LATENTO®

Technical Documentation

IVT
WÜRTH GROUP

General information

LATENTO all-season solar system – new efficiency "Made in Germany"

Shaping the future considerably

In a very few years, fossil fuels will either be exhausted or totally uneconomical to use for heat generation purposes. At the same time, every year the sun radiates an amount of energy which corresponds to about 10,000 times the world's primary energy demands, free of charge. Without question, the sun is the "fuel of the future".

The design of modern low-energy and passive houses requiring little heat makes it possible to utilise solar energy for heating living areas as well as for pre-heating swimming pools in addition to heating for the hot water system.

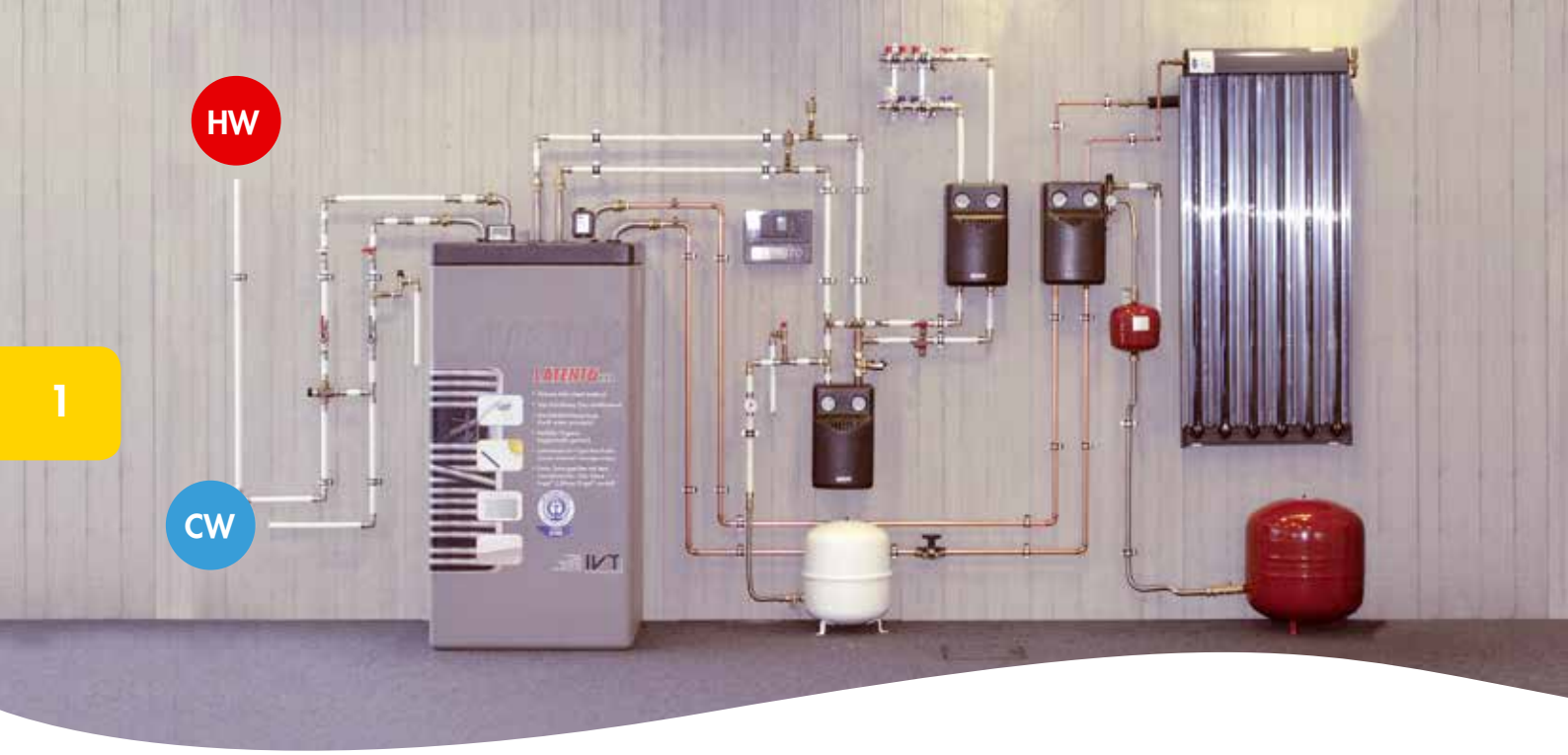
Modern systems have to be compatible with fossil-fuel and regenerative fuel systems (solar, pellets, heat-pumps etc.) and ensure the existing resources are optimally usable for all energy supplies. A decisive factor in the quality of a solar system is how much annual oil or gas usage it can replace by solar energy. A ***LATENTO*** all-year solar system sets standards in that field.

Optimally utilise the power of the sun – *LATENTO* All-season solar system

An efficient solar heating system not only takes care of hot water supplies during the summer, it also converts solar energy in the winter and the transitional months.

With many solar systems, however, on cool days the warmth of the sun never even reaches the solar storage because the collector promptly reflects the sun's heat it receives away again, or it loses the energy in the pipework and storage system. These "apparent" yields then have to be raised to usable temperatures with expensive supplementary energy – which is not the case with a ***LATENTO*** solar system.

It is not the size of the collector units or the storage volume which is decisive regarding the effectiveness of a solar heating system, but the efficiency of its components and how well they are tuned to the demands of the consumers. With a larger collector surface, the yield would certainly be greater, but the solar utilisation rate would deteriorate. The larger the collectors, the more frequently the system is inactive in summer – the sun delivers far more energy than residents can possibly use. Especially in winter and in the transitional periods, when supplementary heating is most in demand, a ***LATENTO*** solar system makes its mark with high solar yields and extremely low levels of heat loss. ***LATENTO*** uses solar output large and small for heating water and utilises it even during frosty weather to supplement the heating. That means the highest possible level of efficiency for maximum solar warmth all the year round.



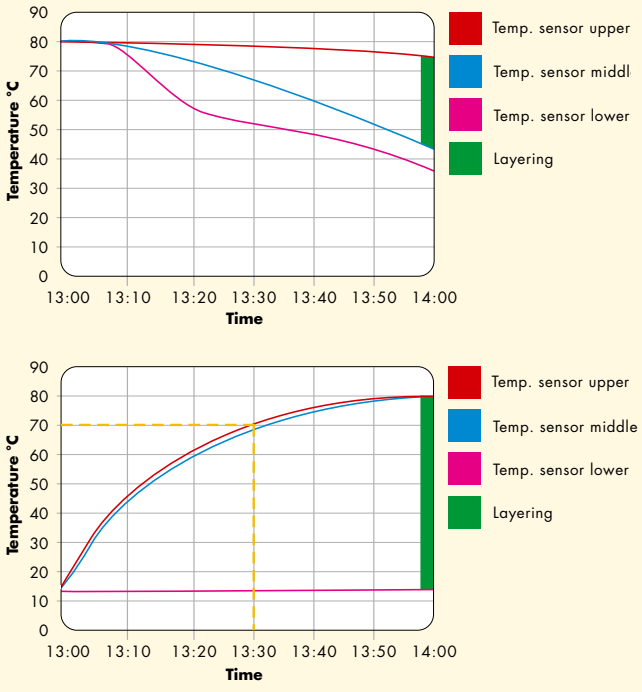
Heat accumulator with boost charge – *LATENTO* XXL Solar layered storage tank
To what extent the heating power and the "solar yield" can be optimized depends mainly on the design of the storage tank.

Due to the special XXL stainless steel heat exchanger with coils also in the lower part of the storage tank, the hot water is preheated (20% higher extraction volume) and at the same time the lower solar area of the storage tank is cooled. This means, even the lowest amount of solar radiation, e.g. during the winter months, can be effectively used. The XXL technology also makes this ***LATENTO*** ideal for connecting power generators with low charge temperatures, e.g. heat pumps.

The special ***LATENTO*** layering device enables the upper area of the storage tank (hot water heat exchanger) to reach a usable temperature level of more than 45 °C in only a few minutes when charged. The stratification (temperature difference between the upper hot water heat exchanger and bottom solar heat exchanger provides for fast and then efficient utilization of solar energy as long as the storage tank is completely heated up to 85 °C.

Optimal stratification over many days (DIN tested HVAC)
The heating and reheating heat exchangers dissipate or absorb heat following the continuous flow heater principle. Hence no fluid flows will develop in the ***LATENTO*** XXL which may cause turbulences and as a result, no merging of the thermal layers.

Fig.: *LATENTO* XXL temperature stratification during operation for heating support (top) and during charging (bottom)



Outstanding heat insulation

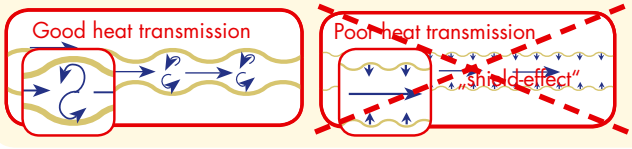
The ***LATENTO*** XXL was developed to primarily store free solar yields over many days to keep them at best possible temperature level for later usage. The tank has received a high thermally insulating hard PUR foam core to minimize outward heat losses and heat transfer within the stratification. By this, a mean hourly temperature decrease of our "heat accumulator" amounting to only 0.1 K/h (63 W) is achieved.
For comparison: the best steel storage tank tested by the consumer magazine Stiftung Warentest 03/2009 demonstrated a heating power loss of 130 W. All ***LATENTO*** storages do not need additional insulation and are maintenance-free thanks to the employment of non-corroding materials.

The continuous flow heater principle for fresh water

Your DHW will always stay fresh thanks to the continuous flow heater principle. Feared Legionella growth is prevented, lime scale deposits reduced, which can shorten the service life of the storage system. Moreover, the ***LATENTO*** storages have no temperature limit at 60/70 °C (Legionellae, furring up). The content of the corrugated stainless steel tube heat exchanger is exchanged at least once a day at normal use, e.g. taking a shower would consume approx. 25-40 liter hot water. The increase up to max. 85 °C results, furthermore, in an additional power output of up to 22 kWh by the ***LATENTO*** XXL 500.

Large surface heat exchanger made from long-corrugation, corrugated stainless steel pipe

The ***LATENTO*** XXL has efficient heat exchangers consistently adjusted to the use range to enable low quantities to be integrated with the greatest possible spread and effectiveness (solar collectors). All heat exchangers are manufactured with long-wave stainless steel corrugated pipes for improved heat yield. This discourages the "shield effect" (flow-past) which is experienced with a narrow-waveband pipe. The result of many years development work on the solar heat exchanger of DN 25 ribbed copper tube with connected stratification device, is excellent temperature transport behavior ensuring outstanding solar charging. The stainless steel drinking water heat exchanger has been designed with a large surface reaching its operating temperature range at 50 °C top charge already (storage tank temperature in the upper region of the storage tank defined via the hot water sensor). You may already draw heat, take a bath or shower from this temperature on. If the solar system produces more energy than necessary, the storage tank may be operated up to 85 °C thus saving an enormous amount of energy.



Latent material as additional heat store

Latent material is located in the upper region of the ***LATENTO*** to increase the heat storage capacity. When in the temperature range between 60–70 °C, the latent material floating on the storage water changes its physical state from solid to liquid thereby absorbing additional heat of fusion. When excess energy is introduced into the storage tank system at extended sunshine for instance, the latent material will melt absorbing the excess energy on reaching the melting temperature (approx. 65 °C), melting heat storage). When energy is withdrawn from the ***LATENTO***, the energy additionally stored in the latent material will be immediately delivered to the storage water without the latent material changing its temperature (solidification enthalpy). The storage water will be reheated on the latent material solidification. This means an extension of the storage capacity at excessive performance without storage losses. This will increase the storage capacity in the decisive upper region (DHW heat exchanger) of the storage tank or the total output (by approx. 1.1 kW at the ***LATENTO*** XXL 500).

Advantages of latent operation:

- Extended storage of free solar energy
- Coasting effect of latent material temperature to the storage water
- Shorter boiler cycle times
- Reduction of water losses in the ***LATENTO*** XXL through evaporation
- Latent material functions as additional effective heat insulation in the upper (hot) region of the ***LATENTO*** XXL

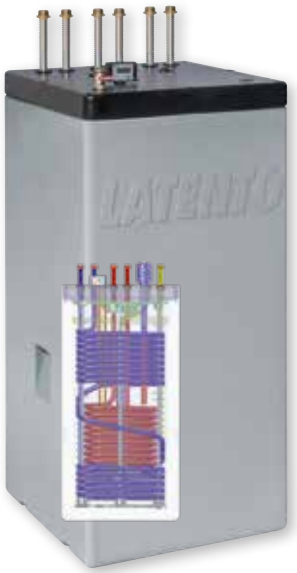
1

High output and compact dimensions
With tapping capacity of240 l (65 °C storage temperature, without back-up heating), a continuous output of 1220 l/h (85 °C reheating) and nominal power rating of NL 7,3, the ***LATENTO*** XXL 500 guarantees a high level of comfort and is ready to use quickly. On account of its dimensions (e.g. ***LATENTO*** 500: only 78 x 78 x 155 cm, standing area 0.64 m², diagonal measurement 1.766 cm), the ***LATENTO*** is ideal for refurbishing old buildings and for installation in small spaces. Thanks to this compactness and the integral carrying handles, the ***LATENTO*** is no problem for transport and negotiates all standard sizes of doors.

Ideal for combination with heat pumps
The ***LATENTO*** WP-S is an unpressurised layer storage unit that has been specially developed for use in conjunction with heat pumps up to 15 kW capacity. The heat exchangers, which have been specially adapted to the low energy level of heat pumps, allow optimum storage and use of the energy from the heat pump for water heating and to back up the heating system. At the same time, there is sufficient storage capacity available in the upper temperature range (up to 85°C) for solar energy on sunny days.

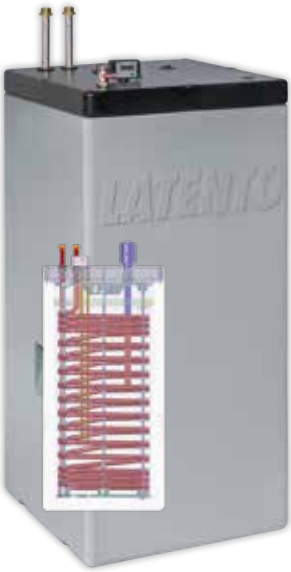
Lasting power – *LATENTO* XW hot water storage
The ***LATENTO*** XW is used to heat water, e.g. in industrial shower facilities, sports facilities and hotels. The ***LATENTO*** XW hot water storage tank works on the continuous-flow heater principle and has heating and discharge heat exchangers of long-wave stainless steel corrugated pipes for a very high continuous rating of 1350l/h at 85 °C re-heating, and 277l bulk volume (65 °C storage temperature without reheating - XW 500). In addition, the heat loss is absolutely marginal. The ***LATENTO*** XW is suitable for combination with all heat generators – solar as well. Latent material ensures additional increase in output.

The long-term heat store – *LATENTO* XP
Buffer storage
The ***LATENTO*** XP buffer storage for long-term heat storage can, e.g. be used as (additional) buffer storage for wood-fired boilers and solar systems. The XP has a large heat exchanger of long-wave stainless steel pipe for very good heat transmission. Its insulating plastic tank loses virtually no stored heat (0.1 K/h). Latent material makes sure of an additional output.



LATENTO XXL 500

LATENTO XW 500



LATENTO XP 500

* DIN 4708-3 (heating output 60 kW)

Solar stratified storage tanks

LATENTO XXL/WP-S Solar stratified storage

Figure below: 878 702 211

Pressure-free plastic solar storage according to DIN 4753 and DIN 4708, in particular suitable for operation with regenerative systems (for low subsequent heating performance, e. g. with heat pumps),with integrated PUR insulation, with drinking water, heating and solar heat exchange from long-wave stainless steel corrugated pipe, exterior thread connection G 1 1/4 including latent material.

	XXL/WP-S 500
Gross content (l)	536
Measure hxdxw (cm)	158x78x78

Description	**Item no.**	**Unit**
WP 500 Heat pump storage tank	878 702 211	1
XXL 500 Solar stratified storage tank	878 702 210	1
WP-S 500 Heat pump solar stratified storage tank	878 702 240	1

LATENTO XW Hot water storage tank

Figure below below: 878 702 221

Unpressurized plastic solar storage tank for hot water generation in single and multiple-occupancy buildings. Integrated PUR insulation, gross volume 540 litres, with hot water heat exchanger and heating heat exchanger of long-wave stainless steel corrugated pipes for improved heat yield, external thread connector G 1¼.

	XW 500
Gross content (l)	536
Measure hxdxw (cm)	158x78x78

Description	**Item no.**	**Unit**
500 Hot water storage tank	878 702 221	1
XW 500 Hot water storage tank	878 702 220	1

LATENTO XP Buffer storage tank

Figure below: 878 702 231

Unpressurized plastic storage tank as a buffer for recharging the boiler from different heat generating units. With integrated PUR insulation, gross volume 540 litres, with heat exchanger of long-wave stainless steel corrugated pipes for improved heat yield, external thread connector G 1¼.

	XP 500
Gross content (l)	536
Measure hxdxw (cm)	158x78x78

Description	**Item no.**	**Unit**
500 Buffer storage tank	878 702 231	1
XP 500 Buffer storage tank	878 702 230	1

LATENTO electric heating cartridge

For electrical storage heating, output 3, 6 and 9 kW, 230/400 V, with adjustable 3-pin. temperature controller (0–85 °C)/and limiter (110 °C), protection class IP 45, screw-in thread G 1½, plastic cap, black. Total length: 125 cm, heater coil length 112 cm, upper unheated part of heater coil approx. 42 cm.

Description	**Item no.**	**Unit**
Electric heating cartridge 3/6/9 KW	878 700 039	1

LATENTO Connection bracket Rp1 - G1 1/4 - Rp 1/2

LATENTO connection bracket for mounting to ***LATENTO*** holder for connection bracket stepped (878700093), sound-proofed installation thanks to poly-amidewashers on securing screws of type M 5 suitable for sanitary, heating sectors as well as solar, material: brass, polyamide, steel, annealed cast iron.

Description	**Item no.**	**Unit**
Connection bracket Rp1 - G1 1/4 - Rp 1/2	878 700 091	2
Holder for connection bracket	878 700 093	1

Standards and regulations

The following standards and regulations have to be heeded when setting up and installing the *LATENTO* XXL and the vacuum tubes IVT CPC 12/18. It might be a good idea to put "or British Standard Equivalent" here.

Standards of the series:

DIN 1988	Codes of practice for drinking water installations (TRWI))

Normen der Reihe:

DIN EN 806	Specifications for installations inside buildings conveying water for human consumption
DIN EN 1717	Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow
DVGW W 551	Systems for heating service water and piping systems – Technical measures
DVGW W 552	Controlling legionella growth
DVGW W 553	Evaluating circulation systems in central hot water heating systems.
DIN 4753	Water heaters and water heating installation for drinking water and service water; requirements, marking, equipment and testing
DIN 4708-1	Central heat-water-installations; terms and calculation-basis
DIN 4708-2	Central heat-water-installations; rules for the determination of the water-heat-demand in dwelling-houses
DIN 8947	Heat pumps; heat pump units with electrically driven compressors for water heating; concepts, requirements, testing
DIN 18380	German construction contract procedures – Part C: General technical specifications for building works – Systems for heating and central water heating
DIN 18381	German construction contract procedures – Part C: General technical specifications for building works – Gas, water and sewage plumbing works inside of buildings
DIN 18338	German construction contract procedures – Part C: General technical specifications for building works – Roof covering and roof sealing works
DIN 18339	Contract procedures for building works – Part C: General technical specifications for building works; Sheet metal works
DIN 18421	German construction contract procedures – Part C: General technical specifications for building works – Insulation works on technical installations
DIN 18451	German construction contract procedures – Part C: General technical specifications for building works – Scaffolding works
DIN EN 12828	Heating systems in buildings – planing of warm water heating systems
DIN EN 12975-1	Thermal solar systems and components – Solar collectors – Part 1: General requirements
DIN EN 12976-1	Thermal solar systems and components – Factory made systems – Part 1: General requirements
DIN EN 12976-2	Thermal solar systems and components – Factory made systems – Part 2: Test methods
DIN ENV 12977-1	Thermal solar systems and components – Custom built systems – art 1: General requirements
DIN ENV 12977-2	Thermal solar systems and components – Custom built systems – Part 2: Test methods
DIN ENV 12977-3	Thermal solar systems and components – Custom built systems – Part 3: Performance characterization of stores for solar heating systems

VDE 0100 and VDE 0700 as well as the provisions of your energy provider have to be heeded when connecting to power.

* This list does not claim to be complete.

Technical documentation

This technical documentation comprises contents that are important for the qualified installer as well as the end user. This technical documentation must remain with the ***LATENTO*** XXL after installation or handed over to the end user for storage.

Proven according to DIN
The pressureless solar stratified storage tank ***LATENTO*** XXL was tested through the Research Association HVAC (Heating, Ventilation, & Air Conditioning) at the Stuttgart University. The tests were conducted according to DIN 4708, part 3 and DIN 4753, part 8. (Test report no. I 04 B2 050 001)

1. Safety Notes

Two different stages of safety notes are used in this documentation:

NOTE

Indicates a note that failure to comply would endanger personal safety, i.e.: there is risk of injuries.

CAUTION

Indicates a note on equipment safety. Failure to comply may cause damage to the device described.

CAUTION

The technical documentation must be exactly observed. IVT GmbH & Co. KG does not assume any liability for damages derived from non-observance of this technical documentation or the applicable standards and installation instructions.

NOTE

Risk of scalding when opening the storage tank cover during operation: There may be up to 85 °C in the storage tank! Since the latent material on the surface prevents the water from evaporating, the temperature of the storage water is often underestimated. Therefore, check the temperature of the storage water, before you start any work on the *LATENTO* XXL. Wait until the *LATENTO* XXL has cooled to 40 °C or less before commencing any work on the *LATENTO* XXL.

Installation and commissioning of the *LATENTO* XXL as well as all repair work must only be carried out by persons who have been accordingly qualified and authorized.

In the case of problems with the ***LATENTO*** XXL which you cannot solve using this technical documentation, the ***LATENTO*** hotline will gladly be at your service.

LATENTO Hotline: +49 (0) 9876/9786–60

5. Function

Unpressurised solar stratified storage tank:
The storage water in the ***LATENTO*** XXL is only used for heat absorption. The heat is fed in and taken via heat exchangers. Hence the storage water does not have any contact to the heating or DHW system. Thereby problems such as furring up and sludge accumulation in the storage tank and legionella growth in the DHW heat exchanger is prevented.

Solar yield:
Primarily, free solar energy which is utilized for DHW heating and (optionally) to backup heating is stored in the ***LATENTO*** XXL. The solar heat is fed in the ***LATENTO*** XXL via the solar heat exchanger. This happens as soon as the temperature in the collector is higher than the temperature in the lower storage tank region and as long as the ***LATENTO*** XXL is fully heated to maximum temperature. The maximum temperature is stored in the control system on the TPU sensor which is normally preset to 80 °C. By this, a temperature of approx. 85 °C is reached in the upper region (cf. picture of upper storage tank region for hot water supply).

DHW + solar yield:
First of all, the cold water in the DHW heat exchanger will flow through the lower storage tank region. Thereby the region of solar feed-in is cooled and the DHW pre-heated at the same time. By this, relatively low temperature levels can be utilized too. At the same time, the extraction volume for the hot water is increased.

The solar yield increases through cooling of the lower storage tank region because a larger temperature spreading between feed and return increases the performance of the solar heat exchanger. So the ***LATENTO*** XXL can be charged faster and use solar heat already at low temperatures.

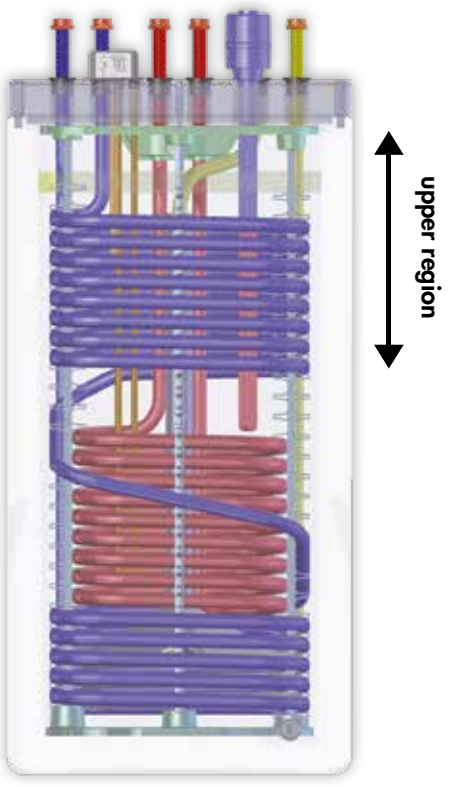
Hot water:
The hot water is heated following the continuous flow heater principle. Thereby the hot water is always generated whenever required. The advantage: The water is fresh at all times and legionella have no chance of growing. What's more, the stainless steel heat exchanger guarantees perfect drinking-water quality and corrosion resistance.

Reheating:
If there is not enough solar energy, the ***LATENTO*** XXL can be heated up to the required temperature via the reheating heat exchanger.
A high flow temperature would be favorable to reheat the ***LATENTO*** XXL. The higher the reheating temperature the faster the ***LATENTO*** XXL can be heated. See Chapter Performance Data on page 64 for data on the heating behavior of the ***LATENTO*** XXL.

Electrical heating element:
Serving as stand-alone solution (power supply only via solar collectors and electrical heating element) or when heat pumps are employed for peak demand, an electrical heating element with 9 kW or 3 kW is optionally offered.

CAUTION

The electrical heating element must only be operated when the *LATENTO* XXL is sufficiently filled with water. Fire hazard! The electrical heating element must only be connected through an authorized professional electrician.



6. Connection notes

Warranty
IVT GmbH & Co. KG will exclusively assume warranty for the functionability of the ***LATENTO*** XXL only then if all notes described in this chapter are observed.
In particular heed the correct hydraulic integration of the ***LATENTO*** XXL: The warranty applies exclusively for that ***LATENTO*** XXL that has been connected following an installation proposal from Chapter "Part 10 Installation Proposals". The responsibility will be with the planning or executing company in case of a hydraulic connection of the ***LATENTO*** XXL deviating from this.

Heating connection
It is essential to take care of professional bleeding (e.g. automatic bleeder) when connecting the ***LATENTO*** XXL to the heat generator/s.

CAUTION

If there are steel pipes used in the cold water supply or in the heating grid, beware of the danger of getting steel blades in the drinking water heat exchanger. This has to be prevented by using a filter, otherwise there may be a contact corrosion, causing a permeable drinking water heat exchanger.

6.1 Transportation
The ***LATENTO*** XXL may be tilted max. horizontally for a short time, e.g. when carrying it to the place of installation. Great care must be taken that the cover was closed with all four clamps.
The tilt height of the ***LATENTO*** XXL is approx. 190 cm.

NOTE

The *LATENTO* XXL must always be delivered in a standing position so as to avoid any damage.

6.2 Mounting
Heed the following points when selecting the installation site for the ***LATENTO*** XXL:
- Frost-protected room
- Level, clean swept floor
- Do not subject the ***LATENTO*** XXL to direct solar radiation (the UV can destroy the plastic)
- Heed the load capacity of the foundation, the filled ***LATENTO*** XXL weighs approx. 660 kg (XXL 500).
- Keeping heat-losses as little as can be, place the ***LATENTO*** XXL in the vicinity of the reheating heat generator
- If possible, mount system in a heated room to minimize heat-losses (EnEV – Energy Saving Decree)

NOTE

**For operation with electrical heating element (878 700 039): The screwing of the electrical heating element into the *LATENTO* storage tank should take place before its filling and piping.
In areas with low room height (<2,70 m) it can be necessary to tilt the *LATENTO* storage tank in order to insert the electrical heating element.**

6.3 Pipework
A thermal mixing valve (Item no. 878 700 021) must be installed to the hot water outlet of the domestic water heat exchanger so as to prevent scalds. The hot water heat exchanger should be 60 °C according to DIN EN 806-2 (June 2005).

Keeping heat-losses of the hot water tube as low as can be, we recommend you to limit the thermal mixing valve to 45 °C–50 °C hot water temperature. Should thermal disinfection become necessary, you may set the mixing valve to 70 °C.

Pressurised flushing connections must be installed in front of the thermal mixer for the flushing and for any descaling of the drinking water heat exchanger that may be necessary. If water hardness exceeds 20° dH (3,57 mmol), we recommend to install a water softening device to avoid an efficiency loss due to limescale in the heat exchangers.

Temperature Sensors
Position the temperature sensors into the sensors glands at the level so indicated in the installation proposal and connect the sensors to the regulation unit. The sensor glands have been dimensioned such that several sensors can be inserted into one sensor gland.

6.4 Temperature- and filling level scale
Is the button shortly pushed, the temperature- and filling level scale will be on for circ. 5 seconds. Is the button pushed until there is "Lon" shown in the scale, the filling level scale will be on for circ. 15 minutes.

Switching temperature unit
To switch the temperature scale from °C to °F and back, push the button during operation (measurement of filling level is shown) as long as temperature is shown with the new unit.

Battery replacement
If battery replacement should become necessary, the housing must be opened and the board loosened. The battery (AA lithium 3.6 V) is on the rear of the PCB. Ensure correct polarity when inserting the battery, + is on the side where the cable is connected to the PCB.

After battery replacement, all the segments of the filling level indicator are shown. The filling level sensor only requires a slight increase in filling level for reinitialisation. This can be achieved through thermal expansion of the water during operation. In individual cases it can be necessary to top up the water level in the ***LATENTO*** slightly. Following this reinitialisation, the correct filling level is displayed again.

Calibration
During calibration, keep the button pressed with the system switched off until "RESET" appears in the display. Then press the button briefly again so that an "X" appears under the "J". After the display has gone out again, calibration is automatically completed. After calibration, the display initially indicates an empty tank even when it is full. As after battery replacement, a slight increase in filling level will lead to the correct filling level being indicated again.

6.5 Filling
After installation the filling level & temperature display must be calibrated (see chapter 6.4)!
Fill the ***LATENTO*** XXL with drinking water via the filling and draining valve. Open the cover for the optional E-heating rod to allow the air displaced by the filling process to escape.

When using the E-heating rod:
Screw the heating rod as far out of the thread as necessary to allow displaced air to escape.

Fill the system with water until the segment display of the filling level indicator is at "OPT". Since the filling level sensor is only located in the topmost 40 cm of the ***LATENTO***, it takes some time for the filling level to be indicated on the display. Put the display into filling mode during filling! With the system switched off, keep the button pressed until the word "LONG" appears in the display. The display then remains switched on for about 15 minutes.

CAUTION

Heed the regulations of the local water distribution company and relevant DIN standards when connecting. The connections must be made pressure-tight. The componenttested safety installations have to be installed according to DIN 4753, Part 1, para. 6.3-7 (safety valve, reflux valve, pressure reducing valve, drainage, control and safety device)

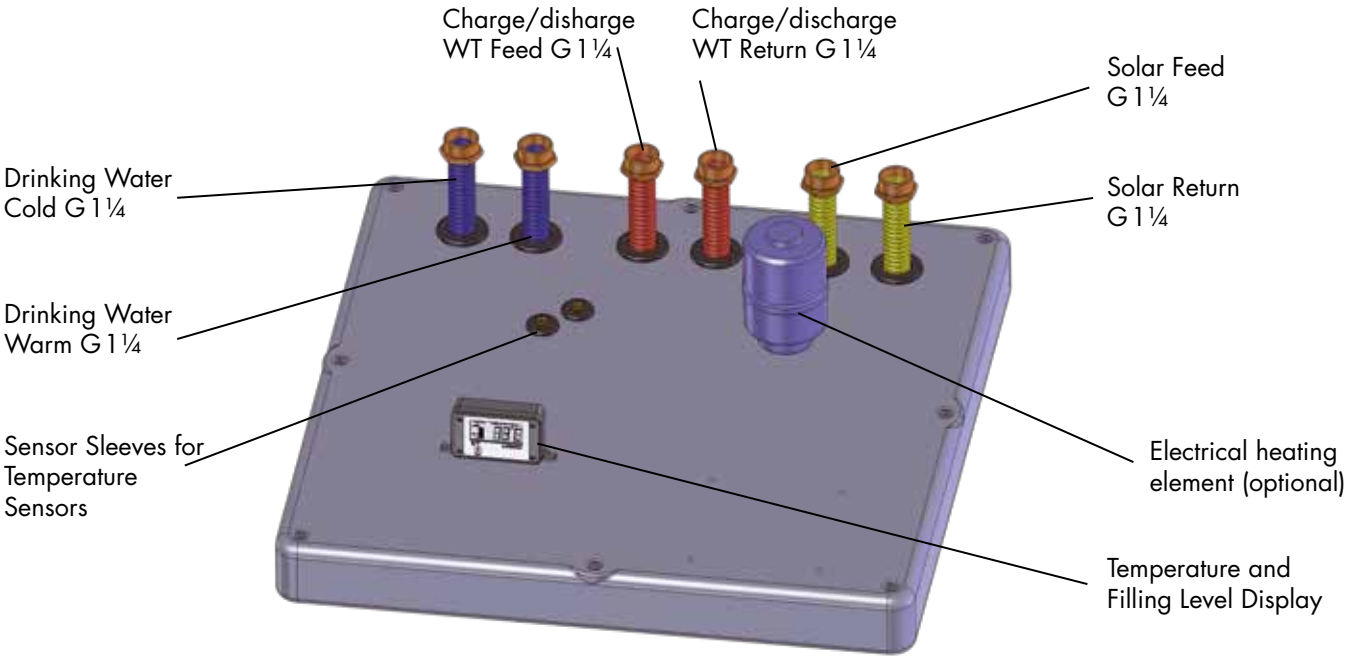
The heating installation must be pressure-checked and flushed due to DIN EN 14336.

NOTE

The DHW heat exchanger must only be charged with a pressure of max. 15 bar. The heat exchanger would expand if the water pressure exceeded 15 bar. The LATENTO XXL might get damaged because of this.

Due to DIN EN 12502, there is a max. chloride concentration of water of 53 mg/l (warm water) respectively, to be kept. Otherwise there may be hole-/grid-corrosion in the heat exchanger.

6.6 Emptying
If the ***LATENTO*** needs to be emptied, this can also be done via the fill/drain cock on the storage tank cover.
The fill/drain cock is provided on the inside of the storage tank with an immersion tube that reaches up to the tank bottom. This allows the ***LATENTO*** to be emptied using a hose or via gravity (siphon principle) or via a pump.
To do so, as during filling, the cover for the optional electric heating rod must be opened or the electric heating rod must be unscrewed from the thread, to avoid the formation of a vacuum inside the storage tank.



7. Adapting to the individual requirements

The ***LATENTO*** XXL has primarily been designed to store free solar heat. The conventional reheating should be limited to a minimum in order to store as much solar heat as can be. There are some tips in the following on how you can achieve this goal:

- Select the storage tank temperature low enough so that it can just cover your hot water requirements. The lower this temperature the more can be stored through the solar yield
- If you leave the house during the morning hours regularly, you may set the hot water heating schedule such that there will not be an conventional reheating after the the tapping of hot water in the morning hence leaving more "space" for the solar yield. It will be in the evening only, when conventional reheating takes place if the required temperature through solar charging should not have been reached
- The less the flow through the DHW heat exchanger, the lower the temperature in the ***LATENTO*** XXL can be to get the same extraction volume of hot water. A flow reduction from 20l/min to 13l/min will increase the extraction volume by approx. 25%

14. Performance data

Performance data when using the electrical heating element

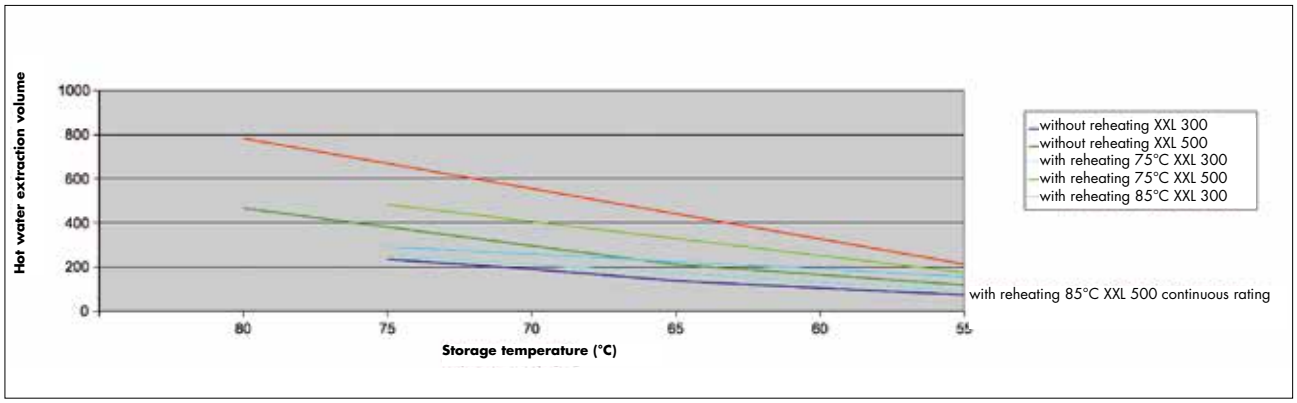
Hot water extraction volume
When heating up using the elec. heating element, a different quantity of hot water depending on the temperature of the upper region of the ***LATENTO*** XXL may be tapped (45 °C, ΔT = 35 K, flow 20 l/min): This temperature is set in the ***LATENTO*** XXL system regulation via the hot water temperature.

Lower *LATENTO* XXL range cold:
At this measurement, the lower region of the ***LATENTO*** XXL is at the temperature of the cold water (approx. 16 °C). There will be no reheating during hot water tapping. This is e.g. the case when the hot water temperature is set to a lower value than at the time of heating. So solar yield can be waited for over the day before conventional reheating takes place. (Point 7)

Reheating with 75 °C:
Reheating at 75 °C flow temperature is done during hot water tapping. The maximum power consumption is 43 kW.

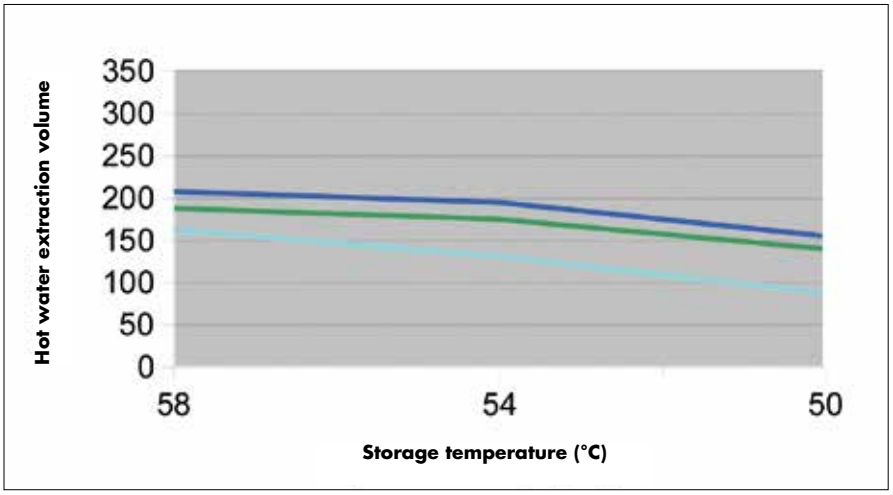
Reheating with 85 °C:
Reheating at 85 °C flow temperature is done during hot water tapping. The maximum power consumption is 43 kW.

Continuous flow *LATENTO* XXL[1]



[1] DHW 45 °C, ΔT = 35 K, 20 l/min flow
At reheating 85 °C (1800 l/h) a continuous flow water temperature of 45 °C (ΔT = 35 °C) is guaranteed.

Hot water extraction volume *LATENTO* WP-S with use of reheating heat-exchanger[1]



[1] DHW 45 °C, ΔT = 35 K, 20 l/min flow

WP-S 500			
Storage temperature in °C	58	54	50
10l/min, 10/45	208	195	155
15l/min, 10/45	188	175	140
20l/min, 10/45	163	131	88

Heating power

The heating power alone is limited via the ***LATENTO*** XXL heating heat exchanger and depends on:

- The flow temperature of the heat generator for reheating
- The temperature to be maintained in the ***LATENTO*** XXL to get the required hot water power
- The maximum required flow temperature of the heating system

Technical data ***LATENTO*** WP

Storage	**WP 500**
CONTAINER	
Material of internal container	Polypropylene
Material of external container	Polypropylene
Material of insulation	Polyurethane
Material class to DIN 4102-1	B2 - normal flammability
Length l [cm]	78
Width b [cm]	78
Height h [cm]	158
Tilt height [cm]	176
Empty weight [kg]	105
With latent material [kg]	125
Nominal capacity, storage water [l]	536
Mean temperature decrease per hour [K/h]	0,1
Max. storage tank temperature [°C]	85
Tapping rating (65 °C storage temperature) without re-heating [l]	330
Continuous rating (85 °C re-heating) [l/h]	1700
Performance characteristics N_L*	10*
Continuous output of hot water Q_D [kW]	(bei 85/10/45) 69

Heat exchange	
Type	Threaded
Material	Stainless steel
Connection [size]	G 1¼
Connection [size]	G 1¼

Drinking water heat exchanger	Long-wave stainless steel corrugated pipe DN 25 (ø 32.8 x 0.3 mm)
Length [m]	43,6
Surface [m²]	6,3
Water content [l]	30,5
Connection	G 1¼

12

12. Certificates

Certificate of Warranty

LATENTO the solar heating system

The IVT solar heating system ***LATENTO*** for domestic water heating and heating support is produced from high-grade qualitiy-controlled materials. Quality assurance is effected by means of in-house and external monitoring.

The ***LATENTO*** solar heating system consists of the storage tank with top, vacuum tube collectors, pump groups and accessories as well as controllers and electrical components.

For any damage to our products which is due to processing defects or defective material we will supply replacement free of charge, if the fault lies with us.
Terms of this warranty from delivery date:

Solar layer storage with top: 5 years
Vacuum tube collectors: 5 years
Pump groups and accessories: 2 years
Controllers and electrical components: 2 years

Our third part liability insurance covers the compensation up to
EUR 5,000,000.00 for personal injury, property damage and pecuniary detriment.

No liability is accepted for faulty installation, assembly or operation. Our technical documentation and the information contained are the integral parts of this warranty.

IVT GmbH & Co. KG
Gewerbering Nord 5
D-91189 Rohr
Germany

Ralf Stottok
Managing Director IVT GmbH & Co. KG

DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

ZERTIFIKAT

Der Firma

IVT GmbH & Co. KG
Gewerbering Nord 5
91189 Rohr

wird für das im Herstellwerk

Dettenhausen

hergestellte Produkt

Sonnenkollektoren

vom Typ

LATENTO CPC 12, LATENTO CPC 18

die Konformität mit

DIN EN 12975-1:2006-06
DIN EN 12975-2:2006-06
CEN-KEYMARK-Programmregeln Solarthermische Produkte

bestätigt und das Nutzungsrecht für die Zeichen

in Verbindung mit der unten genannten Registernummer erteilt.

Registernummer: 011-7S206 R

Dieses Zertifikat ist unbefristet gültig, solange die erforderlichen Überwachungen mit positivem Ergebnis durchgeführt werden.

Deutscher Akkreditierungs Rat
DAP-ZE-2460.00

Weitere Angaben siehe Anhang

DIN CERTCO Gesellschaft für Konformitätsbewertung mbH
Alboinstraße 56, 12103 Berlin

GESELLSCHAFT FÜR KONFORMITÄTSBEWERTUNG MBH DIN CERTCO

2007-07-23
Dr.-Ing. Michael Garmer
- Geschäftsführer, Leiter der Zertifizierungsstelle -

FORSCHUNGS- UND TESTZENTRUM FÜR SOLARANLAGEN

Institut für Thermodynamik und Wärmetechnik
Universität Stuttgart
Professor Dr. Dr.-Ing. habil. H. Müller-Steinhagen

In Kooperation mit SWT TECHNOLOGIE

Nachweis des jährlichen Kollektorertrags

für die Vergabe des Umweltzeichens nach RAL-UZ 73

entsprechend den Richtlinien des Bundesministeriums für Wirtschaft zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien vom 1. August 1995

Für Sonnenkollektoren mit	
der Vertriebsbezeichnung:	**LATENTO CPC 12**
und die baugleiche Typen:	**LATENTO CPC 18**
der Vertreiberfirma:	**IVT GmbH & Co. KG** **Gewerbering Nord 5** **91189 Rohr**

wurde eine Nachweisrechnung entsprechend der beim Deutschen Fachverband Solarenergie hinterlegten "Empfehlung zum Nachweis eines Kollektormindestertrages" durchgeführt bzw. eine entsprechende Nachweisrechnung anerkannt, die für einen baugleichen Kollektor durchgeführt wurde.

Der Nachweis basiert auf der Auswertung des Prüfberichts: 06COL513/2OEM04 vom 4.7.2007 nach EN 12975-2: 2006 des Forschungs- und Testzentrums für Solaranlagen Stuttgart.

Der erforderliche Kollektorertrag* von 525 kWh/m²a wird erreicht.

*am Standort Würzburg bei einem solaren Deckungsanteil von 40%

Zusätzliche Feststellungen:

keine

Dieser Nachweis ist registriert unter der Nummer: 06COL513

Stuttgart, den 04.07.2007

i V

Prof. Dr. Dr.-Ing. habil H. Müller-Steinhagen

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LATENTO®

E&OE; subject also to technical modifications!

02/2019

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WÜRTH GROUP