Helping you supply quality water in high quantities

To succeed in this task, we have designed typical automation and control architectures for remote stations and water treatment plants. They are tested and validated. You can use them with assurance of total security.

1. Optimize the cost of your operation
2. Guarantee the reliability of your process
3. Evolve your existing plants

Complete solutions for a wide variety of applications, from the simple pumping station to the big treatment plant, as well as for your projects of new installations or modernization.
For water pumping remote stations, three different types of architectures have been distinguished, depending on destination and size. For both drinking water and wastewater treatment, four different sizes of architectures have been distinguished. This size of architectures can be expressed in quantity of treated water per day, or in equivalent number of inhabitants.

Remote sites
3 levels of lifting, pumping, overpressure or reservoir remote sites, depending on:

- Volume of water to be pumped (number of pumps).
- Complexity of pumping treatment (availability of technique).

Treatment plants
4 levels of drinking or waste water treatment plants, depending on:

- Volume of water to be treated in inhabitants equivalent.
- Complexity of technique and its constraints:
  - input water quality, environment (plant size, pollution),
  - output water expected quality (taste, clarity).

<table>
<thead>
<tr>
<th>Number of pumps</th>
<th>Remote stations</th>
<th>Treatment plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 pump</td>
<td>Up 2 pumps</td>
<td>Plant for 5,000</td>
</tr>
<tr>
<td></td>
<td>Small lifting,</td>
<td>inhabitants</td>
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<tr>
<td></td>
<td>pumping and</td>
<td>equivalent</td>
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<td></td>
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<td></td>
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<tr>
<td>2 pumps</td>
<td>Up to 4 pumps</td>
<td>Plant for 50,000</td>
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<tr>
<td></td>
<td>Pumping and</td>
<td>inhabitants</td>
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<tr>
<td></td>
<td>small booster</td>
<td>equivalent</td>
</tr>
<tr>
<td></td>
<td>station</td>
<td></td>
</tr>
<tr>
<td>4 pumps</td>
<td>N pumps</td>
<td>Plant for 200,000</td>
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<tr>
<td></td>
<td>Booster or</td>
<td>inhabitants</td>
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<tr>
<td></td>
<td>complex pumping</td>
<td>equivalent</td>
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<tr>
<td></td>
<td>station</td>
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<tr>
<td>N pumps</td>
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<td>Plant for 1,000,000</td>
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<td>inhabitants</td>
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<thead>
<tr>
<th>Inhabitants equivalent</th>
<th>Simple treatment</th>
<th>Complex treatment</th>
<th>Multisite management</th>
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<tr>
<td>1,000</td>
<td>T1</td>
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<tr>
<td>10,000</td>
<td>T2</td>
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<td>500,000</td>
<td>T4</td>
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<tr>
<td>1,500,000</td>
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</table>
Remote SCADA
Parametrable
Wired & compact
Modbus
Supervision
remote access
Process control
Pump control
Multi-sites architectures

Incremental offers by services level

<table>
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<td>Remote SCADA &amp; Web access</td>
<td>Remote SCADA &amp; Web access</td>
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<td>Modbus</td>
<td>Modbus &amp; DNP3 &amp; IEC 870</td>
<td>Modbus &amp; DNP3 &amp; IEC 870</td>
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</table>
En raison de l'évolution des normes et du matériel, les caractéristiques indiquées par les textes et les images de ce document ne nous engagent qu'après confirmation par nos services.

Publication : Schneider Electric
Design : pemaco
Illustration : pemaco
System architecture P1
Up to 2 pumps remote station
P1: a compact solution for lifting stations

1. Vijeo Citect SCADA
2. W@de portal W502
3. Operator SMS alarming
4. Magelis XBT RT
5. W@de W320i
6. HMI push buttons: Harmony XALD
7. Motor starter TeSys U
8. Altistart 48
9. Instrumentation 4-20 mA
10. Power supply ABL7
11. Circuit breaker
12. Contactor
Remote SCADA system

> A Remote SCADA system Vijeo Citect can be used to monitor and control several P1 remote sites (lifting, small pumping stations).
+ Vijeo Citect provides all communication services to interface with remote sites using a different communication system and protocol.

> The W@de W320i compact solutions are optimized for small remote sites. They interface with all open-protocol monitoring systems (Modbus or other) or a W502 portal, accessible via the Web.
+ The W320i integrates different types of modems: PSTN, radio, GSM or Lease Line.

Pumps management

> Application from 2 to 3 pumps are targeted by a P1 architecture.

> Pumps are controlled using Direct Online starters (TeSys D, TeSys U) or the soft starter (ATS 48).
+ Hardwired connection is used between motor control devices and the W320i.

Process Control management

> The P1 architecture is controlled by a compact remote management PLC, the W320i that provides 15 inputs, 8 outputs and 3 analogue inputs.

> The PLC is designed for applications requiring a remote connection via the Modbus protocol (W502 Web server or Vijeo Citect SCADA).

> It comprises an integral supply/charger (battery end of life test). Some preconfigured applications can be configured via an intuitive interface (lifting, tank, pumping applications).

> A text message display or semi-graphic screen. Magelis XBT N, R, RT can be connected to a W320i to perform local diagnostics and to control and adjust a P1 station.
Multi-site lifting architecture

> Several hundreds of lifting stations can be part of the same wastewater installation. A centralized SCADA system is in charge of controlling and monitoring the different sites. The W320i features are well suited to the requirements of lifting station automation.

It integrates different types of modems that can be remotely controlled by a SCADA system.

> The lifting station is used to send wastewater to the treatment plant. A lifting application can be pre-configured in the W320i. This application controls:
  + Pump startup and shutdown according to the tank levels.
  + The mixer operates for a specified time before the first pump is started up.
  + The screen rake operates after a time-delay or when the pumps are shut down.
  + The storm pump is started up if the normal pumps cannot evacuate the water.
  + It ensures automatic pump changeover and it is used to switch from one pump to another in the event of a failure.

> The following parameters can be adapted to the lifting application depending on the number of pumps installed, level detection, number of simultaneous pumps, changeover strategy, mixer, storm pump management.
System architecture P2
Up to 4 pumps remote station
P2: an optimal solution for pumping

1. Vijeo Citect SCADA
2. Operator SMS alarming
3. Magelis XBT GT/GTK/GTW
4. W&de W320 E
5. Altivar 61
6. Altivar water solution card VW3 A3 503
7. Altistart 48
8. Motor starter TeSys U
9. HMI push buttons: Harmony XALD
10. Instrumentation 4-20 mA
11. Power supply ABL7
12. Circuit breaker
13. Contactor
Remote SCADA system

> A Remote SCADA system Vijeo Citect is used to monitor and control several P2 remote sites.
  + Vijeo Citect provides all communication services to interface with remote sites using different types of communication and protocols, such as Modbus, DNP3 and IEC 870.

> The *W@de* remote terminal unit W320 E allows communication with a SCADA system using standard protocols (Modbus, DNP3, IEC 870) and via suitable media (PSTN, GSM, GPRS, radio, LL or Ethernet). It enables data exchange to operators or on-call personnel via a direct or remote (via internet browser) connection using the web server embedded in the modules.
  + Improve the availability of your installation.
  + The Remote Terminal Unit module W320 E can manage two different modems.

Pumps management

> Pump management (up to 4 pumps) is done by the Altivar 61 with its water multi-pump card. With the programmable card multi-pump, Altivar 61 brings you flexibility, user-friendliness and adaptability in the management of several pumps.
  + The *Altivar 61* is a frequency inverter for 3-phase asynchronous motors from 0.75 to 800 kW for variable torque applications.
  > This multi-pump embedded program provides a fully featured control algorithm for a constant pressure pumping system comprising up to four pumps. The variable speed pump is speed controlled from the Water Solution and the (up to) three additional external pumps can be DOL or preferably, under soft starter control. There is also provision for a Jockey / Priming pump.

Process Control management

> The control of a P2 station is done by the Altivar 61 with a multi-pump water solution card (VW3 A3 502 or VW3 A3 503).
  + A pre-configured application is provided to manage a P2 installation with 4 pumps without any programming.

> The Altivar 61 is combined to a Remote Terminal Unit, the W320 E that guarantees:
  + Acquisition of the I/Os in Altivar 61.
  + Time-stamped logging of events, alarms, analog values or metering data made available to the SCADA system (or PC) as files directly usable by a spreadsheet or a data base management system (DBMS).
  + Alarm transmission via SMS (GSM) or to the SCADA system for preconfigured events (change in status conditions, threshold overrun, index overrun...).
  + Management of power outages through failure detection of the internal power supply (W320).
Alternative architecture

> In some P2 installations, additional pumping features and specific constraints (pump availability) require the use of more pumps and more digital or analog I/O data. In this case a specific program will be developed to manage this water pumping or booster installation.

> The Altivar 61 controller inside card VW3 A3 501 allows you to develop your own solution for a P2 pumping or boosting site. A CANopen network can be used to connect additional variable speed drives Altivar 31/61, motor starters, and even Advantys STB distributed I/O.
System architecture P3
Modular remote station
P3: modular remote station

1. Viéo Citect SCADA
2. Operator SMS alarming
3. Magelis XBT GT
4. Modicon M340
5. Wöide W315i
6. Altivar 61
7. Altistart 48
8. Motor Starter TeSys U on Advantys STB EPI2145
9. Ethernet switch ConneXium
10. Instrumentation 4-20 mA
11. HMI push buttons: Harmony XALD
12. RFID Ositrack
13. ETG1000 FactoryCast gateway
Remote SCADA system

A Remote SCADA system Vijeo Citect is used to monitor and control several P3 pumping or boosting remote sites. Vijeo Citect provides all communication services to the interface with remote sites using different types of communication and protocol, such as the Modbus, DNP3 and IEC 870.

The W@de remote terminal unit W315 enables communication with a SCADA system using standard protocols (Modbus, DNP3, IEC 870) and via suitable media (PSTN, GSM, GPRS, radio, LL or Ethernet). It enables data exchange to operators or on-call personnel via a direct or remote (via internet browser) connection using the web server embedded in the module.

Pump management

A P3 pumping station can have a large surface area with several scattered pumping sites. An Ethernet network or a CANopen bus is used to connect all motor control devices, managing these pumps to the centralized PLC.

In case of a distributed pumps control, the variable speed drive, Altivar 61, allows IP54 product solution.

Altivar 61 offers a full range of variable speed drives that are suited to water pumping requirements
• 0.75 to 75 kW, 380 V to 480 V
• Class A or class B product offer, with or without Vario switch.
• Simple integration in installations subject to difficult environments.
• Using the Altivar 61 UL Type 12/IP54:
  - Integrated anti-harmonic solutions.
  - Remedial mechanisms for installation pollution.
  - EN 55011 class A or class B (IEC/EN 61800-3) integrated EMC filters.

The Advantys STB distributed I/O allows -25 to +70°C Extended Operating Temperature Range. This extended operating range will enable the Advantys STB I/O to be used in many water pumping stations exposed to higher or lower temperatures.

Process Control management

A Modicon M340 is in charge of controlling the pumping application and all additional function, such as screening or chlorinating.

Better productivity with Unity, unique software multi-platforms between pumping station and treatment plant.
• Reuse same DFB... developed in treatment plant.
• Reduce training.
• Compactness: digital modules 16 to 64 I/O; mixed module 16 I + 16 O.
• Flexibility: processors with two integrated ports for CANopen, Ethernet or Modbus.
• Advanced functions: multifunction fast counting, low level and multi-range analogue modules.
• Remote access via ethernet: web server embedded in programmable controller; user web pages.
Water distribution architecture

> A water distribution network comprises a significant number of remote tanks, pumping stations and boosting stations.

> The production station is normally dependent on one or more storage stations (tank or recovery station). The pump startup/shutdown commands are related to the empty/full states of these stations.

> The storage tank station generally controls one or more production or recovery stations. The production station startup/shutdown commands are generated according to whether the thresholds are low or high and according to time periods.

> The booster stations are required to provide the right water pressure. The difference between the discharge pressure and the set point controls whether a pump is started up (or shut down). The booster application must control automatic pump changeover and switches automatically from one pump to another in the event of a failure. The use of a variable speed drive also prevents water hammer.
System architecture T1
A treatment plant for 5,000 inhabitants
T1: a treatment plant for 5,000 inhabitants

1. Vijeo Citect SCADA
2. Web client - FactoryCast HMI
3. Modicon M340
4. Magelis XBT GT / Web gate
5. ETG 3000 - FactoryCast HMI gateway
6. CANopen bus
7. CANopen TSX CANTDM4
8. Up to 16 Motor starter TeSys U
9. Altivar 31
10. Motor starter TeSys T
11. RFID Ostrack
12. Instrumentation 4-20 mA
T1 architecture
Compact and autonomous
The T1 system architecture is designed for water treatment plants with non-permanent staff, allowing for remote monitoring and control.

- Optimized and simple remote monitoring is required to control the process of a T1 water plant. A centralized remote Vijeo Citect SCADA provides all easy to use services to monitor one or several water plants:
  - Report, alarm, trend (water quality...), I/O servers of all plants are managed by Vijeo Citect.

An effective "All in One" remote terminal unit solution is provided by FactoryCast HMI gateway ETG3000 module. It is a powerful link between the water plant and the monitoring system.

- It is an advanced and open solution for remote monitoring and control.
- It offers built-in HMI/SCADA functions that can be used alternatively to concurrently to the remote SCADA system.
- It provides internal data logging with time stamping or logging to a remote database (SQL, Oracle...) to log all events, alarms or states of your water plant.
- It provides you with a customized Web server with graphical monitoring and alarming.

For local operation, a graphic HMI Magelis XBT GTW or XBT GK is located on site.

- They offer a large choice of interfaces from 3,8 to 15" screens for close monitoring of the processes of your pumps, valves, motors, tanks...

Motor control management

- The compactness of the architecture is an important criteria in offering an "all in one panel" solution to manage all motors, valves and pumps of the different process steps (screening, clarifier, biological tanks).
- The process associated to the T1 plant is usually simplified. The different process steps are often concentrates with a limited number of equipment to manage.
- Up to 16 motors or pumps have to be managed and controlled in this type of plant.
- Different types of motor control devices connected to CANopen provide motor protection and measurement in a all in one panel architecture.
  - Motor control TeSys U
  - Motor control TeSys T
  - Variable speed drive Altivar 31 and Altivar 61
  - All these motor control devices have a cost effective embedded CANopen interface.
Multiple T1 water treatment plants are usually monitored by a centralized control room using a permanent or non permanent communication.

The FactoryCast HMI gateway ETG3000 provides advanced communication services with dual Ethernet ports and an embedded modem for PSTN or GSM/GPRS communication.

- It provides remote management and maintenance allowing remote web diagnostic and alarm notification via email/SMS.
- It offers a direct access to a relational database (SQL, Oracle...) to store process values, events, alarms and states of the water treatment process.

Vijeo Citect provides all communication drivers for remote monitoring services using the Modbus protocol with T1 water treatment plants.

A Modicon M340 is a compact and high performance architecture for small water and wastewater treatment plants (T1).

- Compact design for limited room
- Powerful architecture:
  - Embedded high speed network connection (Ethernet, CANopen)
  - Effective counting offer appropriate for water processes
- Better productivity:
  - Unique software multi-platforms between all types of treatment plants from T1 to T4.
  - Reuse same DFB (pumps, motors, clarifiers, screeners...), reduce training.
- Simplified maintenance:
  - The SD card enables application program automatic backup.

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- Simplified maintenance:
  - The SD card enables application program automatic backup.
Good to know

Provide an optimized solution for a small village

> Small municipality (500 to 2000 inhabitants) require a very compact and cost effective automation solution.

The T1 system architecture with hardwired connection between PLC Modicon M340 and motor control can be proposed.

Optimize the remote control of your plant

> The Magelis XBT GT range provides web gate functions to remotely control and diagnose a T1 plant.

A standard web browser of your PC is able to access the local HMI application.

Protect your water treatment plant

> The RFID Ositrack module can be connected to CANopen to control access to the water T1 plant.

In case forced entry, an alarm is sent to a remote operator.
System architecture T2
A treatment plant for 50,000 inhabitants
T2: a treatment plant for 50,000 inhabitants

1. Standalone Vijeo Citect SCADA
2. Web client - FactoryCast HMI
3. Modicon Premium
4. ETG 3000 - FactoryCast HMI gateway
5. Ethernet network
6. ConneXium switches
7. Motor starter TeSys U on Advantys STB EPI 2145
8. Advantys STB
9. Altivar 61/71 on Advantys STB CANopen
10. Magelis XBT RT
11. Magelis XBT GT
12. Instrumentation 4-20 mA
T2 architecture
Cost effective
T2 system architecture is an efficient, integrated solution for a medium sized city.

- A standalone Vijeo Citect monitoring system provides an economical solution for a T2 water application with only a few hundred points.
  + Report (water quality...), alarm, trend, I/O servers are centralized in one PC.
  + The graphics capabilities of your Vijeo Citect allow you to quickly develop easy to use water application graphics (sedimentation tanks, filter, clarifiers,...) that provide the operator with an intuitive user interface.

Vijeo Citect system comprises objects from simple pushbuttons through to pumps and valves to complex loop controllers (water quality regulation). It enables you to quickly and easily develop your control system.

Local control of the water process is achieved with compact Magelis XBT N, R, RT or graphic Magelis XBT GT, GK, GTW located in each functional unit.
+ A large range of HMI designed to fit all your needs regarding local monitoring and control to your pumps, motors, or tanks.
+ Ultra-flexible user interface with touch screen and keypad keys.
+ Large connectivity (USB ports, fast Ethernet...).

Up to 100 motors, pumps or valves have to be managed in a T2 water plant.

- Advantys STB distributed I/O solution is an open and modular I/O system. It allows you to design a cost effective distributed functional island with cabling optimization.
  + Advantys STB offers a parallel interface module (STB EPI 2145) to easily connect several TeSys U Motor starters. Each of the 4 channels of the STB EPI 2145 application-specific module provides a basic and effective level of motor protection and measurement.
  + Advantys STB CANopen extension allows you to easily connect variable speed drives (Altivar 31 and 61/71) to manage pumps and to aerate your water treatment plant.

The TeSys U starter-controller is a direct motor-starter with a capacity of up to 32 A/15kW that performs the following functions:
+ Protects and controls single phase or 3-phase motors, disconnects power, protects against overcurrent and short-circuit, protects against Thermal overload, performs power switching, application control, protection alarms, application monitoring: duration of use, number of faults, motor current values, etc.

TeSys U is very well suited to controlling motors of scrappers, screeners, mixers... of the different process steps of your plant.
In a T2 plant, an operation team is not always present on-site, therefore remote monitoring is required to guarantee the quality of the water H24. The FactoryCast HMI gateway ETG3000 module is an effective remote management solution to help you optimize your running and maintenance cost.

- Embedded modem, customizable web server, traceability, data logging, alarming, reporting.

Several T2 water treatment plants can be monitored from a centralized location, thanks to Vijeo Citect clustering capabilities. Vijeo Citect allows a single client to view the alarms, trends, and reports from multiple servers located in different plants without combining all the projects together into a single large project.

A Centralized PLC Modicon Premium controls all the functional units (sedimentation, flocculation, filtration, desyndecting) of a T2 water treatment plant. Modicon Premium offers unrivaled performance, reducing cycle times and providing integrated diagnostic data.

Modicon Premium proposes a conformal coating module for severe environments to increase the isolation capability of the treated circuit board, such as their resistance to condensation, the dusty atmosphere (conducting foreign particles) and to corrosion more particularly at the time of use in a sulfur environment (wastewater plant...) or halogens atmosphere (chlorine...).

Modicon Premium provides an Embedded Ethernet port offering all Transparent Ready services (Web diagnostic, Modbus-TCP, e-mail, time synchronization...). The Ethernet network is used to connect SCADA system and all functional units, providing performance, openness, and high level diagnostics.
Good to know

Optimize the availability of your SCADA system

> A FactoryCast HMI Premium module allows you to develop a low lost cost Web based SCADA solution for small T2 plants. It can also provide a backup SCADA solution to the centralized Vijeo Citect SCADA.

FactoryCast offers advanced web based services. E-mail services, data base access (SQL, oracle…), and SOAP communication services are available using FactoryCast Premium module.

Develop the openness of your solution with Modbus TCP and ODVA

> Modbus-TCP is now part of ODVA organization. The simplicity and openness of Modbus can be easily combined into the advanced capabilities of CIP and Ethernet/IP.

A flexible and adaptable SCADA system

> Vijeo Citect scalable architecture allows you to grow with your requirement. If you require a second operator interface in your plant, just add a new display client while preserving your initial investment.
System architecture T3
A treatment plant for 200,000 inhabitants

T3

Schneider Electric
T3: a treatment plant for 200,000 inhabitants
T3 architecture
Performance, flexibility, diagnostic
Information management

The T3 system architecture is an efficient, flexible and modular solution dedicated to large cities.

A T3 plant requires a large control and monitoring system. Vijeo Citect is the expert to manage significant numbers of tags. Its flexible client server architecture enables you to design and redesign your system as required.

+ Vijeo Citect clients on Magelis iPC are located at functional unit level to optimize plant operation and improve the efficiency of your plant.

+ Process Analyst of Vijeo Citect is an effective tool for quick issue resolution. It is an aid in decision-making for water plants and water process optimisation by bringing together trend and alarm data.

+ On-demand or scheduled reporting to municipality or other entities are often requested. Vijeo Historian is a powerful reporting analysis tool. It bridges water process and corporate networks.

+ Utilising a standard database such as MS SQL server allows easy transition of data between the process system and business system. The data is stored securely and leverages the security of the SQL server.

+ The data can be visualised within web and Excel clients.

Motor control management

> Up to 500 motors, pumps or valves have to be managed in a T3 plant.

> An advanced level of motor protection and measurement is required to optimize the process quality. Motor starter TeSys U and TeSys T connected to Advantys extension provided a high level of protection and a complete set of information for measurement.

> TeSys T motor starter covers all motor monitoring and protection needs in water installations where productivity and a high level of availability is essential. It offers:

+ Wide range of current rating, high level of protection, an all in one device with all main protection & control functions. Complementary protection functions are available with expansion modules.

+ TeSys T is the guarantee to have complete motor protection and measurement even at the most critical process stage, such as biological cleaning or sludge processing.

> Altivar 61/71 variable speed drives connected to Ethernet meets the most stringent requirements of water plant, boosts performance and increases flexibility of use. Altivar 61/71 provides a dual Ethernet port allowing daisy chaining architecture without any need for external switches.

+ Altivar 71 offers a full range of variable speed drives (IP20, IP23 and IP54 enclosed)
  - 0.37 to 90 kW - 200/240 V
  - 0.37 to 630 kW - 400/480 V
  - 4 to 800 kW - 690 V

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  - 4 to 800 kW - 690 V
Process control management

> Several Modicon Premiums (up to 10) share the control of a T3 plant.
> Each Modicon Premium is in charge of controlling one functional unit, such as the screeners, the secondary clarifiers, the sludge dewatering...
> High availability of the most critical process steps like the biological tanks or the preliminary step is required.
> **Premium Hot Standby** with Primary & Standby PLC is a high performance redundant solution.
> Based on Ethernet services with automatic IP address switching.
> No more restrictive programming, thanks to Unity.

> With **Unity Application Generator** and its water object library a water plant project can automatically be configured in multiple PLCs. UAG increases efficiency, improves software quality, speeds up commissioning while simultaneously reducing project risk. Integrated change tracking and automatic documentation generation reduces engineering effort and enables system validation of your plant.

Energy monitoring

> **Minimize energy consumption.**
> The **Power Logic Power Meter** Series 700 and 800 offers all the measurement capabilities required for monitoring an electrical installation in a water plant. By employing sophisticated power monitoring equipment to analyze historical and real-time data, cement plant managers can reduce the cost of electricity and improve its quality and reliability.
> Better understanding of electrical system loading and demand.
> Improved a better understanding of the entire electrical system.
> Troubleshoot system problems such as faults or harmonics.
Good to know

Optimize process design and control

> The complexity of automation architectures in a water plant requires a high level of diagnostics, and ConneXview Industrial Ethernet Diagnostic Software is the perfect solution. ConneXview lets you monitor and troubleshoot your entire Ethernet network from your PC, or anywhere you have network access.

Optimize motor control wiring and maintenance

> iMCC Prisma Plus switchboard is a simple, quick and upgradeable solution to meet any requirement. The modular design of the Prisma Plus system and small size of the functional units (up to 36 feeders per enclosure) let you build cost-effective switchboards that perfectly match the needs of water application. Assembly and mounting is fast and easy.

Optimize the availability of your SCADA system

> A FactoryCast HMI Premium module can be used to integrate some of the SCADA functions in the PLC (data acquisition and data logging to SQL or oracle database, alarming, reporting) and so develop an HMI/SCADA application as a backup of the main SCADA for a critical process step (filtration of a drinking plant for instance). In case of any problem with the SCADA system this part of the process can be still monitored and controlled continuously.
System architecture T4
A treatment plant for 1 million inhabitants
T4: a treatment plant for 1 million inhabitants
T4 architecture
High performance and high availability
**Information management**

- T4 system architecture is a complete solution for a large urban area.
- A T4 water plant is a very critical application; any failure leads to treatment disturbance that causes hazardous situations in terms of water quality.
- Vijeo Citect’s redundancy will tolerate failure anywhere in your system with no loss of functionality.
  - A full Hot Standby configuration is provided with complete I/O device redundancy.
  - The impressive redundancy features of Vijeo Citect can be used with redundancy of network, redundancy of file servers, redundancy of the different tasks (I/O, trends, alarms, reports, display).
- Vijeo Citect provides tools to enable rapid development of large projects.
  - Each project can be divided into up to 240 included projects.
  - These projects can be worked in different locations. Vijeo Citect enables any combination of projects without any additional effort.
- **Vijeo Historian** also supports redundant control system links. In the event of failure the historian will request data from other links or servers.

**Motor control management**

- In a T4 treatment a significant number of pumps, motors and valves have to be managed and up to 1,000 motors have to be controlled. A high level of motor protection is required for advanced process such as reverse osmosis: current, voltage, power, earth fault and temperature sensors.
- **The MotorSys and Model 6 IMCC** solution combines the most dependable low voltage switchboards (IEC and NEMA standard), the most widely used motor feeders in the world, the latest generation protection and motor control systems.
- The Model 6 motor control center enclosure is built to be the backbone of most water and waste water plants. It allows you to reduce installation costs and centralizes equipment for access and maintenance by facility personnel.
- The MotorSys IMCC (IEC standard) with Okken or Blokset high-availability switchboard for large water application (desalination plants for instance) allows you to optimize wiring, maintenance, and flexibility of your system.
  - Motor control TeSys T, TeSys U, and Altivar variable speed drives can be used in Okken or Blokset switchboards.
  - An ethernet connection allows you to have a high level of diagnostic and performance.
  - Vijeo Historian also supports redundant control system links. In the event of failure the historian will request data from other links or servers.
Process control management

> The complexity of a water treatment process for a one million inhabitant plant implies the management of several process lines.
> The control of all process lines and all process steps within each line are shared between several Modicon Quantum PLCs and Modicon Quantum M340 (up to 100).
> Modicon Quantum is perfectly suited to complex processes. The power of its processor results in optimum cycle times, while integrating many more communication functions, diagnostics, memory flexibility and data storage.
> The Hot Standby Modicon Quantum processor is designed for your critical applications that require high control system availability and for which interruptions are unacceptable.

Intelligent instrumentation

> The control and monitoring of instruments such as temperature sensors, flow meters, and level measurements is possible thanks to a specialized Quantum Profibus DP module, which includes a Profibus interface. This module supports Profibus PA slaves on the network through DP/PA couplers or links, up to 125 slave devices with repeaters, and extended diagnostic data.
> Valves or other Profibus DP devices can be connected to the Profibus interface, thus increasing the openness of the solution.
> When required, Hot Standby is also available on the Profibus with Modicon Quantum.
> Transfer of a primary application to the secondary is automatic.

> The Hot Standby Modicon Quantum system offers remarkable computing and switchover performance that perfectly meets the requirements of complex water treatment plants, such as desalination plants and others.
> Modicon Quantum has several Ethernet communication ports that allow you to connect it to dual a Ethernet Ring thanks to ConneXium managed switches.
Good to know

Add value to your system by connecting to Ampla for enterprise-wide reporting

> Ampla is a powerful and dynamic suite of Manufacturing Execution System which allows you to improve the production efficiency, performance and profitability of your business.

Adapt your solution to local constraints or standards

> Use HART connection on Modicon Quantum PLC to manage your instrumentation.
> Use several Proflbus Quantum modules to manage your motor control and devices with Proflbus DP.

Reduce your MV energy cost

> The Altivar 1000 is a range of medium voltage PWM IGBT speed controllers designed for induction motors used in water plant (air blower, inlet pumps,...)
  + Power from 0.5 to 10 MW.
  + Output voltage: 3 300 V.

The basic offer includes the speed controller, transformer and, if required, the motor.

With this solution based on a robust and compact technology, you would optimise your investment and improve the productivity of your water plant, whilst reducing your energy costs. Furthermore, Altivar 1000 is designed not to have any adverse effects on the environment (supply system, processes, etc).
Helping you to supply quality water in high quantities

Building your system architecture