SUSTAINABLE ENERGY SUPPLY

Xpert S

Smart District Heating Substation - saving cost and environment

INTRODUCTION

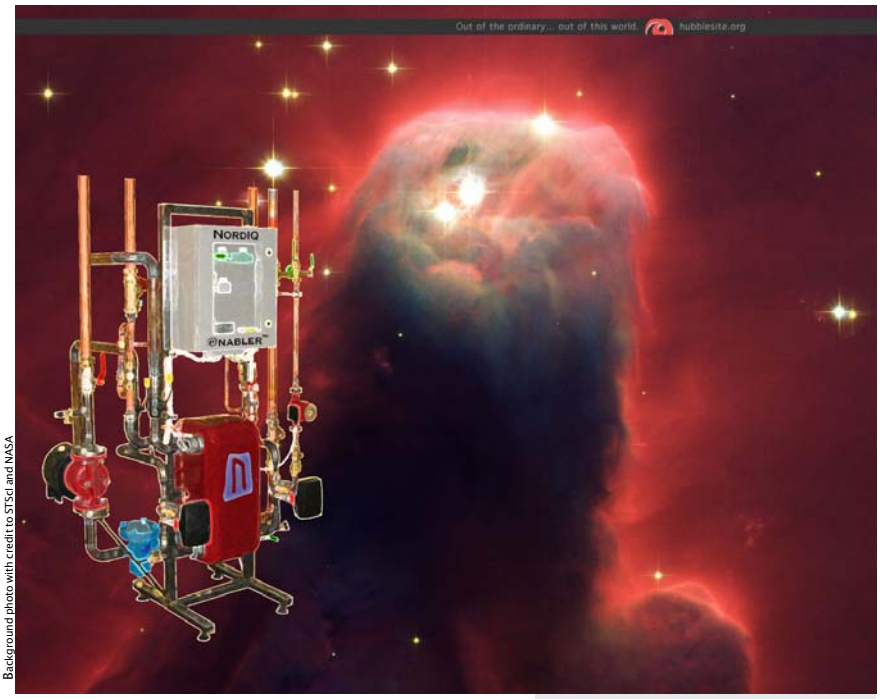
NordIQ have created a completely new concept for substations in district heating systems by the systematic embedment of 20 years of research and experience into electronics and software. The result is the Xpert S series with 3 standard substations covering demands for up to 140 apartments. Forget all the complicated design. Choose colour / size - plug-in-and-start.

The fact that the substation has an unbeatable cooling effect, programmable restriction, energy saving algorithm and other unique aspects hardly make things worse.

The enabler™ is at the heart of the NordIQ concept - the steering equipment with technology borrowed from the vehicle and telecommunications industries makes possible things you can otherwise just dream about.

Where conventional substations with PID-regulation work on an "error correction" principle, the Xpert S is "designed for correctness".

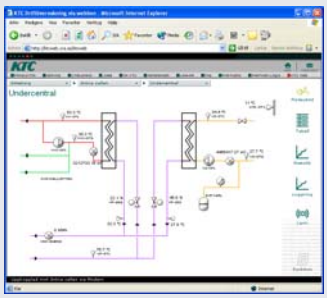
Come on board - something new in district heating is starting up.



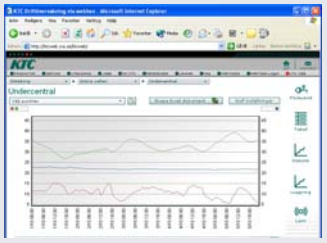
Background photo with credit to STScI and NASA

EMBLA 10-40 apts; 600-2500 m²
FREJA 30-80 apts; 1800-5000 m²
TOR 70-140 apts; 4000-8400 m²

Xpert S can be linked to the internet and a web page.



You can see detailed operational information in the flow chart. You can even set power, flow and/or kv-restrictions.



You can see history, indicators etc with the statistics function.

PROPERTIES

Better cooling - Lower losses and flow rates. More customers on the existing network. Increased potential to utilise environmentally friendly waste heat.

Reduced power demand - lower cost. Soft steering evens out power demand and Primitation™ reduces power peaks further.

Programmable restriction - Limit power, flow rate and/or valve-opening with software. You avoid the problem of substations that gobble all flow.

Plug-and-run. Xpert S adapts to current network conditions. Little engineering and no risk of problems.

Standardisation - The enabling principle means that the substation is non-sensitive for component size and means that we can heat at least 140 apartments with three different sizes.

Problem free, longer life. No risk of oscillation and problems associated with unstable regulation (scale, cracked exchangers, worn actuators, low comfort levels etc).

Energy Saving. Energy loss is reduced by the unique soft steering system giving savings of 10-30%. Data from the substation can also be used to identify conventional energy saving measures.

Built-in diagnostics and fault-tolerance. If the performance (of a heat exchanger for example) decreases, then you can be informed via the web site or by a warning to your cell phone. In the unlikely event that a sensor should malfunction then there is alternative operating modes.

NORDIQ

eNABLED HEAT-EXCHANGERS

Xpert S

The environmentally friendly alternative

District heating is generally seen as an environmentally friendly alternative for space heating.

Xpert S makes it even more environmentally friendly.

Softcontrol™ significantly decreases energy use and thereby decreases CO_2 emissions and other environmental impact.

The high cooling rate facilitates the extraction of a larger proportion of the energy from cheap and environmentally friendly waste heat, flue gas condensing etc.

Secure, fast and easy

No fluctuation problems. High comfort levels – long lasting – minimal costs for adjustment and maintenance.
Fast and safe design.
Standardisation and capacity margins that are only used when needed increase the security of the design and allow up-grades.
Programmable primitation facilitates efficient capacity restriction without risking security as the limitation can be reprogrammed with a click of the mouse.

Type approval

The Xpert S was approved by Det Norke Veritas in October 2004. It is probably the first type approved district heating substation in the world. The enabler control allows standardisation as it makes the design independent of component sizes. This is why we are the first to present a standardised "type" that can be approved.

A complete system for hot water and radiator systems

Xpert S contains everything needed for domestic hot water production and radiator systems. Cut-off valves, filters, check and safety valves, variable-speed controlled radiator pump, hot water circulation pump, regulation components and sensors are included in the prefabricated substation.

You need to add an expansion vessel and a charging valve for the radiator system.

We offer remote monitoring and control in partnership with CRA with alarm, real time information, statistics and indicators

Plug-and-run

Enabler-steering is based on knowledge of the process and more sensors than conventional steering. This has many advantages such as that the substation can immediately adapt to local network conditions.

The secondary temperature is steady as a rock, even if the pressure jumps between close to nothing and 10 BAR. Plug in and run. The Enabler follows the network and building demands. There is no longer any need for tailor-made substations.

Standardization and risk-free dimensioning

Xpert S cover the needs of 140-150 apartments when the need for tailor-made systems disappears

Imagine how much easier life will be without worrying about loads of different sizes and types. Maybe you will even want to keep a stock of substations to be able to quickly respond to customer needs?

Enabler technology makes the dimensioning process simple, fast and safe. It will be much faster and you do not need to be concerned that the substation is wrongly dimensioned.

Conventional substations are sensitive to component size and over dimensioning often causes problems.

Good cooling gives increased efficiency

Operating a district heating system with low cooling is like running a freight train and only unload half of the cargo at the destination, and bring the rest back.

Efficient cooling decreases losses, facilitates increased use of environmentally friendly waste heat and increase network capacity.

Xpert S often cool the district heating system to an average of 30-35ºC. Average return temperatures in Sweden are around 46ºC. An improvement in cooling effect of 15ºC increases the potential for environmentally friendly waste heat by 35%, and we would not need to pump over 200 million m^3 around the Swedish district heating systems.

Sven Werner, Professor in District Heating Systems Technology, has demonstrated that a 10ºC increased cooling would save 60-70M€in Swedish district heating systems. A flow cost of at least 0,2€/m3 primary flow is usual.

You maybe don't even need to increase capacity in the network heat production plants?

Something to rely on in stormy weather

The model-based heat exchanger steering means that Xpert S never start oscillating.

It eliminates problems with comfort and worn valves. But just as importantly it means that you will not have scaling problems and cracking exchangers.

Scaling takes place above 60°C. By minimising the time the hot water is above this limit then this problem will disappear.

If you have high temperatures (>100°C) in the exchanger and the fluctuating regulation system then the exchanger can crack. Stable temperatures help the exchanger.

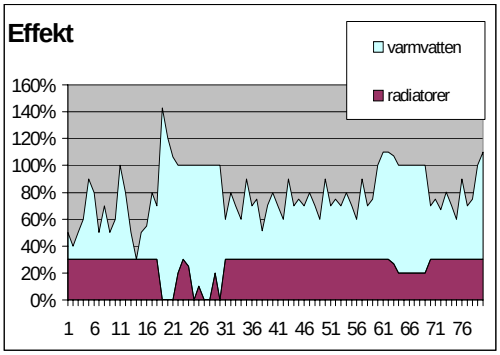
Primitation™ gives you lower power needs

Primitation™ stands for prioritising and limitation. You can limit power, flow and/or valve with this function.

Priority is given to provide heat to the hot water (and ventilation). The radiator system is slow and can often wait until lower demand situations.

The power limit is "soft" so that short-term peaks can be accepted but the average power is limited, see diagram.

In practice, this provides a possible decrease in peak power of 40%.



In the event of a lack of power (i.e. malfunction in a boiler), the available power and flow will be more equally distributed amongst consumers. It is otherwise normal today, in the event of a lack of power, for the "first" consumer in the network to take all the capacity as their substation is over-dimensioned and without limit. In the worst case scenario, consumers at the end of the network may find themselves without a heat supply

It is possible to raise the limit if necessary, so the substation can be more tightly regulated than is the case with a fixed limit (i.e. with small valves) as there is no need for significant safety magins.

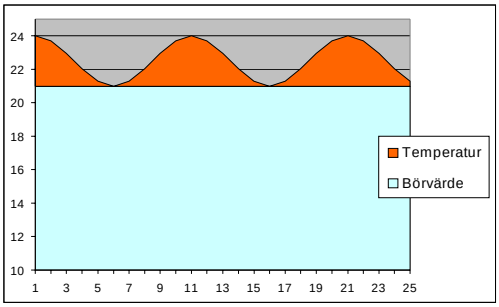
Stop heat for the crows

NordIQ SoftcontrolTM is a new energy-saving way of steering radiator systems!

A conventional system emits surplus energy to the radiators, with the aim that the radiator thermostats will close when it is hot enough. The problem, however, is that this regulation is slow and inaccurate.

It is usual to adjust the system to the lowest acceptable temperature. The extra heat is really just wasted, see diagram.

On-site studies show a saving of 10-30% in normal Swedish housing.



Dimensioning

Dimensioning and choice of the substation can hardly be easier. Xpert S is a "plug-and-run" system, i.e. it adapts to the local network and load conditions.

It is also insensitive to the size of property. You simply need to know which size class your building is, in order to choose the right substation.

The risk of getting the wrong dimensions is minimal. It is even possible that you can connect an additional property without problem. Possibly with slightly poorer cooling on the coldest days of the year. As cooling is better than with other substations, this is of less importance.

Fault-tolerance and Diagnosis

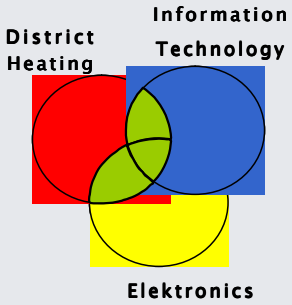
There are sensors for most process parameters to diagnose degraded performance of things like the heat exchanger (scaling etc), but also problems and changes in the building (such as short circuits).

The substation is also fault tolerant which means that it can continue to function even if one or several sensors should fail.

Xpert S

NordIQ Göteborg AB

NordIQ supplies knowledge based heat exchanger applications with a focus on district heating and space heating.



Quality assurance policy:

Our aim is to provide the best possible value for our customers.

Our systems are based on holistic solutions and practical experience.

Standardisation is a motto to maintain simplicity, cost-efficiency and high quality.

Continual evaluation takes place and is used for further improvement of our products.

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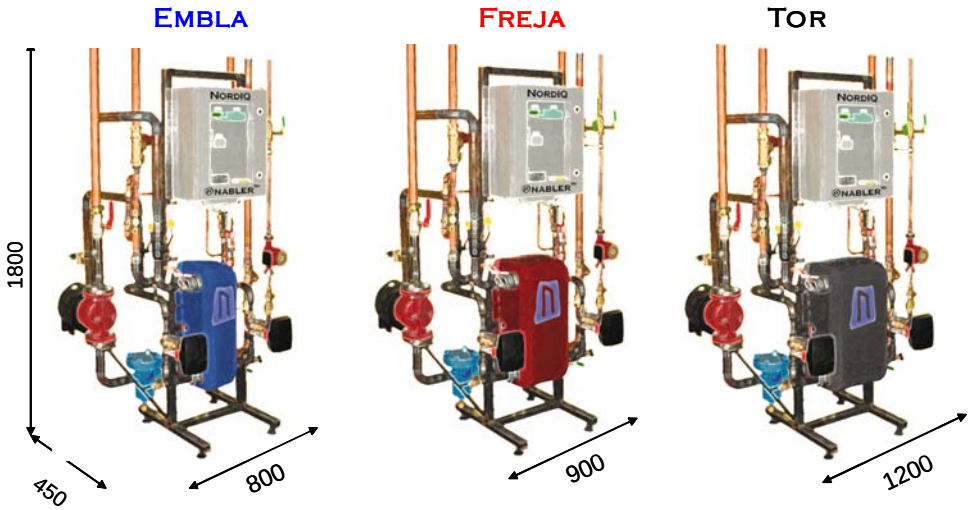
TECHNICAL SPECIFICATION

Number of circuits: 2 hot water, radiator system



Capacity:	10-40 apartments	30-80 apartments	70-140 apartments
Living area:	600-2.500m²	1.800-5.000m²	4.000-8.400 m²
Power rating			
Hot water:	140kW	180kW	250kW
Radiator circuit:	125kW	250kW	500kW

Primary circuit:

Pressure classification: PN16 (PN25 optional)
Max temperature: 120 °C
Connections: forward, return steel piping, welded, DN32
Filter, cut-off valves

Domestic hot water circuit:

Connections: hot water: copper piping, soldered, 42 mm
kallvatten: copper piping, soldered, 42 mm
hot water circulation: copper piping, soldered, 22 mm
Filter, cut-off valves, check valves
Hot water circulation pump

Radiator circuit:

PN6 (PN10 option)
Connections: forward, return: 1,5" internally threaded fitting to cut-off valve, DN40
Filter
Safety valve: 6 bar
Radiator pump: variable speed, Grundfos magna 32120 or 40120
Filling: not included
Expansion vessel: not included

Tillval:

Primitation™
Softcontrol™
Remote connection with IP-modem, telephone modem or GSM-modem
M-bus module
Web-page
Ventilation circuit