC time will be shown in square brackets.

Or to set the system time of the device yourself enable the option **Use specified date and time** – default.

	The date and time selection fields are pre-assigned using the system time of the enCore device at the point at which the user logged in; the date and time are not updated.

To assign the date and time selection fields again with the updated local PC time, click **[Now].** Change the date in the date field and the time in the time field manually if necessary.

If the local PC time or the time you have selected is in daylight saving time select the checkbox **Daylight savings time**.

Clicking **[Update date and time]** transfers your settings to the enCore device. The settings are immediately saved by the device and then in the main display of the Time Service this update time will be displayed as the Latest update value.

If the date and time could not be set successfully, enSuite will display a warning and the cause of the error in the **Output window**. The cause of the error may be, for example, that the user has been automatically logged out due to the **Inactivity timeout**

	Tip: If the output window is not displayed in enSuite, you can open it using the path Window – Output or the <Ctrl + 4> keyboard shortcut.

8.6.2. Displaying and reading analysis results

The analysis results can be displayed and read in different ways.

The **Modbus AFB** can be used to export and process the data. You can also use the **User archives AFB** to save the results in the device. These data can be read out and viewed or saved later to a PC.

The enSuite function "**Live data and trending**" can be used to analyze individual results in more detail and display them in graphic form.

8.6.3. Working with the Modbus AFB

The Modbus AFB allows the Modbus parameters to be configured. It is used if TCP/IP has not been configured for data transfer or data exchange. The settings can be freely selected within wide ranges.

This enables you to adjust the GasLabQ2 perfectly to the environment of your measuring equipment using standard parameter sets or to use the device as a replacement without changing the existing structure.

	**Consider country-specific regulations!** **Please note that Modbus communication is not encrypted. This does not prevent an attacker from intercepting or modifying the communication. Consider the country-specific regulations. These may require manual verification of the data.** **Envisagez des réglementations spécifiques à chaque pays !** **Veuillez noter que la communication Modbus n'est pas cryptée. Cela n'empêche pas un attaquant d'intercepter ou de modifier la communication. Tenez compte des réglementations spécifiques à chaque pays. Celles-ci peuvent nécessiter une vérification manuelle des données.**

	The Modbus AFB has its own operating instructions which can be downloaded from the Docuthek www.docuthek.com.

Please note that Modbus mainly transmits numbers. For example, the operating mode and the operating step of the device are indicated as export values, by (Modbus numbers), since the plain text is not output here. See www.docuthek.com.

8.6.4. Working with archives and logs

Whenever changes occur or events come and go, this information is also written into the log. The instrument has two logs called "**Logbook**" and **"Audit trail"** in which events during operation are stored as a history. The archive takes the form of a ring buffer with 1000 data records.

- **The header contains a timestamp with the precise calendar time at which the entry was generated and an ascending ordinal (sequence) number for the log entry.**
- **The text body contains the text with information about the reason the entry was generated. This text depends on the cause and the settings in enSuite. It starts with the name of the SFB/AFB which caused the entry.**

	All the data in the audit trail is also saved in the log which means that the entire recorded history is visible in the latter. The user cannot delete the entries.⇨ see also enSuite online help

The **Logbook**

documents / saves events and protocol the device operation in this way. All the relevant data, like logins, logouts and password changes, new set of parameters, can be viewed in these archives. The archive content remains available in the event of a power failure or software update. When the logbook is full, after 1000 entries, the next entry will overwrite the oldest data record.

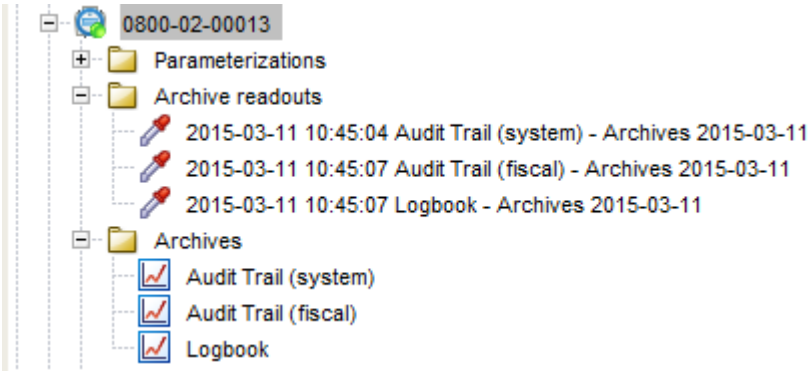
The **Audit trail**

is another protocol archive for documentation. It is part of the basic system and exists in all enCore device types. A distinction is made between "**System /General**" and "**Fiscal**". In the General section, the oldest entry will be overwritten after 1000 entries have been created. In the Fiscal audit trail, parameters can be recorded which can also be changed when the security switch (SSW) is closed. Only if this switch is closed, will the actions be recorded; in all other cases, the archive will be empty. This archive is primarily relevant for billing purposes. After 1000 entries, no changes can be made to the legally relevant parameters unless the security switch (SSW) is open.

	The fiscal audit trail is only filled if the SSW is closed and an approval file is used which provides for the filling. **The terms "official", "fiscal" and "legal metrology" are used synonymously.** The archives can only be cleared/deleted if the user has the appropriate rights and the SSW is open.

The three archives that are always available, "**Audit trail (system)**", "**Audit trail (fiscal)**" and "**Logbook**", document / store the corresponding events and thus protocol the device operation.

Further **individual archives** can be created via the parameterization in the AFB **User archive**. The data can be read out, viewed, saved, backed up and exported using enSuite.

Step	Work: Reading archives
1.	Establish a connection to the device (⇨ see section 8.2.3 General connection options to the enCore device and select the "**Readout archives**" action in the bottom section of the navigation window. A dialog window will appear in which the archive query can be configured.
2.	Select the required archives and settings in this dialog. If necessary, change the suggested names for the reading process. (Always include the date so that you know exactly when something happened.) After making your selection, click on "**Start readout**".
3.	Under the selected name, the read archives will be saved in the path Devices – <Serial number/Name> – Archives or Archive reading cycles. See example:  Each time enSuite reads data, a reading cycle is generated – displaying exactly what was read – sorted by ordinal number.
4.	Disconnect the connection to the device (⇨see section 8.2.5 Disconnecting the device and Connection errors) and view the data in a table. To do this, select the archive, for example Logbook, and click on Display archive in the bottom section of the navigation window.

The operator must read the data and save it to external data media at suitable intervals.

Only if this is done it will be possible to access the information in the logbooks if the data have been deleted or overwritten on the device. The archive can only be cleared/deleted if the user has the appropriate rights and the SSW is open.

Pour lire et enregistrer des données dans enSuite, l'exploitant doit accomplir ces opérations aux intervalles appropriés. Il n'y a qu'à cette condition que les informations contenues dans les journaux de bord peuvent être consultées même s'ils ont déjà été supprimés de l'appareil ou s'ils ont été écrasés. Il n'est possible de vider ou de supprimer l'archive que si l'on dispose des droits correspondants et que l'interrupteur d'étalonnage est ouvert.

After step four, the archive window appears and shows the content of the selected archive in tabular and, possibly, graphic form. The **ordinal number** and the **archive time** are displayed on the left. The archived data is shown in the remainder of the line.

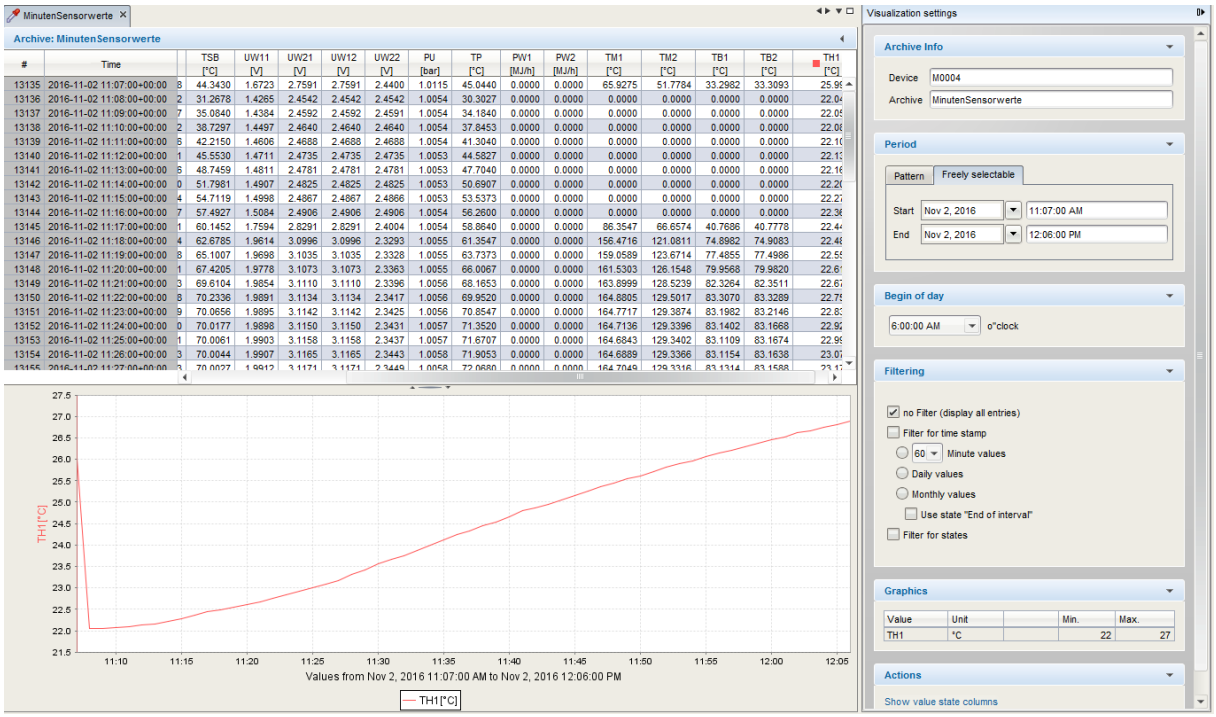


Figure 8.47: enSuite Archive Window

Use the “scroll bar” (if displayed) to view more archive entries. Depending on the type of data, a visualization window may also appear under the table. You can view selected data in graphic form in this window. The selection is made in the context menu by clicking on the header.

There is a clear link between the date and ordinal number; each entry has a time stamp. A window with settings for the visualization appears on the right-hand side. You can filter the display here and decide how the archive channels should be displayed. Once again, you can use the “scroll bar” (if displayed) to view all the options.

Using the same process as for parameterization, you can also export selected files using the **symbols** or the export function in the context menu to make yourself independent of your current enSuite installation.

Figure 8.48: EnSuite export functions

8.6.5. Live data and trending function in enSuite

It is possible to view the device's "Live data and trending" using enSuite. First of all, you must establish a connection to the device (⇨ see section 8.2.4 Establish a connection to the enCore device). Once you are connected to the GasLab Q2, you can right-click on the "**Live data and trending**" entry in the bottom section of the navigation window. The parameters are then read from the instrument and a new window opens in the center of the screen (see figure).

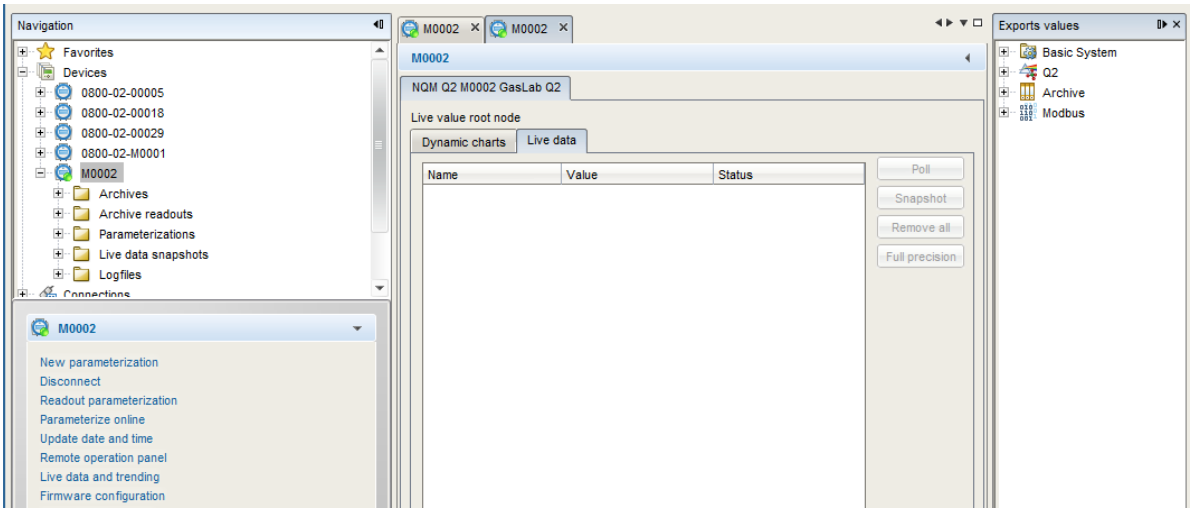


Figure 8.49: Windows and tabs for "Live data and trending" function

There are 2 tabs in the window, "**Dynamic charts"** and "**Live data**". In the "**Live data**" tab, you can monitor lots of data simultaneously in number form. In the "**Dynamic charts**" tab, you can monitor the data in graphic form. There are only 2 physically different data items to observe since there is a maximum of 2 vertical axes. Several data items of the same type can be compared on each vertical axis, for example two temperatures (in °C).

Examples of the "Live data" tab application

There is a window with all the available values in the device (parameter tree) on the right-hand side. Simply navigate to the required value, hold it and drag it into the center window (see the following screen section)

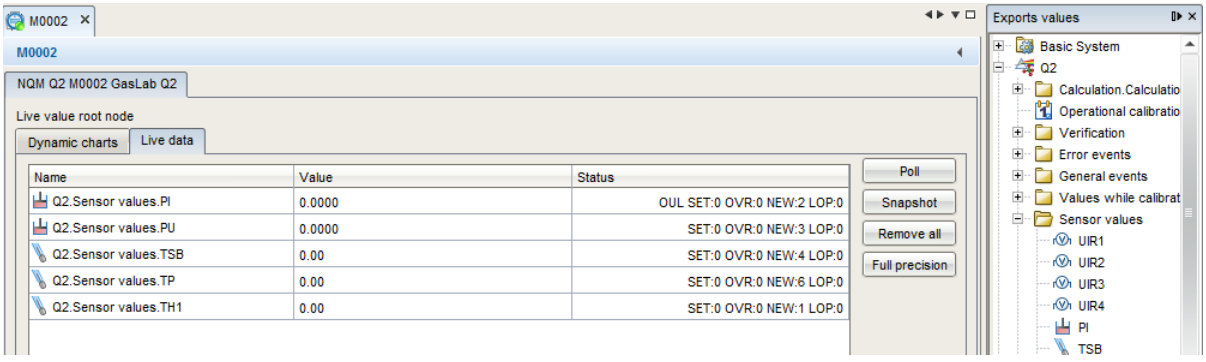
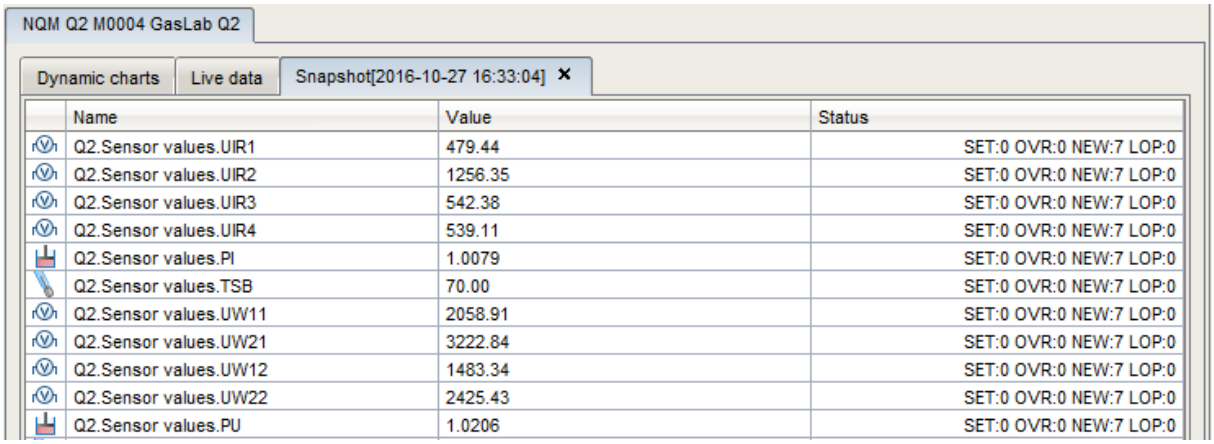


Figure 8.50: Live data tab

If you wish to view a calculated value, for example the inferior calorific value, you can display all three different states of the gas (completely dry/completely wet/partly wet).

When you have dragged the required values from the right-hand window into the center, simply click on "**Poll**" and you will see values updated every second while the button changes to "**Suspend**". If you click on "**Snapshot**", the current value will be frozen and can be viewed in a new table sheet created at the same time.



	Name	Value	Status
	Q2.Sensor values.UIR1	479.44	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UIR2	1256.35	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UIR3	542.38	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UIR4	539.11	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.PI	1.0079	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.TSB	70.00	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UW11	2058.91	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UW21	3222.84	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UW12	1483.34	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.UW22	2425.43	SET:0 OVR:0 NEW:7 LOP:0
	Q2.Sensor values.PU	1.0206	SET:0 OVR:0 NEW:7 LOP:0

Figure 8.51: Snapshot tab

If you click on "**Full precision**", the display of the values will be extended to all the existing decimals. If you click on "**Remove all**", the display window in the center will be cleared. Other examples include the following:

- **Use as "Device monitor"** to obtain information about the operating hours and battery charge and the CPU and RAM load. These data can be opened if the export values from "**Device status**" are used in the tab.

- **Use as "Time Service display"** to provide information about the time setting and events and data linked to it. This information can be opened if the export values from "**Time service**" are used.

	Details are given in the next sections.

Examples of application tab “Dynamic charts”

Here you can select values which you wish to see in graphic form. To do so, drag the values from the right-hand window into the central area.

Please remember that these must be “**Groups**” (see above) if you want to display more than 2 values.

Once the required values have been positioned in the center window, click again on “**Poll**”. The values will then be displayed in a line diagram.

The button will change to “**Suspend**” (as shown below) and “freezes” the graphs when it is clicked until fresh values are displayed by clicking on “**Poll**”.

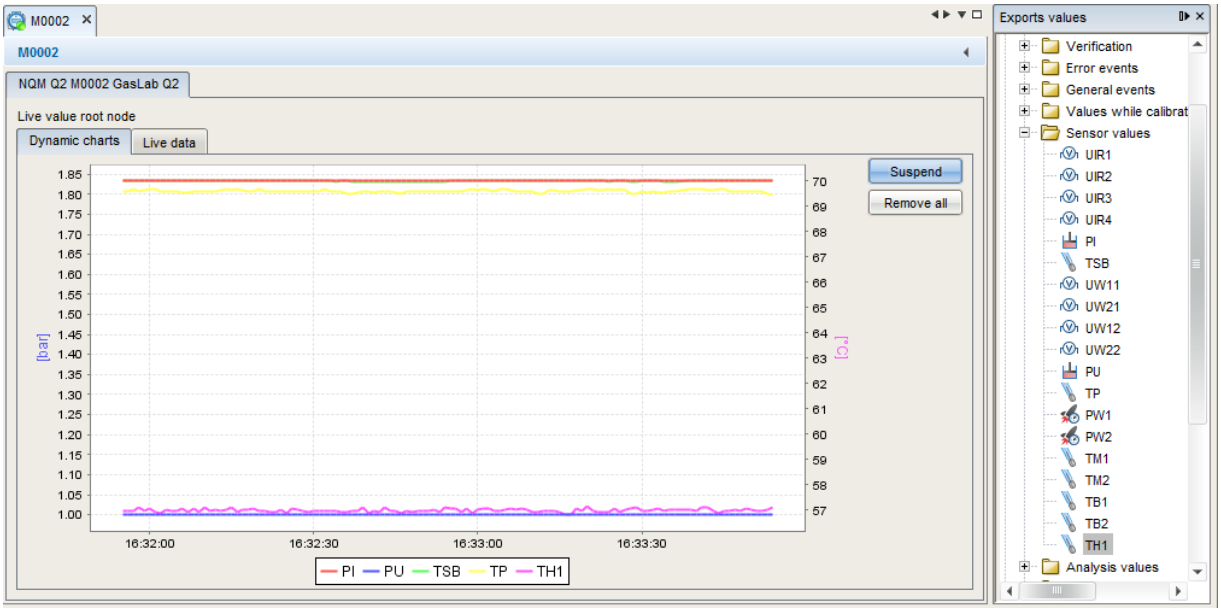


Figure 8.52: Tab “Dynamic chart”

You can clear the central section again by clicking on “**Remove all**” and display other values in graphic form.

The number values form the Y-axis, while the recording time is shown as the X-axis.

8.6.6. Use “Live data tab” as Device monitor

The information about

- Operating hours
- Battery state of charge
- CPU load
- Ram load

can be obtained if the **system export values** are used in the tab “**Live data**” as shown below.

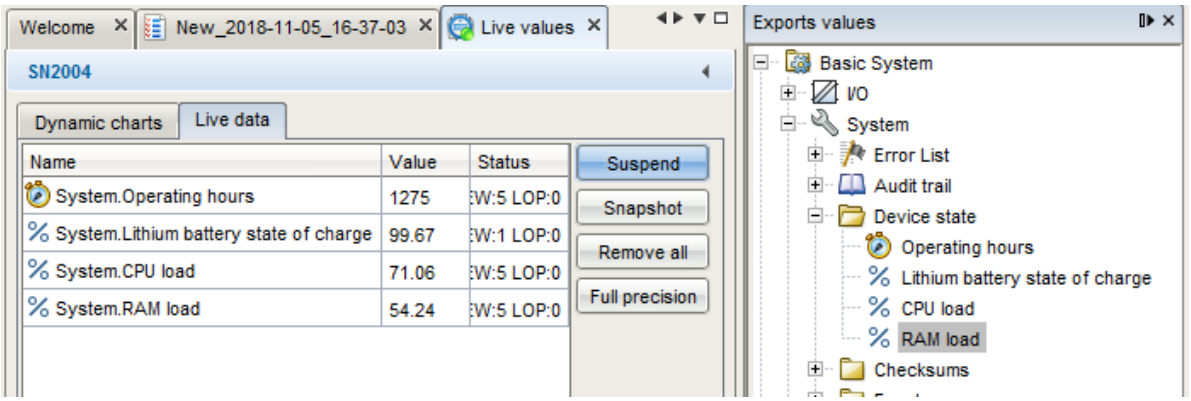


Figure 8.53: System– Device monitor values

The battery is mainly used when the device is off, it must be replaced when the charge drops to less than 20%.

A discharged battery may, in certain circumstances, result in the loss of calculated and saved measurement data. The device will no longer start correctly.

	CAUTION — DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. The replacement of battery must be carried out by Honeywell service personnel additional a permit from the plant operator is needed. ATTENTION - RISQUE D'EXPLOSION SI LA BATTERIE EST MAL REMPLACÉE. Le remplacement de la batterie doit être effectué par le personnel de service de Honeywell et doit être approuvé par l'opérateur du système.

8.6.7. Use “Live data tab” to view Time Service data

Information around time setting, related events and data can be obtained, if the time service export values are used in the tab **“Live data**” as shown below.

Value	Meaning
Current time	System time
Latest update	Time stamp of the last time change.
Latest deviation	Deviation (in seconds) at the last time change
Latest external time source	Number of the external source for the last time synchronization
Daylight saving time	(DST) is the practice of advancing clocks during warmer months

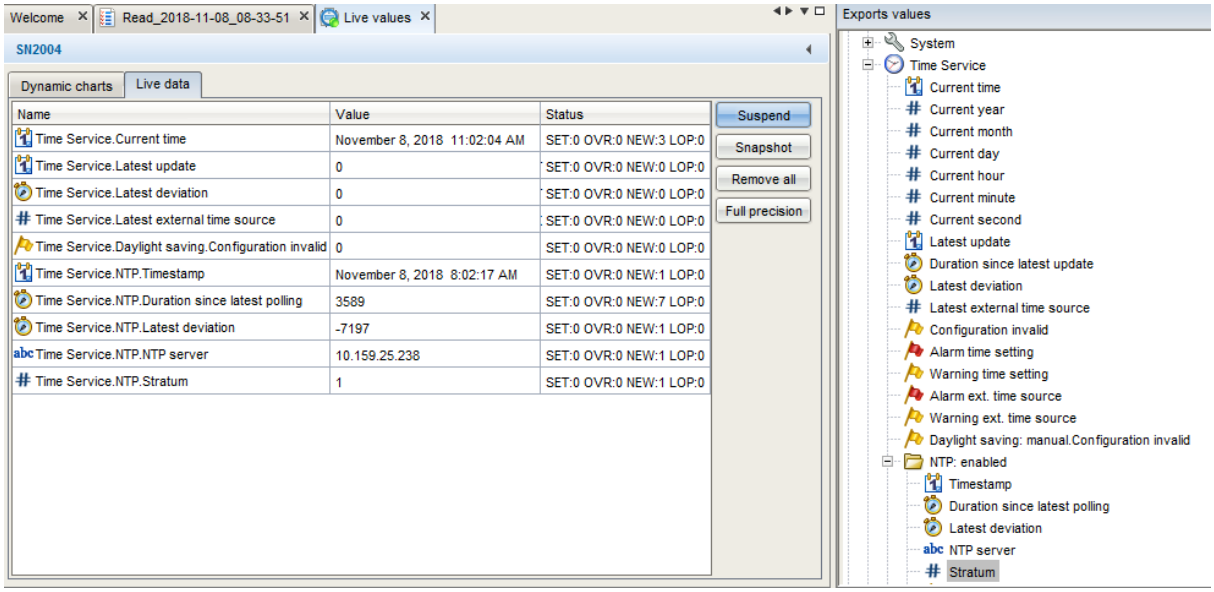


Figure 8.54: Time service main data

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	The **Time zone** (geographical location) and the setting of DST could be viewed in the parameter settings of Basic system. See next figure.

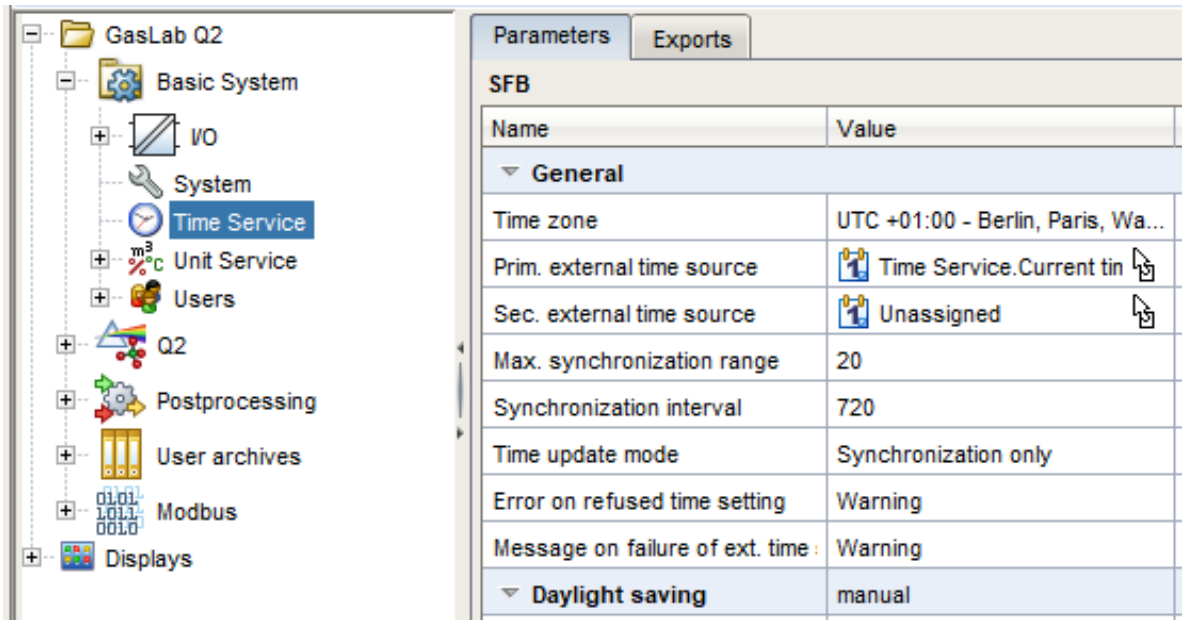

Figure 8.55: Time zone (enSuite)

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The Network Time Protocol (NTP) is a standard for clock synchronization in computer systems. It can be used if NTP synchronization has been activated in the device. Information about enabling and function ⇨ see sections 8.1 and 8.4. Following data can be viewed (information also in the online help available).

Time stamp: Latest update of the last time synchronization using NTP. If a synchronization has already been completed, the precise time of the synchronization can be read in the display (date, time and time zone).

Duration since latest polling: the deviation (in seconds) at the last time synchronization using NTP shows by how many seconds the internal time deviated from the standard time at the last synchronization.

NTP Server: name or IP address of the NTP server used for the last time synchronization, for example ptbtime1.ptb.de or de.pool.ntp.org or company servers as in the figure.

Stratum: stratum value of the NTP server used for the last time synchronization (number of computers up to the time reference in the NTP hierarchy).

8.6.8. Use “Live data tab” to view the Software status

In most enCore devices, a display called “**Software status**” shows information about the identification data of all the software parts in the device. The data comprise the name of the software parts, the version number and the checksum. These data can also be displayed using enSuite functions “**Software configuration**” and “**Live data**”.

Use the “**Software configuration**” tab to display the software status.

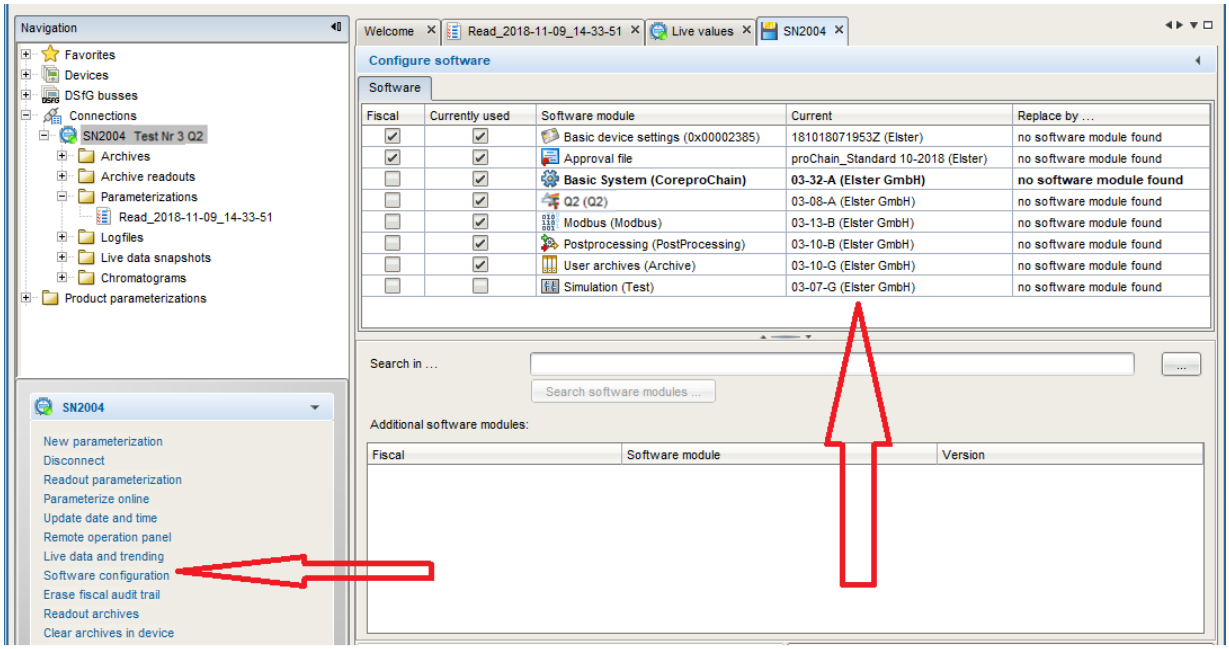

Figure 8.56: Software configuration info

The software configuration lists the names of the main software parts in the column headed Software module. The next column **Current** contains the software version numbers of the components.

The second line of the tab shows the short name of an **approval file**. This file contains the definition of which parameters should be protected from changes so that the device can be operated to the customer’s specification or approval (further information about the approval file is provided in section 8.4.10 Fiscal parameters and optional using approval file (Select approval)).

Operation without an approval file is also possible. In this case, "**none (Elster)**" is displayed. If the device is operated with an approval file and a closed SSW, the appropriate parameters are protected to prevent them being changed.

Use the "**Live data**" tab to obtain information about the software **checksum,** third column of missing "**Software status**" display. To do so, drag the export values out of the checksum folder under "**System**" into the tab's table.

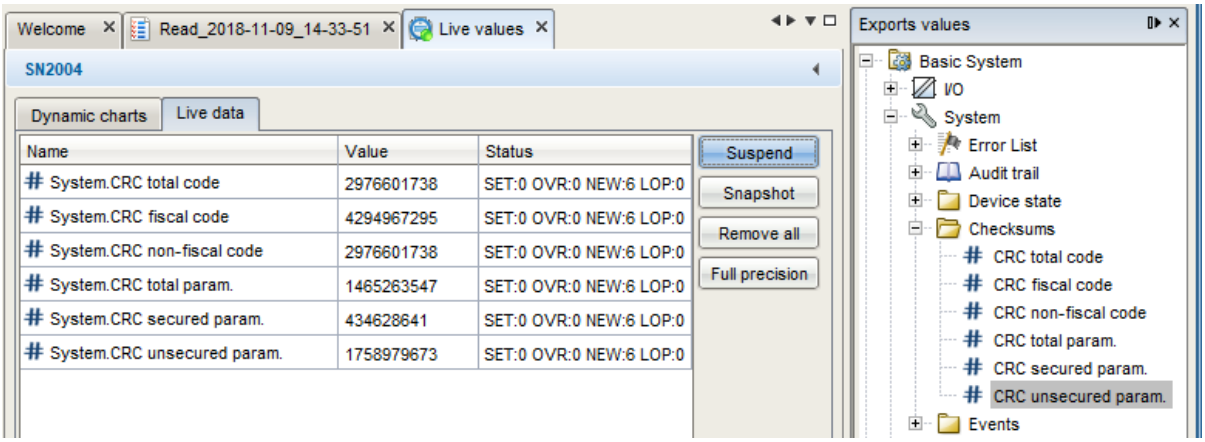

Figure 8.57: Software checksum info

	The above figure only shows examples. If, for example, the device is not used for fiscal measurements, the "**Secured parameters**" display will not be supported.

The **Value** column contains the appropriate checksum (after clicking on Poll). During operation, the actual checksums are calculated and compared to the reference values.

If a checksum discrepancy is identified an error is generated. To check this, add the relevant points listed under **Event** additional in the live data tab.

9. Possible malfunctions and troubleshooting

9.1. Disturbances during normal operation (troubleshooting)

As an aid to troubleshooting and fault elimination, this chapter contains guidelines on troubleshooting. The causes of these errors can be localized and rectified by checking the input and sensor values.

Step	Action: Troubleshooting
1.	Check that the process gas is available at the correct pressure.
2.	Check that the calibration gas is available at the correct pressure.
3.	Check that the waste gas line is not blocked.
4.	Check the position of the needle valves in the device.
5.	Check that the supply voltage is available with the correct values.
6.	Check the communication links.
7.	Check the list in the "**Sensor values**" display for red entries (see 7.3.15 Display Q2 sensor values)

The following describes action to prevent some errors. It is essential to obey all the safety regulations when troubleshooting, particularly the following:

	**The device may only be opened by trained personnel with written authorization from the operator having taken all the necessary safety precautions.//Do not disconnect cable inlets in a potentially explosive atmosphere.//Do not loosen or unscrew the breather element. //Use only explosion-proof, approved equipment.//There must be no potentially explosive gas atmosphere.//Protect all open pipelines and connections from dirt. //Before the device is switched on again, ensure that all the gas connections are sealed and the grounding or PE wire is correctly installed.** **Seul du personnel spécialisé titulaire d'une autorisation écrite de l'exploitant peut ouvrir l'appareil, en respectant toutes les mesures de sécurité!//Ne détachez pas les dispositifs d'entrée de câble dans une atmosphère explosible!//Il est interdit de détacher ou de dévisser le dispositif d'évent! //N'utilisez que de l'équipement antidéflagration autorisé!// Les travaux ne doivent pas être effectués dans une atmosphère gazeuse explosible!//Protégez tous les conduites et tous les raccords ouverts de la saleté!//Avant de remettre en marche l'appareil, assurez-vous que tous les raccords gaz sont étanches et que le câble de mise a la terre ou le conducteur de protection est installé correctement.**

	If the following methods do not produce the required success, contact Honeywell. The Contact data details are provided at the start of this document.

Rectification of the errors under points 1 – 4 (gas supply error)

The following action can be taken if an error occurs in the gas supply, for example abnormal loss of calibration gas.

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Step	Action: Gas supply error rectification
1.	Complete a tightness test by checking the entire gas route (from the cylinder/pipeline to the device) using a gas detector.
2.	Seal any leaks properly.
3.	Set the regulators and valves to the required values.
4.	Disconnect blocked lines from the switched-off device and flush the pipeline with non-flammable gas to remove any blockages and deposits not exceeding the maximum pressure.

Rectification of the errors under point 5 (electrical supply and insulation errors)

The following action can be taken if an error occurs in the electrical power supply. The use of a voltmeter is required to locate the error. If the device is not supplied with electricity or the supply voltage/current is too low, the following effects may occur:

- The interactive screen is dark, the Status LEDs are off.
- The interactive screen is dark, the right Status LED flashes or is off.

Step	Action: Testing the electrical supply
1.	Check all switchgear and fuses outside the device and replace any defective parts.
2.	Check the cable connection between the device and the electrical supply (no break in the wiring). Ensure that a low-resistance electrical contact is established. Reconnect the cores if necessary.
3.	Check that voltage is being supplied to the inlet point and that the voltage is not impaired or reduced by overload, insulation errors or defective components. Remove or replace these components if necessary.

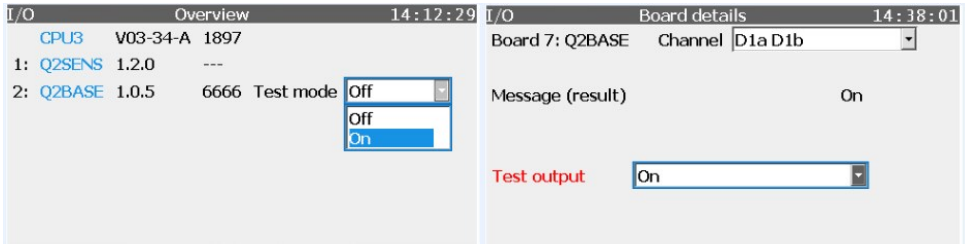
Step	Action: Testing the electrical supply
4.	Measure the idling voltage (without connections). Replace or repair the electrical supply if it is defective.
5.	Measure the incoming idling voltage on the supply cable at the device. To do so, switch off the electrical supply and disconnect the supply cable plug from the board to the GasLab Q2 connection box. Switch on the electrical supply again and measure the voltage in the plug. If there is no voltage, or if it is significantly lower than the idling voltage, replace the cable after disconnecting it from the power supply.
6.	If the problem has not been rectified after completing steps 1 – 5, the error is inside the device. Please contact Honeywell to check the internal fuse. The housing must be opened to replace it and, for safety reasons, this should only be done by service personnel or appropriately trained personnel.

	If the electronic overheating guard or the internal fuse has tripped, the interactive screen will also be dark and the status LEDs will be off. The components involved in the measurement are not live. Notify Honeywell.

Rectification of the errors under point 6 (communication error)

The following action can be taken if an error occurs in the data communication If you have multiple devices on the bus, you must take the slowest subscriber into account when selecting the operating mode. If the bus communication is not working, it may be the case that the device has been parameterized to too high an operating mode.

Step	Action: Checking the communication links
1.	If changes have been made to the parameter set, you can reverse them. Use the lates saved error free parameterization. ⇨ see section 8.4.11 Restoring the parameter set to factory settings (importing data)
2.	Check the communication cables for signs of damage. Check the “terminal to terminal” connection for each core.
3.	Test the function of the digital outputs after switching off the device. **The plugs of communication cables have been disconnected in the connection box.** Use a measurement device to test whether there is a connection between the switch signal terminals and the return cable. **Except for output DO_1, the normally closed contact, no connections are permitted to be made.**

Step	Action: Checking the communication links
4.	Navigate to the **I/O overview display**. Select "**On**" for the test mode of the appropriate hyperlink (Q2Base in the example). Click on the hyperlink to go to the **Board details sub-display**. **Requirement: The inputs and outputs being tested are parameterized, the device is installed, sealed and ready for operation.** **You are logged in with the required rights.**  Figure 9.1: I/O overview and Board details displays
5.	Select the output you wish to test under "Channel" in **Board details**. The desired state of the output is shown next to "Message (result)". In the example, it is "**On**". You can change the states of the output, regardless of the actual conditions, using "**Test output**". **Measure each output in both states (On/Off)** to obtain a complete overview of the error situation. Use a measurement device to test whether a **connection exists, will be created or has been interrupted** between the switch signal cable and the return cable. **Do not forget to switch off test mode again.**

Rectification of the errors under point 7 (Sensor error)

Step	Action: Checking the sensors
1.	If there are entries in red text in the "**Sensor values**" display, despite the parameter set not having been changed, a defect has occurred which you cannot rectify. Contact Honeywell.

9.2. List of possible errors

These are alarms, warnings, messages or hints which are generated by different software parts (called AFB or SFB). All events are binary. They may or may not exist at a certain point in time.

Often the reason for the display is already mentioned in the message text. e.g. archive entries lost.

A current list of all possible display texts of the device can be found in the **export value window** of enSuite under the respective AFB's or SFB's ⇨ 8 Configuration and analysis software enSuite

	Many warning and alarm messages can be prevent or eliminate by changing the parameterization⇨see 8.4 Changing existing device settings (Parameterization) If the parameterization does not show any errors, please contact Honeywell.

The following section provides **a summarized selection** of event-related display texts of the device. Depending on the software version, the message text may differ from the examples shown here, but the meaning of the message is not changed.

Identifier	Cause of Time Service SFB messages
Alarm time setting	The system time is further away from the external time than permitted. Only the synchronization is permitted, not the adjustment of the system time.
Warning time setting	The system time should be adjusted since it deviates from the external time more than permitted. However, only synchro-nization, not the adjustment of the system time, is permitted.
Alarm or Warning ext. time source	External time sources are used and are marked as erroneous, a warning or alarm is parameterized.
Daylight saving: manual. Configuration invalid.	Time switchover (daylight saving time) not completed. The cause depends on the selected mode for daylight saving time switchover.

Identifier	Cause of System SFB messages
CRC-Alarms	If an “approval file” is used, the parameter set is monitored by the checksum (CRC). In the event of discrepancies due to unauthorized changes, the appropriate alarm or warning is triggered.
CRC-Warnings	

Identifier	Cause of System SFB messages
Warning: Battery low	Low battery Notify Honeywell
CPU load high	The CPU capacity is fully used. Do not start any additional functions such as reading archives.
Power supply off	The power supply was switched off.
Power supply on	The power supply was switched on.
Restart ...by user ...after run time error	The reason specified caused a restart.
System watch dog	The power down was not error-free, for example not all files were closed. This signal remains until it is accepted.
Warning signal: Internal warning Alarm signal: Internal alert	The basic system has suffered an error. The device is no longer functioning perfectly. Rectification: Please contact Honeywell.

Identifier	Cause of User SFB messages
Security switch open	The system reports that the security switch has been opened.
User management: User profile ... login	The named user profile has logged in

Identifier	Cause of Q2 AFB messages
Notes on actions or situations	Notes on actions or situations that are currently being performed or are pending, e.g. operational calibration. The analysis mode was left. The message disappears automatically as soon as the task is completed, and the instrument is back in analysis mode.
Operational calibration failed Calibration successful	Results of actions: (Notes and warnings) Rectification: The note will disappear automatically. The message will be retained until the next successful operational calibration.
Warning Standard A/B failure	It may not be possible to calculate the end value. Rectification: Please contact Honeywell.

Identifier	Cause of Q2 AFB messages
Process gas pressure alert	An adequately high-pressure gradient cannot be established in the device, no valid measurement is possible. Rectification: Check the inlet pressure and the flow rates through the device and adjust them within the valid ranges. If they are already within the valid ranges, contact Honeywell.
Alarms XY min/XY max	An error event has occurred. The value specified in the message (blind XY) does not comply with the upper or lower limit, for example because raw values are incorrect or sensors are defective. It may also be that specifications have not been satisfied or an incorrect parameter set is being used. No valid measurement result will be displayed. The following values and end value cannot be calculated correctly. Rectification: The alarm limits are defined by the parameter set. If you have changed the parameter set before the message occurred, reverse the change (⇨ see section 8). If the message appears without any previous changes, contact Honeywell.
Alarm Temperature time out	The device does not reach its working temperature and does not start any measurements. Rectification: Please contact Honeywell.
Alarm Operational calibration out of limit	The operational calibration has not been completed correctly; the device automatically switches to analysis mode with the old calibration values. Measurements will become inaccurate. Rectification: Ensure that all the instructions relating to calibration in this document have been followed and carry out another manual calibration in these conditions. If this is not successful, contact Honeywell.
Alarm Calibration gas pressure alert	
Alarms Q2SENS... / Q2BASE... Alarm signals Q2SENS... / Q2BASE...	This alarms and signals indicate transfer and memory errors. Generally, a repair call for Honeywell service personnel is required. Please contact Honeywell. You can try a restart. Disconnect the power supply and restart.

Identifier	Cause of User Archives AFB messages
Archive entries lost alarm Archive entries lost warning CRC archive alarm CRC archive warning	The archiving system has suffered an error. The results can no longer be reliably saved. Rectification: Please contact Honeywell.

Identifier	Cause of Modbus AFB messages
Note: Protocol error	The protocol has failed. Rectification: The note will disappear automatically.

	The user can also generate additional display text for each type. This is done in the Postprocessing AFB by changing the parameter set. Further information on parameterization and on the Postprocessing AFB ⇨ see 8.4 Changing existing device settings (Parameterization)

10. Maintenance, cleaning and repair

To ensure long-term use, regular weekly **automatic operational calibration** is necessary. This is usually triggered by the parameterization. An annual service calibration with maintenance is also required. Cleaning and, if necessary, Honeywell service or repair work are the results of this maintenance.

	Honeywell recommends that the completed service calibrations, maintenance work and general operations are documented.

10.1. Maintenance

Maintenance consists of an inspection of the entire system and preventive checks. The regular maintenance interval is 1 year. This monitoring work may be carried out more often to identify discrepancies at an early stage. Check the possible ranges of consumables and look out for signs of unusual damage which may have occurred since the installation and start-up work using the actions set out in the following sections.

	**The regulations for explosion protection (for example IEC/EN 60079-14) must be followed to the letter. In addition, the operator must check the function of all safety devices regularly, even outside the maintenance interval if necessary.** **Les réglementations en matière de protection contre les explosions (par exemple, selon la norme CEI EN 60079-14) doivent être impérativement respectées. En outre, l'exploitant doit vérifier régulièrement le bon fonctionnement de tous les dispositifs de sécurité et ce, même en dehors de l'intervalle d'entretien le cas échéant.**

10.1.1. Maintenance and maintenance intervals at a glance

	**Not all maintenance work, for example replacing the battery, can be carried out by the user. The following overview lists all the possible maintenance work and intervals. Arrange a service appointment if necessary.** **Tous les travaux d'entretien ne peuvent pas être effectués par l'utilisateur, par ex. remplacement de la batterie. L'aperçu suivant récapitule tous les travaux et intervalles d'entretien possibles. Convenez d'un rendez-vous de service si nécessaire.**

- Visual inspection 1 month after start-up,
  complete the form First inspection⇨ section 10.1.2
- Close inspection(s) every 12 months (use the report form) ⇨ section 10.5
- Completing a service calibration ⇨ section 10.2

Main areas for the inspection

- Check the gas connections using a tightness test with gas detector (⇨ 10.1.10 System tightness test)
- Check the battery capacity*
- Check the housing parts
- Check the external elements with tools (is everything secure)
- Monitor the vent/breather element
- Conduct a visual inspection of the connections (electrical/mechanical)
- Inspect the interior of the device
- Conduct a visual inspection of the cylinder pressure
- Conduct a visual inspection of the inlet pressures
- Adjust the flow volumes using the rotameter
- Conduct a visual inspection of the integrated particle filter in the process gas pipeline and replace it if necessary (only possible during a service visit).
- Check the mechanical strength of the electrical grounding and test it for low resistance

* If you find during inspections that a replacement is necessary, it must be done as part of a service visit, see section ⇨ 10.4 Repair work and Honeywell service work.

Replacing the consumables *

- Particle filter for process gases, depending on impurities, every 1 to 3 years
- Sensor block due to ageing of the bulb in the IR sensor, every 3 to 5 years
- Lithium cell battery, depending on use, as a precaution every 10 years

* The replacement of the above consumables is only possible during a service visit.

	If you operate the device official (fiscal), please also observe the applicable regulations regarding sealing and closing off the housing before opening it. If you have any questions, please contact Honeywell.

10.1.2. First inspection

To ensure that the work carried out during installation and start-up remains functional in the long term, check the following points after one month. Complete the form.

First inspection	Date of inspection ___. ___. 20____	
Device	Q2 serial number: _____ Q2 software:_____	
Inspector/Company: _____		Result Yes/No
Gas connections, gas lines and flow meters have been checked with a methane detector and are tight.		
Housing parts (washer/flow meter) are undamaged and secure.		
The openings in the breather elements are free of dirt and blockages.		
Gas and electrical connections are undamaged and free of corrosion.		
No corrosion inside the device, all cores are securely connected.		
Pipelines and cables around the Q2 are undamaged and free of corrosion.		
The ground connection is mechanically secure. There is a low resistance connection to the ground, both between the equipotential bonding system on the connection box (FE) and the external grounding connection (PA), see Figure 5.4.		
Unused connectors are sealed, there are no unconnected wires in the connection box.		
The cylinder pressure of the calibration gas mixture is: _____		
The inlet pressures are in the valid range: Process gas pressure: _____ Calibration gas pressure: _____		
The flow rates (flow meter display) are in the valid range.		
The battery charge is:_____ and is adequate.		

10.1.3. Checking the battery charge

Step	Action: Battery check
1.	Click on: Home -> and System (Info)
2.	Select “Device monitor”.
3.	Read the battery charge. • > 50% – the battery can be used for another year. • < 50% – check the battery more frequently. • < 20% – Notify Honeywell to replace the battery.
4.	Note the battery charge in the maintenance report.

10.1.4. Checking the housing parts

Step	Action: Checking the housing parts
1.	Check the housing parts (windows/flow meter) for signs of damage and loose parts.
2.	Tighten any loose parts. Activate any existing loosening guards, for example on the connection box.
3.	Notify Honeywell if any parts are damaged. Disconnect the gas and voltage supply. Do not take any further action or complete any work until the damaged parts have been replaced.
4.	Note the result in the maintenance report.

STOP	The housing may only be repaired by Honeywell. Explosion-protected equipment which has not been repaired by the manufacturer must not be reused. Seul Honeywell est habilité à réparer le boîtier. L’équipement antidéflagration non réparé par le fabricant ne doit pas être réutilisé.

10.1.5. Checking the breather element/venting system

Step	Action: Monitoring the breather element
1.	Check whether the openings are free of dirt and blockages.
2.	If openings are dirty or clogged, remove the dirt. Do not pour or spray water or cleaning products into the breather element.
3.	Notify Honeywell if the breather element cannot be cleaned. Disconnect the gas and voltage supply.
4.	Do not take any further action or complete any work as long as the breather element is blocked.
5.	Note the result/condition in the maintenance report.

10.1.6. Visual inspection of the connections

Step	Action: Visual connection inspection
1.	Check the connections (fluids/electrical) to determine whether they are undamaged, complete and free of corrosion.
2.	If you find any damage or corrosion, replace the damaged and/or corroded components and seal the unused openings. Obey the explosion protection regulations.
3.	If step 2 is not possible or spare parts are required, contact Honeywell to arrange a service visit. Disconnect the gas and voltage supply.
4.	Do not take any further action or complete any work until the functions have been restored or the defective parts have been replaced.
5.	Note the result/condition in the maintenance report.

10.1.7. Checking the interior

Step	Action: Checking the interior of the device
1.	Disconnect the gas and voltage supply. Unscrew the connection box cover and hood on the instrumentation section **(only in non-hazardous areas after permission of the plant operator ⇨10.4 Repair work and Honeywell service work.)**
2.	The interior is undamaged, there are no loose wires and no parts are corroded. All unused openings are sealed.
3.	If step 2 is not satisfied, contact Honeywell to arrange a service visit.
4.	Only reconnect the device to the power supply if step 2 is satisfied and all the covers have been screwed back into place. Obey the explosion protection regulations!
5.	Note the result/condition in the maintenance report.

10.1.8. Visual inspection of the cylinder pressure/inlet pressures

Step	Action: Checking the calibration gas cylinder pressure
1.	Read the calibration gas cylinder pressure on the pressure gauge
2.	Note: you can empty the cylinder up to a minimum pressure of 0.5MPa ≙ 72.52psi ≙ 5bar, but the cylinder must then be replaced, regardless of the maintenance interval. Replace the calibration gas cylinder if necessary. ⇨ sections 5.3.4, 7.4.2 and 10.3.
3.	Notify Honeywell if you require a new calibration gas mixture. You can use the device without calibration gas, but the results may not be as accurate.
4.	Note the result/condition in the maintenance report.
Step	**Action: Testing the inlet pressures**
1.	Read the process gas inlet pressure and the calibration gas inlet pressure on the pressure gauges.
2.	If the process gas inlet pressure (PG) is not between 0.15 MPag ≙ 1.5 barg and 0.3 MPag ≙ 3 barg = max. inlet pressure, set the pressure to within this range. If the calibration inlet pressure (CAL) is not between 0.15 MPag ≙ 1.5 barg and 0.25 MPag ≙ 2.5 barg = max. inlet pressure, set the pressure to within this range.
3.	If you cannot complete step 2, disconnect the gas and voltage supply. Do not take any further action or complete any work until step 2 has been satisfied, contact Honeywell to arrange a service visit.
4.	Note the result/setting in the maintenance report.

10.1.9. Flow rate check

Step	Action: Flow rate check
1.	Flow rates are valid (the float in the flow meter is in the area between the lower and upper mark), a process gas pressure alarm is not emitted.
2.	If step 1 is not satisfied, adjust the flow rates. If this is not possible at the current inlet pressure, check if the calibration gas pressure alarm is given during calibration. If no calibration gas pressure alarm is issued, the inlet particle filter must be replaced. If an alarm is issued in both cases, the error is in the gas management or in the sensor system.
3.	If a new adjustment cannot be made, disconnect the gas and voltage supply. Do not take any further action or complete any work until step 1 is satisfied. Contact Honeywell ⇨ 10.4 Repair work and Honeywell service work.
4.	Note the result/setting in the maintenance report.

10.1.10. System tightness test

	**Leaks in the gas supply lines increase the danger of explosion and may result in inaccurate measurement results.** **Les fuites dans les conduites d'alimentation en gaz augmentent le risque d'explosion et peuvent entraîner des mesures défaillantes!**

Step	Action: Tightness test
1.	If the device is already operating, close the valves in the GasLab Q2 by switching off the power supply.
2.	Supply all inlet gas lines for the measuring equipment with gases and pressures so that the pipelines contain a gas volume.
3.	Check all the parts of the system for leaks using a gas detector.
4.	If you identify a leak, it must be sealed immediately. Shut off the gas supply. Seal the leak. Repeat the test.
5.	Do not complete any further action or work until the system is completely tight.

10.2. Completing a service calibration

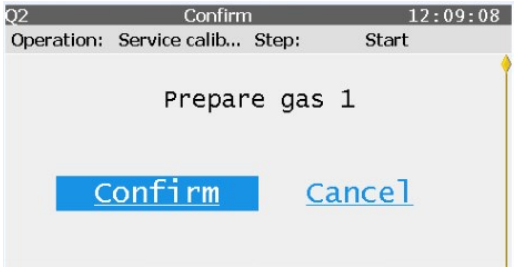
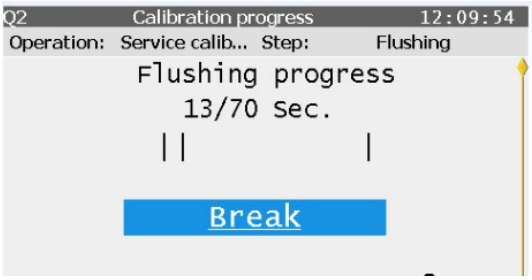
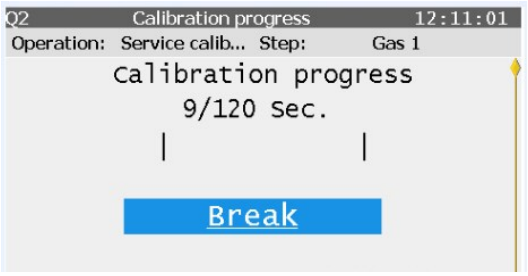
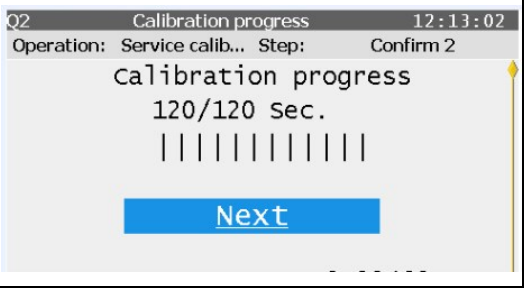
An annual service calibration with 2 special gases is required to maintain measuring accuracy (this may also be carried out more frequently if necessary). For non-fiscal use, you are permitted to carry out this calibration yourself. The instructions for this are provided below. The required gases are specified in section 11.4 Notes on device characteristics and operating conditions and in the enSuite online help.

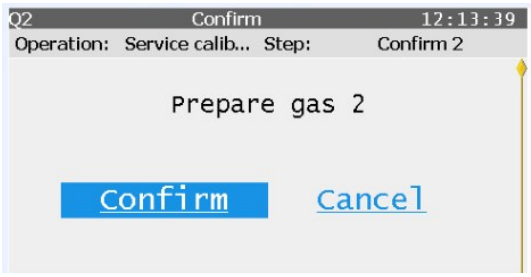
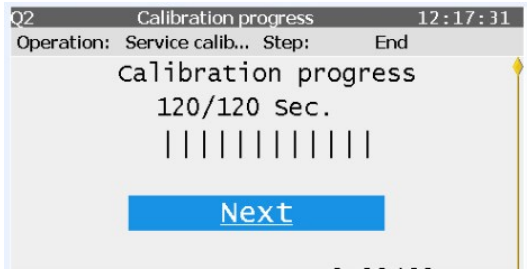
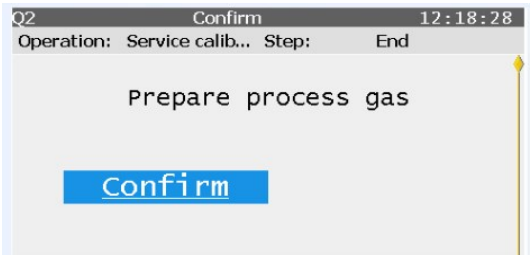
	Have this work carried out by the manufacturer, or personnel contracted or trained by it, in order to rule out the possibility of malfunctions caused by an unsuccessful calibration and to avoid having to stock the special gases.

	**A gas inlet (generally the calibration gas inlet) must be connected to the service calibration gases for this process.** **Refer to all safety information when working on gas connections.** **Une entrée de gaz (généralement l'entrée de gaz de calibrage) doit être raccordée aux gaz de calibrage de service pour ce processus.** **Respectez toutes les consignes de sécurité lorsque vous travaillez sur les raccords gaz!**

Requirements: You must be logged in and there must be no current sensor errors. The components of the two service calibration gases used with the selected gas inlets must be saved in the device before the service calibration is carried out. These values can be most easily selected and entered using enSuite at "**Q2 >> Service calibration**". See the online help for support.

Step	Action: Service calibration
1.	Transfer the parameter set adjusted for the service calibration to the device.
2.	**Click on: Home**  ->  ->  ->  **and log in**. Navigate to -> Q2 control  -> Calibration 
3.	Click on: 
Note: If an error occurs during the following steps, for example the pressure is inadequate, the display will jump straight to point 10. Carry out steps 10 and 11. Rectify the error and repeat the process from step 4.	

Step	Action: Service calibration	
4.		Connect the first gas (**offset gas to correct the measurement offset**) to the selected gas inlet correctly and click on "**Confirm**".
5.		The procedure will then start automatically. First of all, the system is flushed with the calibration gas mixture. This will be displayed throughout the duration of the process.
6.		Then the first service calibration gas (**offset gas**) is measured. The duration of this process will also be displayed.
7.	If you want to cancel the process prematurely, you can end the calibration after point 4 by selecting "**Cancel**". The measurement device will then interrupt the calibration process and will ask you to take further action to return to analysis mode.	
8.	After measuring the first **gas (offset gas)**, the following display will appear and will initiate the second part of the calibration. Select "**Next**".	

Step	Action: Service calibration	
9.	Connect the second service calibration gas **(gain gas to correct the measurement gain)** to the selected gas inlet correctly and click on "**Confirm**". The process from steps 5 and 6 will then be repeated.	
10.	After measuring the second gas, the following display will appear and will initiate the switch to analysis mode. Select "**Next**".	
11.	Restore the original connection correctly and **conduct a tightness test**. Click on "**Confirm**" once all the gas connections have been prepared for normal operation again.	

	Using measurement outputs, the last valid gas property values are held throughout the calibration time. If the calibration fails, the parameters from the last successful calibration will remain in use.

	**The message from point 11 will appear regardless of the actual gas inlets selected. Restore the connections to their state before the service calibration. Test the tightness.** **Le message du point 11 apparaît indépendamment des entrées de gaz effectivement sélectionnées. Restaurez les connexions telles qu'elles étaient avant le calibrage de service! Contrôlez l'étanchéité!**

10.3. Connecting and replacing gas cylinders

For the correct operation of the GasLab Q2 a gas cylinder with a binary mixture of methane (CH_4) and carbon dioxide (CO_2) is connected to the instrument. This should be replaced as soon as the outlet pressure can no longer be held at a stable level. This will generally take place at around 0.5MPa ≙ 72.52psi ≙ 5bar, depending on the regulator.

Some situations, for example, a verification or a service calibration, make it necessary to connect further gas cylinders or replace the existing ones.

This work must be carried out according to the steps described here. A suitable pressure reduction is necessary, if not already existing, to connect the gas cylinder with the GasLab Q2.

Complete the following steps in accordance with national regulations on the basis of the information in this document. Failure to do so may result in significant destruction of the device or the system.

Suivez impérativement les étapes suivantes conformément aux normes locales en respectant les instructions de ce manuel. Le non-respect de ces étapes peut entraîner des dommages importants sur l'appareil ou l'installation!

Step	Action: Removing the gas cylinder
1.	Close the main valve on the gas cylinder.
2.	Depressurize the connected gas pipeline.
3.	Remove everything from the gas cylinder connector.
4.	Close the connection thread on the valve with the screw cover (nut).
5.	Place the protective cap onto the gas cylinder and screw it tightly.
6.	Release the anti-tipping device and remove the gas cylinder.
7.	Protect the connection thread for the remaining installation if a new gas cylinder is not to be connected immediately.

Step	Action: Connecting the gas cylinder
1.	Secure the cylinder to prevent it from tipping over.
2.	Unscrew the protective cap from the gas cylinder.
3.	⚠ Ensure that the main valve on the cylinder is closed. ⚠ Only then remove the screw cover (dummy plug) from the valve connector.
4.	The cylinder fittings must include safety equipment.
5.	⚠ Ensure that the hand wheel or setting screw for the outlet pressure on the high pressure reducer* or cylinder pressure regulator* you wish to connect is closed
6.	Connect the cylinder connector on the high pressure reducer or cylinder pressure regulator to the valve connector on the gas cylinder. ⚠ **Do not apply any oil or grease to the thread.**
7.	Now flush the pressure reducer to ensure accuracy (see below).
8.	After the flushing cycle, connect the outlet of the pressure reducer to the appropriate gas inlet on the GasLab Q2 using a fixed pipeline. If this is not yet possible, seal the gas pipeline with a dummy plug so that you can continue with step 9 later.
9.	Open the main valve on the gas cylinder. Set the outlet pressure of the high pressure reducer or cylinder pressure regulator/reducer to the operating pressure approx. 0.2 MPag ≙ 29.01psig ≙ 2barg ⚠ Maximum pressure 0.25 MPag ≙ 36.26psig ≙ 2.5barg.
10.	Check carefully for leaks. ⇨ 10.1.10 System tightness test

* Not parts of GasLab Q2; not automatically supplied, use suitable standard types only.

Step	Action: Manual flushing of the high pressure reducer
1.	⚠ Ensure that the following requirements are satisfied: 1. Steps 1 to 6 of the gas cylinder connection procedure (see above) have been completed. 2. Gas can flow into the parts which require flushing. The gas pipeline must be disconnected immediately upstream of the GasLab Q2 (close gas cylinder) to make this possible. Ensure that the flushing gas is discharged in a professional, safe manner.
2.	Slowly open the main valve on the gas cylinder.
3.	Adjust the stream of gas and observe it using the flow indicator. Do not exceed the maximum pressure levels.
4.	Now close the main valve on the gas cylinder.
5.	If the outlet pressure of the high pressure reducer or cylinder pressure regulator has fallen to almost 0 MPa, open the gas cylinder briefly and then close it again.
6.	Repeat the procedure described in step 5 several times to ensure that there is no more air in the dead space of the regulator and the pipeline. Everything will be flushed after a total of 5 filling and emptying cycles.
7.	After the flushing cycle, immediately continue with step 8 of the “Steps to connect the gas cylinder” (see above) to prevent contamination.

10.4. Repair work and Honeywell service work

The device has got hardly any consumables and wear parts. Honeywell recommends that the filter in the process inlet is checked every year to prevent errors and enable the service calibration to be completed with special gases.

	For security reasons, the service calibration in fiscal mode and some other work may only be carried out by the manufacturer or by personnel trained or authorized by it.

Please arrange an appointment promptly. This is also an ideal opportunity to rectify any other discrepancies which occurred during the maintenance work and check the process gas inlet filter.

The instrumentation section may only be opened by trained personnel with the appropriate device expertise.

If the device is used for fiscal measurements, the presence of a fiscal verification officer or a representative may also be required if the instrumentation section is opened.

In any case, the following always applies:

	**DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT** **DISCONNECT POWER BEFORE OPENING** **N'OUVREZ PAS L'APPAREIL DANS UNE ATMOSPHÈRE EXPLOSIBLE** **DÉCONNECTEZ LA TENSION AVANT L'OUVERTURE**

	Please contact Honeywell if the device suffers any damage or to arrange an appointment for a service visit. The Contact data details are provided at the start of this document. Spare and replacement parts for work which you can carry out yourself can also be ordered from this contact.

The process gas inlet is fitted with a filter to protect the interior of the device from dirt. The filter is neither visible nor accessible during normal operation. This filter may block and must then be replaced if gas which does not meet the specifications is supplied or the upstream filter system fails.

Example: The message "**Process gas pressure alert**", although the requirements from chapter 11 have been satisfied, indicates a possible blockage. In this case, contact Honeywell to conduct further tests or exclude other causes.

After several years of operation, additional maintenance and repair work may be required due to wear and ageing. **Examples** of this include **battery replacement (around 10 years)** and the **replacement of seals** and the **IR radiant heater**. See also section 10.1.1 Maintenance and maintenance intervals at a glance.

Furthermore, factory maintenance is required if defects are identified during the annual maintenance work which cannot be rectified or if the housing has been damaged. Depending on the situation, this work may require the complete dismantling of the device or its return to the manufacturer. The required work may only be carried out by Honeywell service staff or by personnel trained by Honeywell. **Exception:** Complete device replacement.

For example, the housing can only be repaired by the manufacturer since the dimensions of the explosion-protection gaps are not public knowledge and are only specified in the manufacturer's design documents. Please contact Technical Support if you require such services.

	Explosion-protected devices which have not been repaired by the manufacturer must not be reused until they have been inspected by an accredited expert and again comply with the design documents. L'équipement antidéflagration non réparé par le fabricant ne doit pas être réutilisé jusqu'à ce qu'il ait été vérifié par un expert reconnu et qu'il soit à nouveau conforme aux documents de construction.

Do not take any safety risks by using incorrect spare or replacement parts. Only genuine Honeywell spare parts may be used.

	No liability can be accepted for damage caused by the use of non-genuine, non-approved spare and replacement parts.

10.5. Device cleaning and documentation of the work

Ideally, you should use a damp cloth to clean the GasLab Q2. Generally, a mild cleaning solution or a mild glass cleaner for domestic use may be used.

	Do not use any equipment for cleaning which charges statically and may generate sparks. Do not pour or spray water or cleaning products directly into the breather element. Do not use high pressure cleaners or similar equipment for cleaning. Pour le nettoyage, n'utilisez que des outils qui ne permettront pas l'accumulation de charge statique et ne créeront pas d'étincelles. Il est interdit de verser ou de vaporiser de l'eau ou du détergent directement dans le dispositif d'évent! N'utilisez pas de nettoyeur haute pression ou d'équipement similaire pour le nettoyage!

Below you will find a form designed to help you document the completed work. You can copy this form and add it to your documents.

Maintenance/Service	Report number: _____	
Device	Q2 Serial number: _____ Q2 software: _____	
Date of work ___. ___. 20____	Inspector/Company: _____	Result Yes/No
Gas connections, gas lines and flow meters have been checked with a methane detector and are tight.		
Housing parts (washer/flow meter) are undamaged and secure.		
The openings in the breather elements are free of dirt and blockages.		
Gas and electrical connections are undamaged and free of corrosion.		
No corrosion inside the device, all cores are securely connected.		
Pipelines and cables around the Q2 are undamaged and free of corrosion.		
The ground connection is mechanically secure. There is a low resistance connection to the ground, both between the equipotential bonding system on the connection box (FE) and the external grounding connection (PA), see Figure 5.4		
Unused connectors are sealed, there are no unconnected wires in the connection box.		
Service calibration completed Date:_____		
The cylinder pressure of the calibration gas mixture is higher than 0.5MPa ≙ 72.52psi ≙ 5bar. The pressure is: _____		
The operational calibration gas cylinder was replaced***		
The inlet pressures are in the valid range: Process gas pressure: _____ Calibration gas pressure: _____		
The flow rates (flow meter display) are in the valid range.		
The particle filter was replaced* or inspected		
The sensor block was replaced**		
The battery charge is above 20% and is:_____		
The battery was replaced by Honeywell***		

* Must only be completed if blocked or for preventive reasons, for example after 3 years

** Must only be completed if measuring errors occur, for example after 5 years

*** Must be completed after 10 years or if the battery charge/pressure is low

11. Technical data and information

The technical data and device specifications are given below. The data from the CE declaration complete this overview.

11.1. Explosion protection data

Ex rating					
ATEX	II2G Ex db IIC T4 Gb (Ta: -25°C ≤ Ta ≤ + 55°C)				
IECEx (JPEx)	Ex db IIC T4 Gb (Ta: -25°C ≤ Ta ≤ + 55°C)				
FM(us)	Class I Zone 1 AEx db IIC T4 Gb Ta: -25°C ≤ Ta ≤ + 55°C / Class I Div 2 Groups ABCD T4				
cFM	Ex db IIC T4 Gb Ta: -25°C ≤ Ta ≤ + 55°C / Class I Div 2 per CEC J18-150				
Pursuant to the standards:					
IECEx	IEC 60079-0 IEC 60079-1	2011 6th edition 2014-06 7th edition			
ATEX:	EN 60079-0 EN 60079-1	2012 + A11 2013 2014			
FM	Class 3600	2018	Class 3810	2005	
ANSI	ANSI/ISA 60079-0 ANSI/ISA 61010-1	2013 2012	ANSI/UL 60079-1	2015	
CAN/CSA	C22.2 No. 0.4 2013 C22.2 No. 61010-1 C22.2 No. 60079-1	C22.2 No. 0.5 2012 2012 2016	C22.2 No. 60079-0	2015	
JPEx	JNIOSH-TR-46-1 2015	JNIOSH-TR-46-2 2018			

11.2. Reported values and analytical performance

			Range				
Reported values (SI Units)		Formula	Calculation standard	Normal	OIML R140	Unit	Output available?
	Heating Value superior	Hs	ISO 6976-1995	27.9 - 48.5	29.9 - 45.6	MJ/m³	Yes
	Wobbe index (superior)	Wis	ISO 6976-1995	33.8 - 58.0	36.0 - 55.3	MJ/m³	Yes
	Density	ρ(rho)	ISO 6976-1995	0.7168 - 1.063	0.7175 - 1.005	kg/m³	Yes
Reported values (Imperial Units)	Gross Heating Value	GHV / GCV	GPA 2172-2009	707.9 - 1237.3	707.9 - 1237.3	BTU/ft³	Yes
	Wobbe index (superior)	Wis	GPA 2172-2009	859.4 - 1479.8	914.5 - 1403.9	BTU/ft³	Yes
	Density	ρ(rho)	GPA 2172-2009	0.04232 - 0.06277	0.04236 - 0.05931	lbm/ft³	Yes
Other reported values	Methanenumber	MN	Simplified method			-	Yes
	Wobbe index	Wis / WIi	Dry / Wet / Saturated			MJ/m³ or BTU/ft³	Yes
	lower heating Value	LHV / NCV / Hi					Yes
	relative density or specific gravity	RD / SG				-	Yes
	Calculated Model Gas Composition	CH_4...C_8H_{18}, N_2				%	Yes
Analytical performance	Uncertainty	Hs, Ws, ρ: ≤0.5%, xCO_2: ≤0.2mol%					
	repeatabilty	Hs, Ws, ρ: ≤0.1%, xCO_2: ≤0.1mol%					

all calculated values according:

- ISO 6976-1995 T1: 25°C; T2: 0°C; P1, P2: 1013.25 mbar
- GPA 2172-2009: T1, T2: 60°F; P1, P2: 14.696 psi (using GPA 2145 - 2009 tables)

11.3. List of suitable gases and calibration gases

List of suitable gases	Generic natural gases						
		Formula	Calculation standard	Normal	OIML R140	Unit	Output available?
	Methanenumber	CH_4		70 - 100		mol%	Yes
	Ethane and higher alkanes	C_2+	C_2>C_3>C_4>C_5>C_6	0 - 20	0 - 15	mol%	Yes
	Carbon dioxide	CO_2		0-20		mol%	Yes
	Nitrogen	N_2		0-30	0-20	mol%	Yes
	sum of Water, Oxygen, Hydrogen, Helium	$H_2O + O_2 + H_2$ + He	< 0.1			mol%	No
	Hydrogen Sulfide	H_2S	10 ppmV (or 14 mg/m³ or 0.5 grains/100 scf) (higher amounts on request)			N/A	No
	Dust / liquids	technically free				N/A	No
Calibration Gas	Binary mixture (CH_4/CO_2) with automatic calibration cycle						

Attention: Gases which may react when there is no air must not be used.!

Calibration gas	Ranges/Variables
Mixture (methane + CO_2)* Blend tolerance: ±-2% rel. Accuracy: ±-2% rel.	with automatic calibration cycle Flow rate of calibration gas during calibration: 30 l/h – 60 l/h recommended setting Minimum 0.15 MPag ≙ 1.5 bar Normal 0.20 MPag ≙ 2.0 bar Maximum 0.25 MPag ≙ 2.5 bar
10 l operational calibration gas cylinder (not always included in Honeywell package)	Ensure that only suitable standard-compliant types are used if you do not source them from Honeywell. The cylinder pressure must be greater than 2.0 MPag ≙ 20 barg. Other accessories required: pressure regulators and connection lines

* The mixture depends on the measuring gas. Please use an appropriate gas from the following table

Current measuring range for CO_2		Preferred gas for Operational calibration	Service calibration
min 0	max 4 mol%	2 mol% CO_2 + CH_4 mixture	5 mol% CO_2 + CH_4 mixture
min 0	max 20 mol%	10 mol% CO_2 + CH_4 mixture	20 mol% CO_2 + CH_4 mixture

GasLab Q2 system	Values and/or comments
Gas connections (Standard equipment, other connections available on request)	Inlets (up to 1 x process gas, 1 x calib. gas) Outlets (1 x process gas bypass, 1 x measured gas) Swagelok pipe fittings 6 mm or ¼" available from Honeywell
Gas Manifold Gas management	Integrated two-channel double block and bleed device for process gas and calibration gas

11.4. Notes on device characteristics and operating conditions

Operational Pressure/ Consumption	Inlet pressure 150 - 300 kPa gauge (22 to 43 psi) lower pressures possible with limitations, please contact your local Honeywell office. Flow 20-300 l/h (0.7 to 1.1 scf/hr / total including adjustable bypass flow)
Dynamics	Analysis rate f=1 Hz, reaction time T90≤6s (90% step response / Tested @ NMi)
Power Supply	24VDC±15% (Including mains fluctuations), max. 96W, 60W nominal power (ambient temperature dependant)
Environment	IP64, -25 to +55°C (-13 to +131°F), 0-95%RH (non-condensing)
Interfaces	1x TCP/IP, 2x RS485 interface, 4 digital outputs, 2 digital inputs, 4 analog outputs Modbus via TCP/IP and serial
Data Logger	Integrated logging of measurements as mean values (e.g. on hourly basis) or current values. Integrated logging of measurement system status and external events
Operational Interface	7-channel capacitive touch panel, PC software (enSuite) for configuration, data logging, display and archive retrieval
Safety Approvals	Zone 1: Ex II 2G Ex d IIC T4 Gb / Class I Div 2 Groups ABCD T4 KC Mark (Korea) & TS Mark (Taiwan) available TIIS (Japan) Pending
Metrological Approvals	NMi: OIML R140 Class A (C_2+ <15% & N_2 < 25%)

GasLab Q2 system	Values and/or comments
Place of use	Installation close to the sampling point up to Ex Zone 1 at atmospheric pressure, gas outlets with no back pressure.
Breather line	Connection at breather element: 1/4” NPT
Housing dimensions	L = 38cm ≙ 14.96 ″, W = 27cm ≙ 10.63 ″, H = 23cm ≙ 9.06 ″
Weight	16kg ≙ 36 lb
Installation gaps:	At least 300 mm to the left and right, at least 200 mm≙ 7.87 ″ at the top and bottom (recommended 900 x 900 mm≙ 35.43 x 35.43 ″)
Appr. Heating time	20 min at 20°C ≙ 68°F ≙ 293 K / 1 hour at -25°C ≙ -13°F ≙ 248 K
Interval settings	1 week for operational calibration
	1 year for service calibration
Operating system	Service PC: See download section
Software	EnSuite
File format	enSuite.csv/enSuite.par
Data logger	Integrated (interval adjustable)
Communication Speed:	345,600 Baud TCP/IP (serial)
EMC strength	Electrostatic discharge to IEC 61000-4-2 [25]
Mechanical strength	Vibration to IEC 60068-2-64 [20]; IEC 60068-2-47 [19]
Level of dirt	of the macro environment: 4

11.5. Declaration of conformity

The EU Declaration of Conformity lists all certificates and approvals; it is enclosed as hardcopy with the delivery of the device. An extract of the declaration is shown below. The complete Declaration of Conformity and related documents can also be downloaded in PDF format from our Docuthek (www.docuthek.com).

<table>
<tr><td>Type, model</td><td colspan="3">GasLab Q2</td></tr>
<tr><td>Manufacturer</td><td colspan="3">Elster GmbH, Steinern Straße 19-21, 55252 MAINZ-KASTEL, GERMANY</td></tr>
<tr><td>Product</td><td colspan="3">Caloric value determining device (CVDD)</td></tr>
<tr><td colspan="4">This declaration of conformity is valid for the following Directives:</td></tr>
<tr><td>2014/30/EU (EMC)</td><td>2014/34/EU (ATEX)</td><td colspan="2">2011/65/EU (RoHS)</td></tr>
<tr><td colspan="4">The object of the declaration described above is in conformity with the relevant harmonization legislation from the European Union:</td></tr>
<tr><td>EN/IEC 61326-1:2013</td><td>EN 60079-0:2012/A11:2013
EN 60079-1:2014</td><td colspan="2">EN 50581: 2012</td></tr>
<tr><td colspan="4">Certificates and interventions by notified bodies:</td></tr>
<tr><td rowspan="3">Not applicable</td><td>DEKRA 15 ATEX 0113 X</td><td rowspan="3" colspan="2">Not applicable</td></tr>
<tr><td>EU-type examination</td></tr>
<tr><td>Notified Body 0344
DEKRA Certification B.V.
Meander 1051
NL-6825 MJ Arnhem</td></tr>
<tr><td colspan="4">This declaration of conformity is valid for products labelled accordingly:</td></tr>
<tr><td>CE</td><td>CE 0044 Ex II 2 G Ex db IIC T4 Gb</td><td colspan="2">CE</td></tr>
<tr><td colspan="4">The production is subject to the following surveillance procedures:</td></tr>
<tr><td>Directive Annex II</td><td>Directive Annex IV + VII</td><td colspan="2">Directive Article 7</td></tr>
<tr><td>Not applicable</td><td>Notified Body 0044
TÜV NORD CERT GmbH
D-30519 Hannover</td><td colspan="2">Not applicable</td></tr>
</table>

12. Keywords and figures

12.1. Keyword index

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12.2. List of figures

Honeywell

www.honeywellprocess.com