



IQ SENSOR NET

Flexibility through digital technology – The IQ SENSOR NET from WTW



IQ SENSOR NET

- **One** system for **all** parameters
- Any sensor combination possible
- Up to **20** sensors may be connected
- Simple extension of system at any time
- Simple installation using two-wire technology
- Digital signal transmission
- Integrated lightning protection

With the modular IQ SENSOR NET, WTW has set standards in the field of continuous on-line measurement. Meanwhile, WTW can look back on a more than 10-year success history with thousands of systems and sensors sold. The development of the system has progressed steadily. The list of available parameter measured and the technologies for communication continue to grow. Based on instrument and sensor technology that has been field-proven many times over, IQ SENSOR NET offers an impressive level of performance and flexibility that is unique in this form.

The system can be optimally adapted to any conceivable measurement task, even under special on-site conditions. The IQ SENSOR NET communication system allows the easy integration of multiple measurement locations. This results in a significant reduction in costs while maintaining full functionality.

IQ SENSOR NET System Philosophy



IQ SENSOR NET – the multi-parameter measuring system

The System 2020 XT is the flexible solution for today and for the future. It's fully modular design "keeps on growing" to keep pace with your growing demand. This flexibility makes the system very appealing also for small, medium, and larger sewage plants. Any conceivable application can be managed including discharge measuring with the parameters turbidity, pH, conductivity and temperature, furthermore the control of nitrification/denitrification and complete sewage plant analytics can be supported by one single system. All this at a low investment cost and highly economical operation – with an easy to handle system.

Any sensor combination possible

The parameter-specific sensors are equipped with a standard interface for communication with central components. Thus, different types of sensors or parameters can easily be connected to the system. The user can freely select parameters and is only restricted by the maximum number of sensors. Thus, application-specific tasks such as inlet or outlet measurement in wastewater treatment plants or simultaneous measurement in several aeration basins can be easily and economically accomplished using a single system.

Up to 20 sensors may be connected

WTW offers IQ sensors for more than 15 different parameters, including new sensors for carbon parameters, nitrate, nitrite that feature a unique cleaning system, and for sludge level measurement. Numerous special sensors designed for specific applications are available for each type of parameter. WTW has available a total of 31 different IQ sensors that can be combined as required. When a sensor is connected to the IQ SENSOR NET, it is recognized automatically and the measured value is displayed immediately. The software is designed in such a way that future parameters can readily be integrated into the existing system. With this intelligent structure, the system can easily be extended or modified to incorporate up to 20 sensors.

Because the calibration data are stored in the sensor, the calibration of IQ sensors can be processed in the laboratory.



Consistently digital and modular

Functional units, such as power supply units, outputs, relays, etc., that were originally incorporated in a conventional monitor, have now been modularized – at both the functional and mechanical levels. Communication between individual components and between sensors is digital.

Digital transmission technology now allows transmission over large distances between the separate system components. Consequently, these components can be placed at almost any location within the system.

The connection is a shielded 2-wire cable that not only transports digital information but also provides the low-voltage power supply to the individual components. With these features the system is able to meet such requirements as

- **a high degree of flexibility in positioning equipment**
(measurement locations can be installed at great distances)
- **local orientation of functionality**
(modules are installed where the functionality is required) and
- **simple installation and system extension**



Extremely flexible and economical

The fact that sensors and system units can be placed at almost any desired location in the wastewater treatment plant, coupled with a simple and secure connection technique, result in the remarkable flexibility of the IQ SENSOR NET. Moreover, the IQ SENSOR NET is highly cost efficient, a direct consequence of the intelligent technology it incorporates:

- A decrease in costs as the number of measurement locations rises, since each additional parameter requires only one additional sensor
- Point-to-point cable connections between individual measurement locations is not required – resulting in considerable savings in cable and installation costs
- The system can be simply and economically extended at any time



Features and functions

of the IQ SENSOR NET system

Power supply and communication in the IQ SENSOR NET

Both power and communications within the system are transmitted via a special shielded two-wire cable referred to as the SNCIQ SENSOR NET cable. The conductors are color-coded to assist in correct connection. Should polarity be reversed accidentally, correct function of the system is fully guaranteed. Because the supply voltage within the system is approx. 24 VDC, there is no risk of coming into contact with dangerously high voltages.

Digital signal transmission

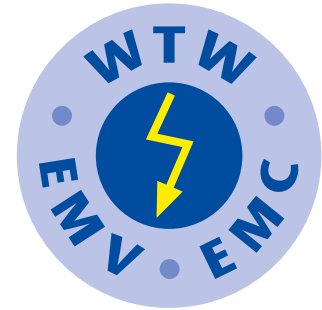
The complete system communication is digital. This ensures high measurement accuracy even with large distances between system components. Digital signal transmission is immune to external EMC interferences.

Integrated lightning protection / high EMC immunity

All IQ SENSOR NET components offer integrated lightning protection in proven WTW quality as a standard feature. This eliminates the need for additional external protective systems. The high EMC immunity of each of the individual components contributes to the maximum operating safety and high availability of the system.

Extension of system components

When the IQ SENSOR NET is extended, the new components are automatically recognized and integrated immediately.



Exchanging sensors

Sensors can be exchanged during operation without having to shut down the system. All settings from the old sensor can easily be taken over into the new sensor.

Allocation of inputs and outputs as required

Each input component of the system (sensor) can be allocated to any output (mA/relay). Multiple allocations are possible.

Error diagnosis

The system status and all events that occur are recorded in an internal LogBook. The display provides the user with detailed information regarding error diagnosis and troubleshooting.

Mounting

IQ sensors can be installed directly in open channels or basins using field-proven accessories. Various flow-thru vessels are available. Special mounting kits are provided for mounting modules in panels and on top hat rails, walls and handrails. The new SSH/IQ sun shield can be used in combination with all current WTW mounting stands for installation in field.



Features and functions

of the modules

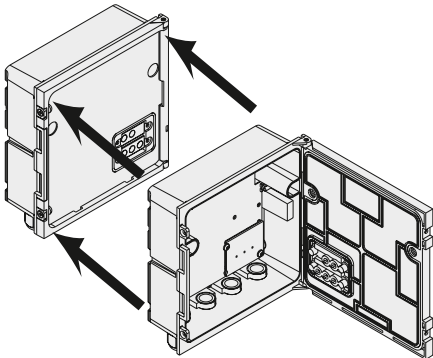


Mechanical docking of a terminal

A Terminal TC 2020 XT can be easily connected to each module. The electrical contact for the power supply and data communication is made simultaneously with the mechanical connection.

Stack mounting of modules

Up to three modules can be mechanically connected to form a stack. Simultaneous mechanical and electrical connection to data and power transmission. The individual modules of the stack can be accessed at any time without dismantling the stack by simply undoing two lateral screws.



Distributed mounting of modules

All modules can be installed anywhere in the system, both individually and in stacks. When not stacked, system components are connected via the 2-wire shielded SNCIQ SENSOR NET cable. Each Sensor Net connection of a system component can be used to extend the IQ SENSOR NET cable. Furthermore, IQ sensors can also be connected directly to the Sensor Net terminals.

Terminator function of the modules

Each module is equipped with a terminator function. This function is a terminating resistor that can be switched on and off as required. This is important whenever a module is located at the end position in the Sensor Net.

Local identity function

The local ID function is integrated in each module in the form of a memory component. The memory can be used to store relevant information when configuring the system such as location and designation of the measurement location and the sensors connected there. When connecting a terminal, this information is output and facilitates rapid localization of sensors for calibration purposes.

Diagnosis via LEDs

Each module is provided with two LEDs (yellow/red) for diagnostic purposes. They are located on the side of the module and are clearly visible at all times. They indicate whether the respective module is operational (power supply/ data communication).



IQ SENSOR NET system technology

The IQ SENSOR NET construction kit

The IQ SENSOR NET system consists of a variable number of system components with different functions.

The individual components and their primary functions are

Controller and terminal	Controller	Controls all communication within the system
	Terminal	Display of measurements, operation and system configuration (“Human Machine Interface”)
Modules	Power supply modules	Power supply for system components
	Combined output module	Transmission of measured data or message/alarm functions (mA/relays)
	Branching modules	System branching and sensor connection
Sensors	IQ sensors and connection modules for passive sensors	Measurement of parameters
Cables	Sensor connection cable	Cables for connecting sensors to modules
	Module connection cable	Cables for connecting modules to remote measuring points
	Module connection cable, ground installation	Cables for connecting modules to remote measuring points, specifically for the ground installation.

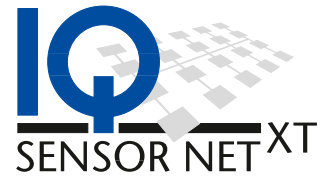


Simple installation at the process tank (on-site)

IQ Systems

Sensor network or single measuring stations – an easy choice ...

The planning begins with a basic decision between 2 systems



**Sensor network
System 2020 XT
(up to 20 sensors)**

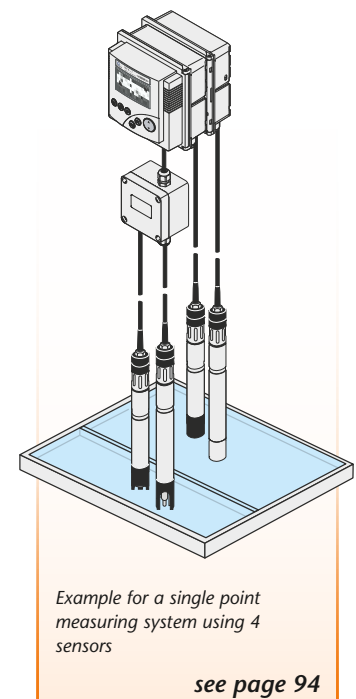
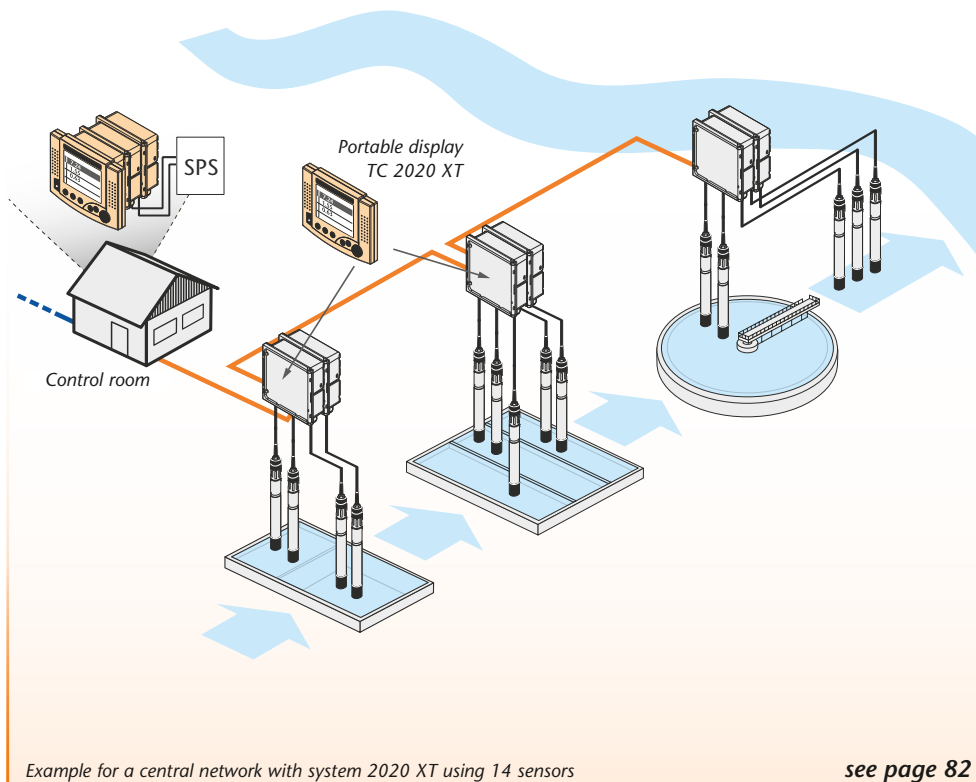


**Single point
measuring system
System 182
(1 to 4 sensors)**



- Central (network) and decentralized system for up to 20 sensors possible – extendable by up to 3 terminal / controller units for flexible installation within the network.
- Digital and / or analog outputs, can be combined and extended by modules and integrated within the network.

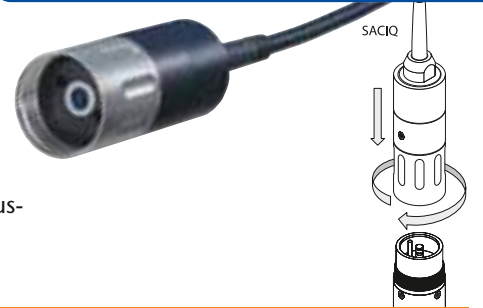
- Decentralized system for 1 to 4 sensors with integrated terminal.
- Models with integrated analog or digital outputs (i.e. RS-485/ field bus connections PROFIBUS or MODBUS) available



IQ Sensors

One connection for all IQ sensors – via the universal SACIQ sensor cable

The standard version of high grade stainless steel is suitable for process and industry. All media contacting components of the seawater versions are made of titanium and plastic and are therefore extremely resistant to corrosion.



<p>O₂</p>	<p>pH</p>	<p>Cond</p>	
<p>Dissolved Oxygen page 8–16</p>	<p>pH / ORP page 19–22</p>	<p>Conductivity page 28–31</p>	
<p>Turb TSS</p>	<p>NH₄ NO₃</p>	<p>TSS NO₂ NO₃ SAC</p>	<p>IFL</p>
<p>Turbidity and suspended solids page 34–37</p>	<p>Ammonium and nitrate page 44–50</p>	<p>Nitrite, Nitrate, COD / TOC / DOC / BSB / SAC page 51 & 60/61</p>	<p>Sludge level page 70</p>

General Description of Meters

IQ SENSOR NET

Monitors

Analyzer

Sample Preparation

Samplers

Accessories

The System 2020 XT –

the modular solution for today and for the future

Do you plan a sensor network with multiple sensors or to upgrade your installation step by step?

The System 2020 XT represents the perfect solution for these challenges.

Important system features:

- Up to **20** digital IQ sensors at user's choice may be connected
- Easy **system expansion**, no previous knowledge required
- Centralized power supply using a wide range power supply (100 – 240 VAC) or 24 V variant
- A nearly unlimited number of relays and analog outputs (0/4-20 mA) may be selected
- Digital outputs **PROFIBUS DP** or **MODBUS RTU**
- Optional modem connection via **analog** or **GSM modem**
- **Wireless connection** via radio transmission
- **Easy integration** of existing measuring points by mA inputs

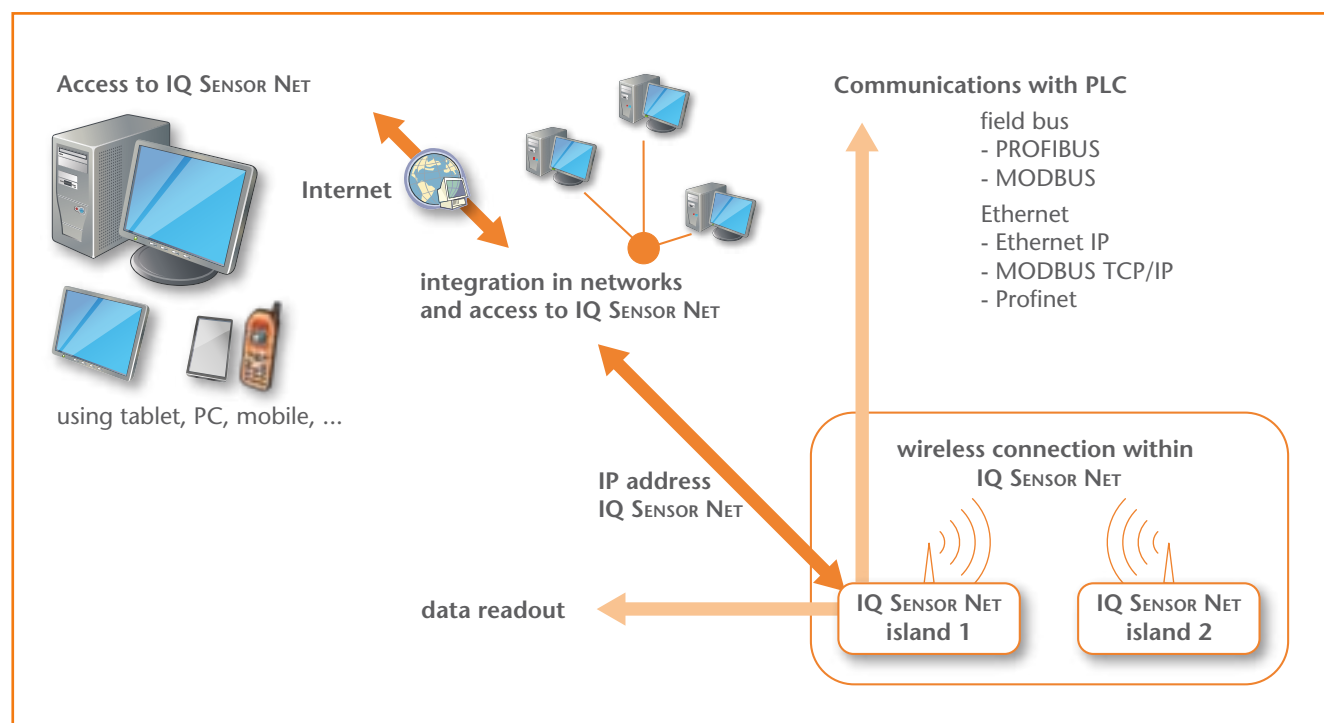
Digital communication with the IQ Net

MIQ/2-PR modul IQ
with PROFIBUS-DP
connection

MIQ/2-MOD modul IQ
with MODBUS RTU/RS 485
connection

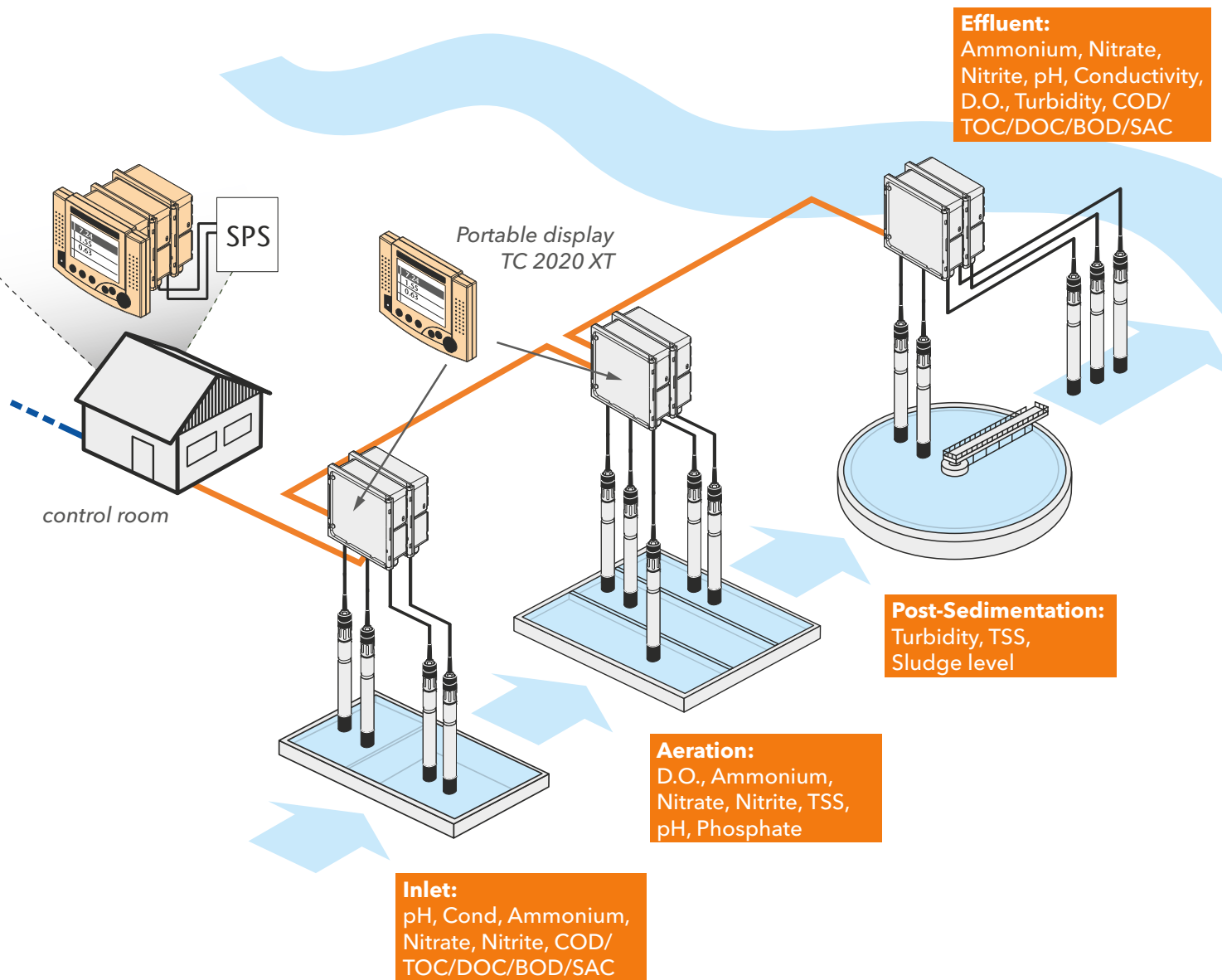
MIQ/Blue PS
for wireless connection
and linking with the
IQ SENSOR NET System

Additional IQ SENSOR NET
islands possible.



System architecture MIQ/TC 2020XT

The terminal/controller MIQ/TC 2020 XT can be operated as either controller (permanently installed with the system) as also as mobile terminal. This function can easily be configured with the software by each user. The status LED indicates the selected function and informs about any possible incidents.



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System 2020 XT (USB)

- USB interface
- Electronic-Key function
- IQ-LabLink function

System 2020 XT (Connect)

- LAN & USB interface
- Integrated Web server
- Various TCP/IP Communication protocols
- Profibus and Modbus versions



starting on page 85



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Terminal / Controller MIQ/TC 2020 XT



The terminal/controller MIQ/TC 2020 XT presents the core of each IQ SENSOR NET System 2020. Its high-performance processor coordinates all tasks within the network. Via the USB interface an extremely fast data exchange via USB memory stick to any external system directly is possible. The system-status LED gives reliable and fast information regarding function and status of system.



When integrating two MIQ/TC 2020 XT in the system, the dual-processor function increases the system stability and therefore also availability of the entire system.

Can be operated as terminal and controller all-purpose solution (constantly installed) or as mobile terminal solution.

- Multi-functional USB interface
- Increased system stability through dual-processor function

Network integration

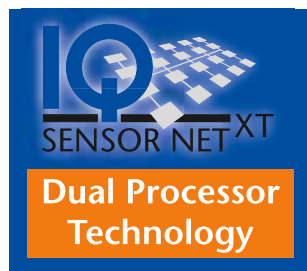
- Remote communication
- Remote maintenance

Status LED display

Each MIQ/TC 2020 XT terminal/controller shows a LED for diagnostic purposes on the front. This LED shows normal and malfunctions of the system at a glance.

Multi-functional USB interface

- IQ-LabLink function
- Electronic-Key function
- Storage of configuration
- Storage of calibration
- Logbook recording
- Storage of recorded data (data logging function)
- Software upload



- In case of any failure regarding the central unit (terminal/controller function) the second unit fully automatically takes over both functions (goes fully automatically from the plain terminal operation to the terminal/controller operation).
- Status LED indicates any failures



IQ-LabLink – the link to the world of laboratory

IQ-LabLink enables a safe data exchange between the IQ SENSOR NET and the laboratory instrument. The exchange is processed via a common USB memory stick, serving as data medium between the online system and the laboratory instrument. The condition is that both instruments feature this function and are equipped with a USB interface. The first WTW instruments to include this function are the two new spectrophotometers **photoLab® 6100 VIS** and **photoLab® 6600 UV-VIS** (laboratory instruments) and the **terminal/controller MIQ/TC 2020 XT** with access to the IQ SENSOR NET.



Application example: Matrix adaption with VARION®Plus

The multi-parameter sensor measures ammonium and nitrate at the same time. The ammonium measurement is dynamically compensated by the separate measurement of potassium. As every wastewater has its individual matrix, a precision-adaption is processed occasionally. The values for the matrix adaption are determined using a photometer and provided to the sensor. The value entry was processed manually up to now.

Matrix adaption via IQ-LabLink

Step 1, IQ terminal:

Automatic generation of job files on a USB memory stick with actual sensor values, parameters, description of measuring site and the automatic allocation of job reference number for a unique identification.

Step 2, photometer:

After inserting the USB memory stick, the instrument identifies the job file, asks for the measurement with the according parameters, gives advice for supporting the correct operation, stores all determined data back on the job file and verifies the completeness.

Step 3, IQ terminal:

Complete reading of data related to the matrix adaption by pressing one button, without any interruption of the online measurement.

IQ-LabLink

Advantages at a glance:

- Software supported routines for the safe data transfer from laboratory to online systems.
- Safe and easy allocation of online and laboratory measurement via job files and functions.
- Integrated help functions for correct processing.
- Check for completeness and verification.
- Complete reading of all data using one button without any interruption of the online measurement.

Electronic-Key function with programmable access permission



Electronic-Key function

- Protection against non-authorized access
- Individual access permission

Function:

When the Electronic-Key function in the IQ SENSOR NET system is activated, the USB memory stick works like an electronic key giving access to the system.

A coded file is therefore stored on the USB memory stick. After reading the file access is activated to the system.

It is also possible, to release only certain functions in order to personalize access.



- General Description of Meters
- IQ SENSOR NET**
- Monitors
- Analyzer
- Sample Preparation
- Samplers
- Accessories

NEW

System 2020 XT (Connect)

The new controller family MIQ/
MC2 by WTW

*Ethernet connection - web server and much more
Easiest network connections - local and via internet*



Measured values are available worldwide at any time

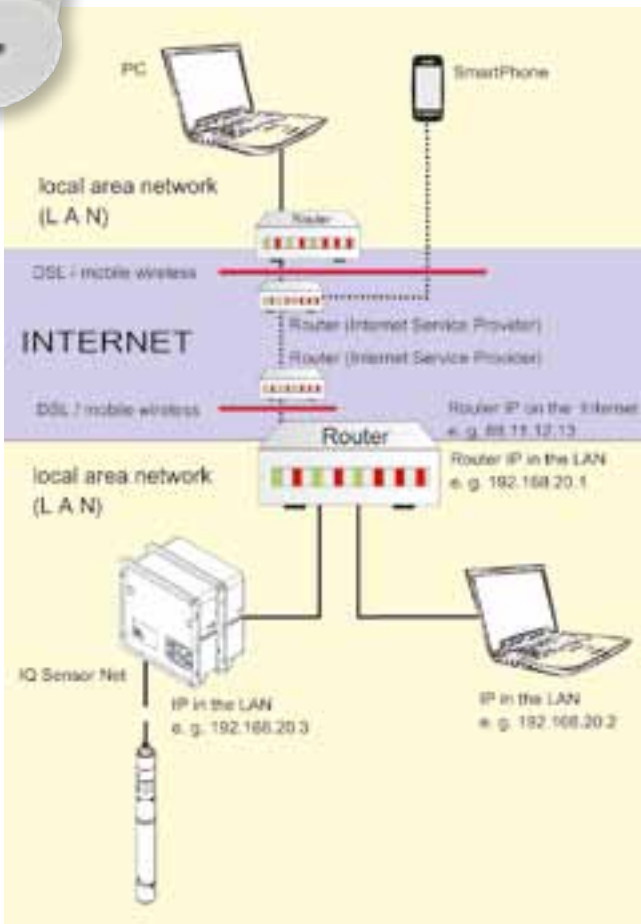
The availability and retrieval of online measurement values - at any time and from anywhere in the world - with the assistance of network connected computers and smart phones, becomes increasingly more important for users in industry and wastewater treatment plants. Modern online measurement technology must therefore provide a simple and cost-effective integration into local networks, and also into the Internet.



IQ SENSOR NET measured values displayed via web browser/internet



Housings of the new MIQ/MC2 family with integrated Ethernet/LAN and USB interface.



Integration of the IQ SENSOR NET system via Ethernet/LAN and routers into a local network or via the Internet into a second local network.

Ethernet/LAN interface and Web server included – ready to use

WTW continued to raise the bar with the new controller family MIQ/MC2 that has integrated an Ethernet / LAN interface as standard. The integration through existing routers in system networks and the Internet must be implemented easily and inexpensively without additional accessories. Thanks to the integrated Web server, data can be viewed at anytime with Internet-enabled devices such as PCs, tablet PCs or smartphones via web browsers.

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General Technical Data System 2020 XT

System

Certifications	ETL, cETL (conforms with relevant UL and Canadian standards), CE	
Electromagnetic Compatibility	EN 61326, Class B; FCC Class A, EMC for indispensable operation	
Integrated Lightning Protection	According to EN 61326 enhanced overvoltage protection for the entire system, implemented in each component	
Connection Medium Cable	IQ SENSOR NET cable SNCIQ or SNCIQ/UG (underground cable with additional PVC coating): 2-wire with shield; 2 x 0.75 mm ² ; Filler cord for easy connection of shield: 0.75 mm ² ; pressure resistant to 10 bar	
Connection Characteristics	Power supply and data transmission on these wires; resistant to polarity reversal with respect to switched shield and inner conductor (no damage); comprehensive EMC shield control; cable topology within IQ Sensor Net system as required, e.g. in the form of a line, tree, star, multiple star Total cable length: max. 1.000 m/1094 yds (without signal amplifying), with signal amplifying module MIQ/JBR additional 1.000 m/1094 yds	
Connection Medium Radio	Radio transmission Class 1 with a range of 100 m/109 yds (max. 300 m/328 yds)	
Connection Characteristics	Data transmission, separate power supply necessary for each island	
Controller	Terminal-/Controller MIQ/TC 2020 XT	Controller MIQ/MC2
MIQ Module Coupling at Rear	Combined mechanical and electrical connection, for rapid coupling to MIQ modules	
USB interface	USB-A (host)	USB-A
Ethernet port	–	RJ45 socket or LSA terminal strip can be used
Display	Graphic display; resolution: 320 x 240 pixel; visible area: 4.49 x 3.39 in. (114 x 86 mm), black/white, backlit	
Control Functions/Function Keys	5 operating keys: 3 master keys for functions: Measurement (M), calibration (C), set/system settings (S), 2 keys for: confirmation/switching menu O.K. (OK), Escape (ESC) 4-directional button for rapid selection of software functions and input of alphanumeric values	
Datalogger	Data memory for up to 525,600 data sets	
Electric Supply	Directly via the IQ SENSOR NET when coupled to MIQ module	
Ambient Conditions	Operating temperature: –4 °F ... 131 °F (–20 °C ... +55 °C) Storage temperature: –13 °F ... 149 °F (–25 °C ... +65 °C)	
Housing Material	ASA (Acrylonitrile-Styrene-Acryloesterpolymer)	
Protection Rating	IP 66 / equivalent to NEMA 4X (not suitable for conduit connection)	
Dimensions (W x H x D)	8.27 x 6.69 x 1.57 in. (210 x 170 x 40 mm)	5.67 x 6.81 x 2.05 in. (144 x 173 x 52 mm)
Weight	Approx. 1.54 pounds (0.7 kg)	
Guaranty	3 years for defects of quality	
Modules		
MIQ Module Coupling at Front	Combined mechanical and electrical connection for rapid docking and removal of the MIQ/T2020 (PLUS) terminal and the MIQ/TC 2020 XT controller, and for docking additional modules	
MIQ Module Coupling at Rear	Combined mechanical and electrical connection for docking additional modules, a total of 3 modules as a stack mounted unit	
Cable Feeds	4 screw cable glands M 16 x 1.5	
Terminal Connections	Screw terminal strips Terminal area for solid conductors: 0.2 ... 4.0 mm ² Terminal area for flexible conductors: 0.2 ... 2.5 mm ² accessible by opening cover	
IQ SENSOR NET Terminal Connections	Terminal connections for the IQ SENSOR NET are available on each module and can be used as required: - for connecting sensors - as an input/output or for looping through/branching of the IQ SENSOR NET cable	
Other Functions	Two LEDs, yellow and red, for monitoring the operating voltage of the IQ SENSOR NET; IQ SENSOR NET connection, resistant to reversed polarity; Integrated local identity function; Integrated switchable terminal resistor (SN terminator)	
Electric Supply	Directly via the IQ SENSOR NET	
Ambient Conditions	Operating temperature: –4 ... 131 °F (–20 ... +55 °C); Storage temperature: –13 ... 149 °F (–25 ... +65 °C)	
Housing Material	PC – 20% GF (polycarbonate with 20% fiberglass)	
Protection Rating	IP 66 / equivalent to NEMA 4X (not suitable for conduit connection)	
Dimensions (W x H x D)	5.67 x 5.67 x 2.05 in. (144 x 144 x 52 mm)	
Weight	Approx. 1.1 pounds (0.5 kg)	
Guaranty	3 years for defects of quality	
Sensors		
Mechanical Connections for Accessories	Connection slot; Connection screw thread G 1"	
IQ Sensor Connection Cable	Combined mechanical and electrical connection for rapid attachment and exchange of sensors. Consists of jack plug and pressure-resistant screw connection. Cable lengths: 1.64 – 7.66 – 16.40 yds (1.5 – 7.0 – 15.0 m)/ 21.87 – 54.68 – 109.36 yds (20 – 50 – 100 m) in sea water design available. Storage temperature: –13 °F ... 149 °F (–25 °C ... +65 °C) Operating temperature: –4 °F ... +131 °F (–20 °C ... +55 °C)	

System components and functions

Terminal/Controller			
	Model	Function	Order No.
Central Control Unit	TC 2020 XT (Operation in MODBUS: terminal/controller)*	Central terminal/controller unit: is required to be installed once at any point, remains in the system, cannot be removed. Operation mode is shown through LED.	470 000
	MIQ/TC 2020 XT-H3	Multi-parameter measuring converter, consisting of the components MIQ/TC 2020 XT + MIQ/CR3 + MIQ/PS, 100 – 240 VAC main voltage, 3 analog outputs (0/4-20 mA) and 3 relay outputs, up to 20 free selectable IQ sensors can be connected	470 016
	MIQ/TC 2020 XT-H3 C6	Multi-parameter measuring converter, consisting of the components MIQ/TC 2020 XT + MIQ/C6 + MIQ/PS, 100 – 240 VAC main voltage, 6 analog outputs (0/4-20 mA) up to 20 free selectable IQ sensors can be connected	470 017
Controller			
	MIQ/MC2	Module IQ/Micro Controller; is required to be installed once at any point; with fully automatic air-pressure compensation and USB + LAN interface	471 015
	MIQ/MC2-MOD	Module IQ/Micro Controller with fully automatic air-pressure compensation and MODBUS RTU / RS 485 connection and USB + LAN interface	471 016
	MIQ/MC2-PR	Module IQ/Micro Controller with fully automatic air-pressure compensation and PROFIBUS-DP connection and USB + LAN interface	471 017
MIQ Modules			
	Model	Function	Order No.
Power Supply	MIQ/PS for 100 – 240 VAC	Depending on the power consumption up to 6 modules can be installed in the system.	480 004
	MIQ/24V for 24 VAC/24 VDC		480 006
Output Modules (analog)	MIQ/CR3 with 3 analog (0/4-20 mA) and 3 relay outputs	With any combination	480 014
	MIQ/C6 with 6 analog outputs (0/4-20 mA)		480 015
	MIQ/R6 with 6 relay outputs		480 013
Output Modules (Digital)	MIQ/2-MOD	Module IQ with fully automatic air-pressure compensation and MODBUS RTU / RS 485 connection	471 018
	MIQ/2-PR	Module IQ with fully automatic air-pressure compensation and PROFIBUS-DP connection	471 019
Magnetic valve module	MIQ/CHV PLUS	Magnetic valve module for automatic controlled cleaning via compressed air	480 018
Linking modules	MIQ/JB	MIQ/JB with 4 connections (for IQ Net or IQ sensors)	480 008
	MIQ/JBR	MIQ/JBR, same as MIQ/JB additionally with amplifier signal for long cable distances (>1 km total length)	480 010
Connecting module Power input	MIQ/IC2	MIQ/IC2 with 2 inputs for 0/4-20 mA signals Enables the connection of separate measuring transmitters and analyzers to the IQ Net	480 016
Radio communication module	MIQ/Blue PS	For wireless connection and linking within the IQ SENSOR NET system	480 021

All IQ sensors are connectable; for ordering information see each parameter chapter. An overview of all connectable sensors can be found in our brochure "Product Details".

**Via the software adjustable by user.*



IQ SENSOR NET performance data

All components within the system require a specific electric power supply. Due to the enormous flexibility of the system, an infinite number of variations are possible. Therefore, a balance sheet must be drawn up after selecting the components. This is easily done by totaling the power consumption of the individual components and checking whether the sum exceeds the power provided by a particular power supply unit. If so, the available power can be increased by installing additional or more powerful power supply units.

Power consumption in Watts	Number of power supply units
MIQ/PS	
≤18 Watts	1 power supply unit
18 - 36 Watts	2 power supply units
36 - 54 Watts	3 power supply units
55 - 72 Watts	4 power supply units
73 - 90 Watts	5 power supply units
91 - 108 Watts	6 power supply units

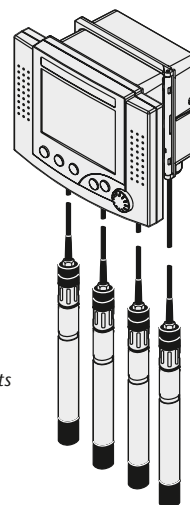
Additional cable losses generally do not need to be taken into account for installations where the main consumers are near (<164 yds/150 m) the next power supply and the overall cable length does not exceed 437 yds (400 m). In systems with greater cable lengths, approx. 1 watt of power loss per additional 109 yds (100 m) of cable have to be considered. These standard values apply when using specified IQ SENSOR NET cable SNCIQ.

Example

Outlet measurement with the following parameters: turbidity, pH, dissolved oxygen, conductivity and temperature	Components:	Power consumption or power supply	One power supply unit MIQ/PS is sufficient for the complete system consisting of four connected sensors.
	MIQ/PS	+ 18.0 Watts	The system comprises a buffer/reserve of approx. 9 watts. The system can be accordingly extended sensors and components.
	MIQ/TC 2020 XT	- 3.0 Watts	
	MIQ/C6	- 3.0 Watts	
	VisoTurb® 700 IQ	- 1.5 Watts	
	SensoLyt® 700 IQ	- 0.2 Watts	
	TriOxmatic® 700 IQ	- 0.2 Watts	
	TetraCon® 700 IQ	- 0.2 Watts	
	Total	Σ: +9.4 Watts	

MIQ/TC2020 XT
+ MIQ/PS
+ MIQ/C6 (6 x mA)
+ 4 IQ sensors

Multi-parameter monitor for any 4 parameters, with 6 analog outputs



Configuration and Performance Data

IQ Sensors			
Type	Description		Power Consumption/ W
SensoLyt® 700 IQ (SW)	pH/ORP assembly		⇒ 0.2
TriOxmatic® 700 IQ (SW)	D.O. sensor		⇒ 0.2
TriOxmatic® 701 IQ	D.O. sensor		⇒ 0.2
TriOxmatic® 702 IQ	D.O. sensor		⇒ 0.2
FDO® 700 IQ (SW)	Optical D.O. sensor		⇒ 0.7
TetraCon® 700 IQ (SW)	Conductivity sensor		⇒ 0.2
VisoTurb® 700 IQ (SW)	Turbidity sensor		⇒ 1.5
ViSolid® 700 IQ (SW)	Suspended solids sensor		⇒ 1.5
VARION®Plus 700 IQ	Double sensor ammonium and nitrate (ISE)		⇒ 0.2
AmmoLyt®Plus 700 IQ	Ammonium assembly (ISE)		⇒ 0.2
NitraLyt®Plus 700 IQ	Nitrate assembly (ISE)		⇒ 0.2
NitraVis® 70X IQ (TS)	Optical nitrate sensor		⇒ 8.0
CarboVis® 70X IQ (TS)	Optical sensor for the measurement of COD/TOC/DOC/BOD/SAC		⇒ 8.0
NiCaVis® 705 IQ	Optical sensor for the measurement of nitrate and COD/TOC/DOC/BOD/SAC		⇒ 8.0
NiCaVis® 70X IQ NI	Optical sensor for the measurement of nitrate, nitrite and COD/TOC/DOC/BOD/SAC/TUV ₂₅₄		⇒ 8.0
P 700 IQ	Orthophosphate analyzer		⇒ 0.5
IFL 700 IQ	Sludge level sensor with integrated scraper		⇒ 5.5**
IFL 701 IQ	Sludge level sensor without scraper		⇒ 3.0
Output modules analog			
Type	Description	In total there are 48 output channels/ system available Number of occupied output channels	Power Consumption/ W
	Each mA-output, each relays with one module is considered as 1 channel.		
MIQ/CR3	IQ / current relay 3 module. with 3 analog outputs and 3 relay outputs each	6	⇒ 3.0
MIQ/C6	IQ / current 6 module with 6 analog outputs	6	⇒ 3.0
MIQ/R6	Module IQ/ Relays 6 with 6 analog outputs	6	⇒ 1.5
MIQ/CHV PLUS	Module IQ/ Cleaning Head Valve for automatically controlled cleaning	1	⇒ 1.0
Output modules digital			
Type	Description		Power Consumption/ W
MIQ/2 PR	Module IQ with PROFIBUS-DP connection		⇒ 2.0
MIQ/2 MOD	Module IQ with MODBUS RTU / RS 485 connection		⇒ 1.6
MIQ/Blue PS	Module IQ for wireless connection within the IQ SENSOR NET system		⇒ 0.6
MIQ/IF232	IQ / software terminal module		⇒ 0.2
Power input connection module mA			
Type	Description		Power Consumption/ W
MIQ/IC2**	IQ / input current 2, module with 2 inputs for 0 / 4 - 20 mA signals **each occupied current input is counted as IQ sensor		⇒ 0.2*
MIQ/JB	IQ / junction box module		⇒ 0.0 (non-active module)
MIQ/JBR	IQ / junction box repeater module		⇒ 0.2
Terminal-Controller			
Type	Description		Power Consumption/ W
MIQ/TC 2020 XT	Terminal / controller for system 2020 XT	In total 3 units per system possible, whereby 1 is installed constantly to the station (terminal / controller function) and 2 are removable or replaceable (terminal function)	⇒ 3.0
Controller			
Type	Description		Power Consumption/ W
MIQ/MC2	Module IQ/Micro Controller		⇒ 1.6
MIQ/MC2-PR	Module IQ/Micro Controller with PROFIBUS-DP connection		⇒ 2.0
MIQ/MC2-MOD	Module IQ/Micro Controller with MODBUS RTU / RS-485 connection		⇒ 1.6
Power supply modules			
Type	Description		Power Output/ W
MIQ/PS	IQ / power supply module for input power with wide range power supply unit for 100 - 240 VAC input voltage		18 ⇒
MIQ/24V	IQ / 24 V module for input power with 24 VAC or 24 VDC input voltage		18 ⇒

Attention: Please consider power consumption of SNCIQ cable: 1 W per 100 m/109 yds (for cable lengths above 400 m/437 yds)

*(+2.2 W per connected power supply/isolator)

** operating with MIQ/Blue PS: 3,0 W




System 182

Up to 4 digital sensors can be connected to this system – insofar the system 182 is perfectly designed for the operation or completion of single measuring points at wastewater plants:

System 182

- 1 to 4 sensors
- Digital outputs
- All IQ sensors can be connected

- Up to 4 sensors can be connected out of a variety of 19 available digital sensors
- pH, ORP, D.O., conductivity, temperature and turbidity/ suspended solids, nutrient parameters ammonium, nitrate and COD can therefore be measured directly, in-situ
- Power supply through wide range mains converter (100-240 VAC) or 24 V alternative.
- Digital outputs PROFIBUS DP or MODBUS RTU
- Analog model with up to 5 analog outputs and 6 relays

Module	DIQ/S 182	DIQ/S 182 XT	DIQ/S 182 XT-4
			
Max. number of sensors	2	2	4
Plug connection for Bus	Plug connection for Bus 2 x mA (0) 4 - 20 mA 3 x relay	DIQ/S 182 XT 4 x mA (0) 4 - 20 mA 5 x relay	DIQ/S 182 XT-4 5 x mA (0) 4 - 20 mA 6 x relay
Models with digital output PROFIBUS	DIQ/S 182 PR Plug connection for Bus 3 x relay	—	DIQ/S 182 XT-4/ PR Plug connection for Bus 3 x relay
Models with digital output MODBUS	DIQ/S 182 PR Plug connection for Bus 3 x relay	—	DIQ/S 182 XT-4/ PR Plug connection for Bus 3 x relay

Linking module for sensors and magnetic valve modules for compressed-air cleaning



- (DIQ/JB): Connection of a second or further distant IQ sensor
- (DIQ/CHV): Integrated magnetic valve is directly controlled by a relay of the transmitter

Configuration Options for System 182

Example 1

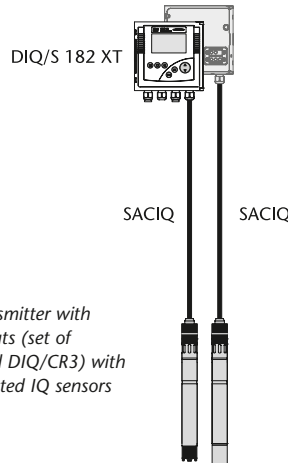
Configuration Example	Order No.
DIQ/S 182	472 000
SACIQ-7,0	480 042
IQ Sensor	user selected



Transmitter with 1 direct connected IQ sensor

Example 2

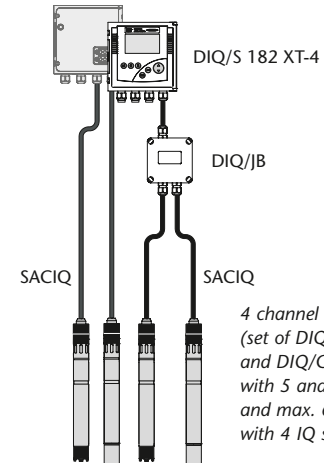
Configuration Example	Order No.
DIQ/S 182 XT	472 001
2 x SACIQ-7,0	480 042
2 IQ Sensors	user selected



2 channel transmitter with 4 analog outputs (set of DIQ/S 182 and DIQ/CR3) with 2 direct connected IQ sensors

Example 3

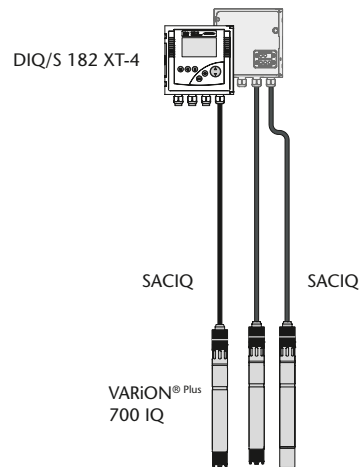
Configuration Example	Order No.
DIQ/S 182 XT-4	472 015
4 x SACIQ-7,0	480 042
DIQ/JB	472 005
4 IQ Sensors	user selected



4 channel transmitter (set of DIQ/S 182 and DIQ/CR3) with 5 analog outputs and max. 6 relays with 4 IQ sensors

Single measuring point with analog outputs

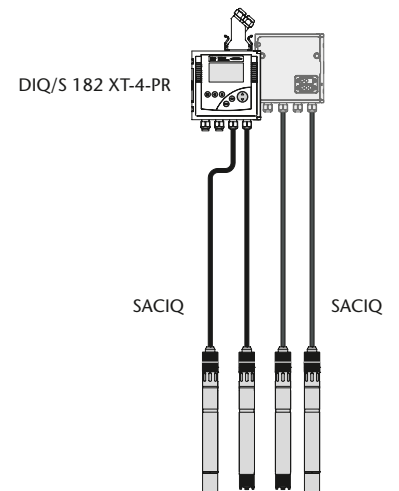
Configuration Example	Order No.
DIQ/S 182 XT-4	472 015
3 x SACIQ-7,0	480 042
VARiON [®] Plus 700 IQ	107 066
2 IQ Sensors	user selected



4 channel transmitter (set of DIQ/S 182 and DIQ/CR3) with 5 analog outputs and max. 6 relays with 3 IQ sensors

Single measuring point PROFIBUS / MODBUS

Configuration Example	Order No.
DIQ/S 182 XT-4-PR	472 017
4 x SACIQ-7,0	480 042
4 IQ Sensors	user selected



4 channel transmitter (set of DIQ/S 182 and MIQ/JB) with 3 relays and PROFIBUS-DPA connection with 4 IQ Sensors

General Technical Data System 182

System

Certifications	ETL, cETL (conforms with relevant UL and Canadian standards), CE
Electromagnetic Compatibility	EN 61326, Emission: Class B, EMC for indispensable operation, FCC Class A
Integrated Lightning Protection	According to EN 61326 enhanced overvoltage protection for the entire system
Connection Medium Cable	IQ SENSOR NET cable SNCIQ or SNCIQ/UG (underground cable with additional PVC coating): 2-wire with shield; 2 x 0.75 mm ² ; filler cord for easy connection of shield: 0.75 mm ² ; pressure resistant to 10 bar
Connection Characteristics	Power supply and data transmission on these wires; resistant to polarity reversal with respect to switched shield and inner conductor (no damage); comprehensive EMC shield control; Cable topology within the IQ SENSOR NET system as required, e.g. in the form of a line, tree, star; total cable length max. 273 yds/250 m
Connection Medium Radio	Radio transmission with a range of 100 m/109 yds (max. 300 m/328 yds)
Connection Characteristics	Data transmission, separate power supply necessary for each island

Monitors

Display	Graphic display; resolution: 128 x 64 pixel; visible area: 2.83 x 1.57 in. (72 x 40 mm), black/white, backlit
Control Functions/Function Keys	5 operating keys: 3 master keys for functions: measurement (M), calibration (C), set/system settings (S), 2 keys for: confirmation/switching menu O.K. (OK), escape (ESC) 2 knobs for rapid selection of software functions and input of alpha-numeric values (up), (down)
Electric Supply	100 ... 240 VAC (50/60 Hz), 24 V AC/DC
MIQ Module Coupling at Rear	Combined mechanical and electrical connection for docking additional modules, additionally max. 2 modules as stack mounted unit
Cable Feeds	4 screw cable glands M 16 x 1.5
Terminal Connections	Screw terminal strips Terminal area for solid conductors: 0.2 ... 4.0 mm ² Terminal area for flexible conductors: 0.2 ... 2.5 mm ² accessible by opening cover
IQ SENSOR NET Terminal Connections	Terminal connections for the IQ SENSOR NET for connecting sensors
Ambient Conditions	Operating temperature: -4 °F ... 131 °F (-20 °C ... +55 °C); Storage temperature: -13 °F ... 149 °F (-25 °C ... +65 °C)
Housing Material	PC – 20% GF (polycarbonate with 20% fiberglass)
Protection Rating	IP 66 / equivalent to NEMA 4X (not suitable for conduit connection)
Dimensions (W x H x D)	5.67 x 5.67 x 3.74 in. (144 x 144 x 95 mm) (DIQ/S 182 XT: 5.67 x 5.67 x 5.63 in. / 144 x 144 x 143 mm) / DIQ modules: 3.74 x 3.74 x 2.28 in. (95 x 95 x 58 mm)
Weight	DIQ 182: approx. 2.2 pounds (1 kg) DIQ/S 182 XT and DIQ/S 182 XT-4: approx. 3.31 pounds (1.5 kg)
Guaranty	3 years for defects of quality

Sensors

Mechanical Connections for Accessories	Connection slot; connection screw thread G 1"
IQ Sensor Connection Cable	Combined mechanical and electrical connection for rapide attachment and exchange of sensors. Consists of jack plug and pressure-resistant screw connection. Cable lengths: 1.64 – 7.66 – 16.40 yds (1.5 – 7.0 – 15.0 m)/ 21.87 – 54.68 – 109.36 yds (20 – 50 – 100 m) in sea water design available. Storage temperature: -13 °F ... 149 °F (-25 °C ... +65 °C) Operating temperature: -4 °F ... +131 °F (-20 °C ... +55 °C)

Ordering Information System 182

		Order No.
Monitors		
DIQ/S 182	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors with 2 analog outputs (0/4-20 mA) and 3 relays	472 000
DIQ/S 182 XT	Dual IQ/ system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 4 analog outputs (0/4-20 mA) and 5 relays	472 001
DIQ/S 182-PR	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 3 relays and PROFIBUS-DP connection	472 002
DIQ/S 182-MOD	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 3 relays and MODBUS RTU/RS 485 connection	472 003
DIQ/S 182/24V	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 2 analog outputs (0/4-20 mA) and 3 relays, for 24 V AC/DC power supply	472 010
DIQ/S 182 XT/24V	Dual IQ/ system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 4 analog outputs (0/4-20 mA) and 5 relays, for 24 V AC/DC power supply	472 011
DIQ/S 182-PR/24V	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 3 relays and PROFIBUS-DP connection, for 24 V AC/DC power supply	472 012
DIQ/S 182-MOD/24V	Dual IQ/system 182, Universal Transmitter for connection of 2 digital IQ sensors, with 3 relays and MODBUS RTU/RS 485 connection, for 24 V AC/DC power supply	472 013
DIQ/S 182 XT-4	Dual 182 XT-4 system for connecting 4 digital sensors with 5 analog outputs (0/4 - 20 mA) and max 6 relays. Delivery scope DIQ/S with DIQ/CR3	472 015
DIQ/S 182 XT-4-PR	Dual 182 XT-4 system for the connection of 4 digital sensors with 3 relays and PROFIBUS-DP connection, delivery scope DIQ/S 182 with MIQ/JB	472 017
DIQ/S 182 XT-4-MOD	Dual 182 XT-4 system for the connection of 4 digital sensors with 3 relays and MODBUS RTU / RS-485 connection, delivery scope DIQ/S 182 with MIQ/JB	472 019
DIQ/S 182 XT-4/24V	Dual 182 XT-4 system for the connection of 4 digital sensors with 5 analog outputs (0/4 - 20 mA) and max 6 relays for the 24 V AC/DC power supply, delivery scope DIQ/S 182/24V with DIQ/CR3	472 021
DIQ/S 182 XT-4-PR/24V	Dual 182 XT-4 system for the connection of 4 digital sensors with 3 relays and PROFIBUS-DP connection for 24V AC/DC power supply, delivery scope DIQ/S 182 24V with MIQ/JB	472 023
DIQ/S 182 XT-4-MOD/24V	Dual 182 XT-4 system for the connection of 4 digital sensors with 3 relay outputs and MODBUS RTU / RS 485 connection for 24 V AC/DC power supply, delivery scope DIQ/S 182/24V with MIQ/JB	472 024
DIQ Modules		Order No.
DIQ/JB	Dual IQ/Junction box for connection of a second or a further IQ sensor to the Universal Transmitter DIQ/S 182 (system 182)	472 005
DIQ/CHV	Dual IQ/Cleaning Head Valve for automatic air cleaning controlled by a relay for system 182 (relay and compressed air supply external)	472 007
MS/DIQ	Mounting plate for up to 2 DIQ modules (DIQ/CHV and DIQ/JB)	472 009
MIQ Module and Cables for System Supplement		Order No.
MIQ/Blue PS SET	Module IQ/Radio transmission, for wireless connection within the IQ SENSOR NET system, for system 182, 184 XT and 2020 XT. SET with two pairwise preconfigured modules	480 021
MIQ/CR3	Output Module (analog) with 3 analog and 3 relay outputs, with any combination	480 014
MIQ/C6	Output Module (analog) with 6 analog outputs, with any combination	480 015
MIQ/R6	Output Module (analog) with 6 relay outputs, with any combination	480 013
MIQ/IC2	MIQ/IC2 with 2 inputs for 0/4-20 mA signals Enables the connection of separate measuring transmitters and analyzers to the IQ Net	480 016
MIQ/JB	Linking with 4 connections (for IQ Net or IQ sensors)	480 008
MIQ/CHV PLUS	Magnetic valve module for automatic controlled cleaning via compressed air	480 018
MIQ/PS	Module IQ/Power Supply, wide-range power supply for system 182, 2020 XT and 184 XT, power output max. 18 W	480 004
MIQ/24V	Module IQ/24V, power supply for 24 VAC / 24 VDC input voltage, for system 182, 2020 XT and 184 XT, power output max. 18 W	480 006
SNCIQ	Specific two-wire IQ SENSOR NET cable with shield for safe power/information transfer within the IQ SENSOR NET system. Please indicate cable length in m when ordering (unit: m)	480 046
SNCIQ/UG	Specific two-wire IQ SENSOR NET cable with shield for safe power/information transfer within the IQ SENSOR NET system, esp. for use in underground. Please indicate cable length in m when ordering (unit: m)	480 047



Mounting Material for Monitors on request / see brochure "Product Details"