

*Best Deal - STAINLESS STEEL*



**Combined-Water-Heating-Systems  
storing and charging**

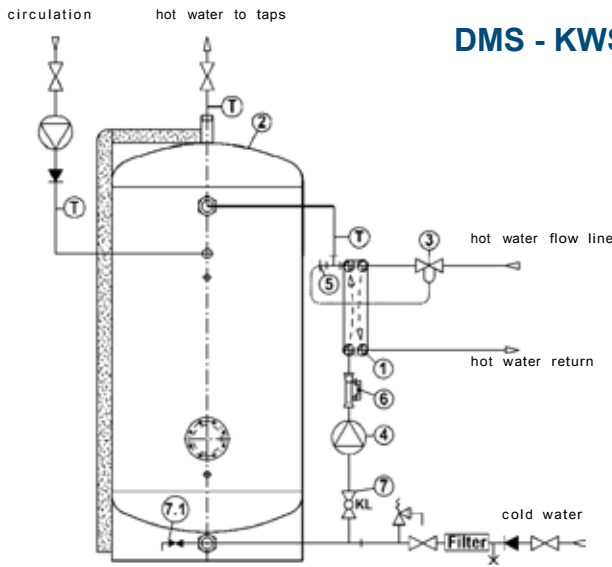
1. Water storage tank without or with disinfection volume will be heated completely
2. Contents of the vessel complete = 100 % for use
  - 2.1 Therefor it is possible to reduce the volume up to 20 % without capacity loss
3. No dead storage therefor high hygienic working system
4. Heating outside of the tank therefor
  - reduction of heat-water flow because the difference of the temperature is much higher
  - easy maintenance
  - much better efficiency of the whole system
5. It is possible to reduce the heating-temperature to get the same hote-water-temperature - leading to lower heat losses during time of no demand
6. More than one hot-water-tank can be loaded by one heat-exchanger. Pipework can be produced that any hot-water-tank can be shut-off for maintenance without interrupting the hot-water supply
7. Combined-water-systems are installed since many decades to deliver hot-water to any demand beside private homes and quite state of art



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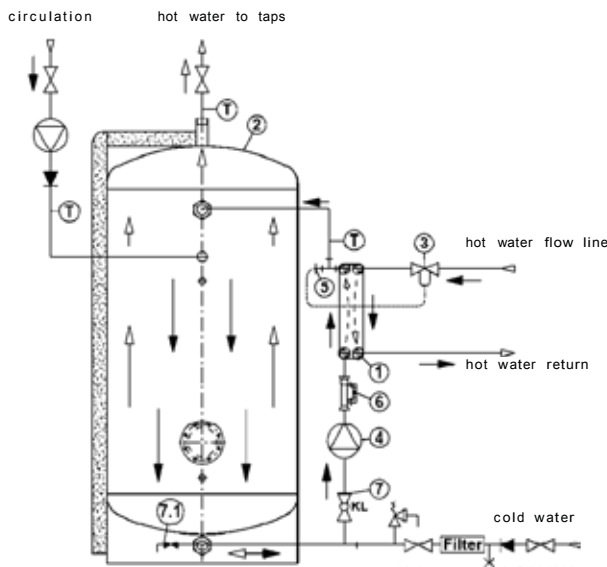
## heat exchangers - hot water systems - district heating stations

### DMS - KWS-K - Combined - Water - Heating - Systems storing and charging



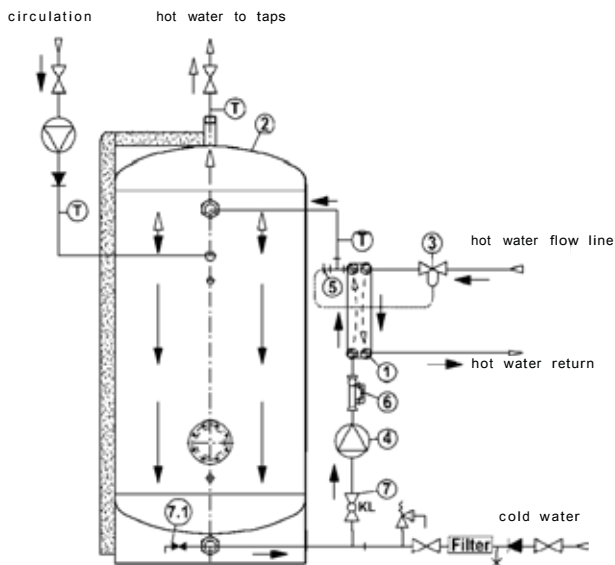
#### System before starting (filled up)

- 1) heat exchanger (brazed)
- 2) hot water storage tank
- 3) water temperature regulator
- 4) charging pump
- 5) sensor connection point
- 6) taco-setter
- 7) shut off valve
- 7.1) draining



#### System loaded or unloaded

- ↓ charging
- ↑ unloading

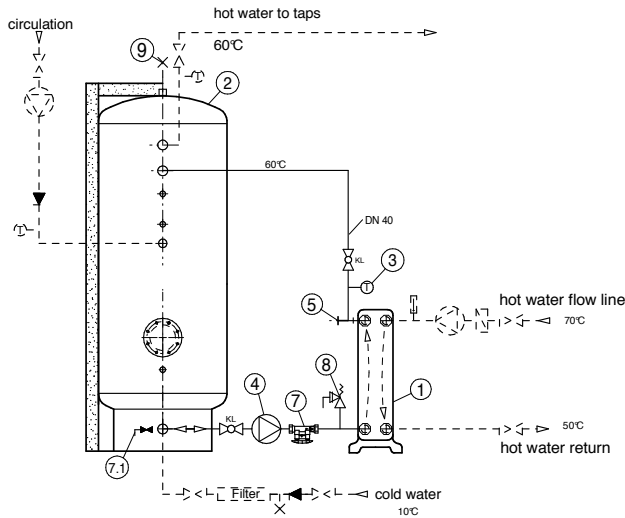


#### System loaded - circulation running

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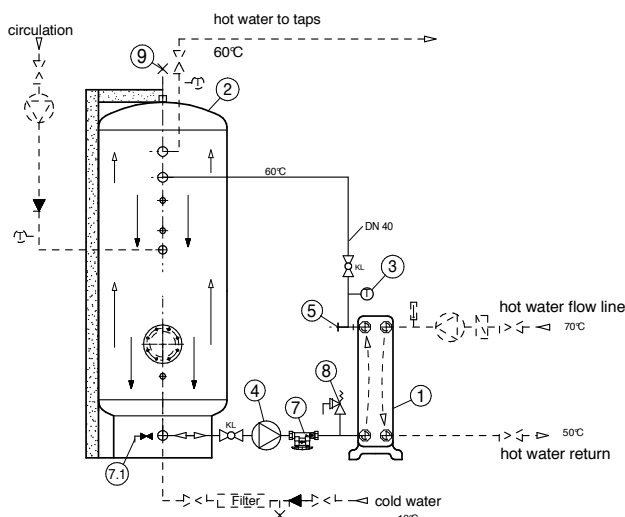
## heat exchangers - hot water systems - district heating stations

### DMS - KWS-K - Combined - Water - Heating - Systems storing and charging



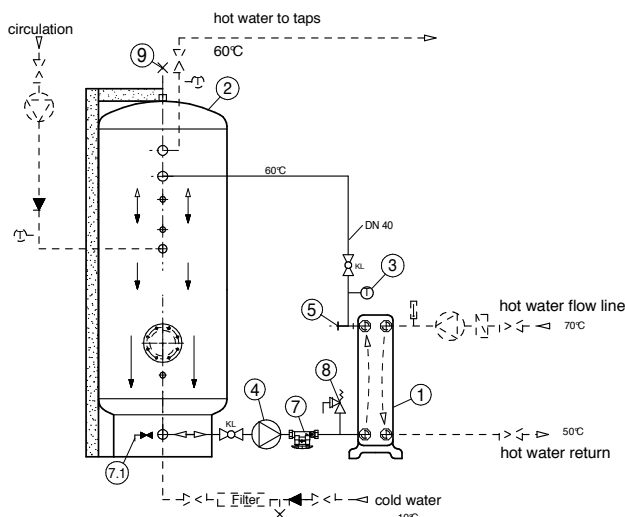
#### System before starting (filled up)

- 1) heat exchanger (gasketed)
- 2) hot water storage tank
- 3) thermometer
- 4) charging pump
- 5) sensor connection point
- 7) taco-setter
- 7.1) draining
- 8) safety valve
- 9) venting valve



#### System loaded or unloaded

- ↓ charging
- ↑ unloading



#### System loaded - circulation running

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## heat exchangers - hot water systems - district heating stations

Position	Quantity		single price Euro	total price Euro
		<p><b>DMS KWS-K System</b> hot water system ready for use storing and charging combined pipework of welded stainless steel (no flexible pipes acc. to hygienic requirements) with gun metal fittings</p> <p><b>Type: KWS-K _____</b> consisting of:</p>		
(1)		<p><b>DMS-brazed/gasketed plate heat exchanger</b> material: steel 1.4401 (ANSI 316) stainless steel with insulation Typ: PS-LG _____</p>		
(2)		<p><b>___stainless steel hot water storage tank</b> Typ: DINOX LAS _____ contents: _____ l</p>		
(3)		<p>constructed and built according to DIN 4753 part 1, vertical designed, material quality 1.4571/1.4404 (conformant to US.ANSI 316TI) with all necessary connections and hand hole, pickled and neutralized with removable soft foam/fleece insulation with plastic cover</p>		
(4)		<p><b>water temperature regulator</b> two-/three-way valve (not mounted) with/without safety thermostat Type: Samson _____</p>		
(6)		<p><b>charging pump</b> material stainless steel/bronze Typ: Grundfos / Wilo _____</p>		
		<p><b>balancing/setting valve</b> Type: TACO-Setter 23- _____</p>		
		<p>including shutt/off valves thermometer, and safty gauge</p>		
		<p>max. working pressure/-temp. secondary: 10 bar/ 95°C/203°F primary: 25 bar/ 185°C/365°F</p>		
		<p>height: _____ mm diameter/width: _____ mm weight: _____ kg</p>		
		<p>boiler input: _____ kW</p>		
		<p>primary: temperature: _____ °C/°F head loss: _____ kPa</p>		
		<p>secondary: temperature: _____ °C/°F head loss: _____ kPa</p>		
		<p><b>Total Price:</b></p>		

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## heat exchangers - hot water systems - district heating stations

Position	Quantity		single price Euro	total price Euro
		<p><b>DMS KWS-K System</b></p> <p>hot water system ready for use storing and charging combined pipework of welded stainless steel (no flexible pipes acc. to hygienic requirements) with gun metal fittings</p> <p><b>Type: KWS-K _____</b> consisting of:</p>		
(1)		<p><b>shell / coil heat exchanger</b> material: steel St37.2 / stainless steel 1.4571 (conformant to US.ANSI 316TI) with insulation Typ: ER - SR _____</p>		
(2)		<p><b>___stainless steel hot water storage tank</b> Typ: DINOX LAS _____ contents: _____ l</p> <p>constructed and built according to DIN 4753 part 1, vertical designed, material quality 1.4571/1.4404 (conformant to US.ANSI 316TI) with all necessary connections and hand hole, pickled and neutralized with removable soft foam/fleece insulation with plastic cover</p>		
(3)				
(4)		<p><b>water temperature regulator</b> two-/three-way valve (not mounted) with/without safety thermostat Type: Samson _____</p>		
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		<b>Total Price:</b>		

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## heat exchangers - hot water systems - district heating stations

Position	Quantity		single price Euro	total price Euro
		<p><b>DMS KWS-K System LK-min</b></p> <p>hot water system ready for use storing and charging combined pipework of welded stainless steel (no flexible pipes acc. to hygienic requirements) with gun metal fittings</p> <p><b>Typ: KWS-K Systems LK-min _____</b> consisting of:</p> <p><b>(1) DMS-brazed/gasketed plate heat exchanger</b> material: steel 1.4401 (ANSI 316) stainless steel with insulation Typ: PS-LG _____</p> <p><b>(2) _____ stainless steel hot water storage tank</b> Typ: DINOX LAS _____ LK usable contents: _____ l disinfection volume: _____ l constructed and built according to DIN 4753 part 1, vertical designed, material quality 1.4571/1.4404 (conformant to US.ANSI 316TI) with all necessary connections and hand hole, pickled and neutralized with removable soft foam/fleece insulation with plastic cover</p> <p><b>(3) water temperature regulator</b> two-/three-way valve (not mounted) with/without safety thermostat Type: Samson _____</p> <p><b>(4) charging pump</b> material stainless steel/bronze Typ: Grundfos / Wilo _____</p> <p><b>(6) balancing/setting valve</b> Type: TACO-Setter 23- _____</p> <p>including shutt/off valves thermometer, and safty gauge</p> <p>max. working pressure/-temp. secondary: 10 bar/ 95°C/203°F primary: 25 bar/ 185°C/365°F</p> <p>height: _____ mm diameter/width: _____ mm weight: _____ kg</p> <p>boiler input: _____ kW</p> <p>primary: temperature: _____ °C/°F head loss: _____ kPa</p> <p>secondary: temperature: _____ °C/°F head loss: _____ kPa</p> <p><b>Total Price:</b></p>		

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## heat exchangers - hot water systems - district heating stations

Position	Quantity		single price Euro	total price Euro
		<p><b>DMS KWS-K System LK-min</b></p> <p>hot water system ready for use storing and charging combined pipework of welded stainless steel (no flexible pipes acc. to hygienic requirements) with gun metal fittings</p> <p><b>Typ: KWS-K Systems LK-min</b> _____ consisting of:</p> <p><b>(1) shell / coil heat exchanger</b> material: steel St37.2 / stainless steel 1.4571 (conformant to US.ANSI 316TI) with insulation Typ: ER - SR _____</p> <p><b>(2) stainless steel hot water storage tank</b> Typ: DINOX LAS _____ LK usable contents: _____ l disinfection volume: _____ l constructed and built according to DIN 4753 part 1, vertical designed, material quality 1.4571/1.4404 (conformant to US.ANSI 316TI) with all necessary connections and hand hole, pickled and neutralized with removable soft foam/fleece insulation with plastic cover</p> <p><b>(3) water temperature regulator</b> two-/three-way valve (not mounted) with/without safety thermostat Type: Samson _____</p> <p><b>(4) charging pump</b> material stainless steel/bronze Typ: Grundfos / Wilo</p> <p><b>(6) balancing/setting valve</b> Type: TACO-Setter 23- _____</p> <p>including shutt/off valves thermometer, and safty gauge</p> <p>max. working pressure/-temp. secondary: 10 bar/ 95°C/203°F primary: 25 bar/ 185°C/365°F</p> <p>height: _____ mm diameter/width: _____ mm weight: _____ kg</p> <p>boiler input: _____ kW</p> <p>primary: temperature: _____ °C/°F head loss: _____ kPa</p> <p>secondary: temperature: _____ °C/°F head loss: _____ kPa</p> <p><b>Total Price:</b></p>		

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**heat exchangers - hot water systems - district heating stations****DMS – Combined – Water – Heating – Systems KWS-K and LK – Systems****Assembly instruction:**

All the constituent components of the completely pre-mounted piped KWS-K-Systems are manufactured from corrosion resistant material – mainly stainless steel. The warm water and circulation pipework, following the DMS-KWS-K-System, should not be made out of galvanized steel tubes for corrosion reasons. The systems should be installed in a frost-free room by a recognized specialized company. Strainers or filters must be mounted in the inlets of primary and secondary connections. The pipework must be layed without tension.

**Safety equipment:**

The safety equipment of the hot water storage tank together with the heat exchanger is regulated in DIN 4753, part 1 (German rule). Requirements and regulations from the district heating operator/or boiler are to be considered. In addition DIN 1988 applies as well as possible regulations of local water suppliers for the installation.

Function of the DMS-KWS-K-Systems:**Charging:**

From the bottom of the hot water storage tank (2) cold water flows to the charging pump (4) to heat up to desired temperature in the heat exchanger (1) to the hot inlet of the storage tank (2). When all of the water in the storage tank has been heated to the desired temperature the water temperature regulator (3) closes to reduce and stop heating.

**Tapping:**

When warm water is taken from the taps, only the amount of water, which could be heated up to desired temperature, flows through the heat exchanger (1), the quantity beyond flows through the storage tank to the taps. Therefore it is necessary to match the flow capacity of the charging pump by the Taco-setting valve (6) with the heating capacity. If the capacity of the charging pump is too big, water at a lower temperature than desired may flow from the heat exchanger – or the heating capacity is too low. Complaints because of apparently inadequate capacity results in both cases. The Taco-setting-valve (6) must be adjusted in such a manner, that the completely opened water temperature regulator at a lowest inlet temperature to the heating water achieves the desired temperature of warm water in the heat exchanger. The thermostat of the water temperature regulator should be placed at the hot outlet (5) of the heat exchanger.

**Circulation / no tapping:**

In order to have in a short time water at the desired temperature at the taps, a circulating pump is installed. From the warm outlet of the storage tank the circulation starts. Circulation water should cool down not more than 5 K (°C). The whole circulation has to be adjusted in order to have well balanced hygienic pipework.



**heat exchangers - hot water systems - district heating stations****Highest capacity:****Start:**

1. Check, that installation of primary and secondary devices are duly. Consider the installation scheme too, which is settled at every delivered system.
2. At first start with secondary side filling the storage tank, open slowly the shut off valves at cold water inlet, and one by one in the warm water pipe to the taps. Exhaust the pipework at the taps. Wait as long as evenly water withdraws from the taps and close the taps.
3. Switch on the charging pump (4) and exhaust it in the same way.
4. At second start filling up the primary side of the heat exchanger:
  - a. Regulations of the district heating supplier or boiler manufacturer are to be considered.
  - b. The heating water has to heat up steadily at 70 °C at minimum at the heat exchanger. If not, a special system with a special manual may be required.
  - c. Then open shut off valves slowly at the in- and outlet pipework.
  - d. The regulation thermostat has to be adjusted to the desired temperature  
The hot water temperature should be adjusted to 60 °C at maximum to avoid a build-up of limescale.
5. Coordinate the flow rate of the charging pump (4) by the Taco-setting valve (6) with the capacity of the primary side.
6. Check, whether the water temperature regulator is closing when the desired temperature is reached. Adjust the temperature regulator if necessary.
7. Check the installations of the circulation pump and the non-return-valves and then start the pump.
8. For hygienic and long term operation reasons, the charging pump has to run constantly. Otherwise it may cause under supply or not enough heated water.

When all components are adjusted the system run independently.

**Examination and maintenance:**

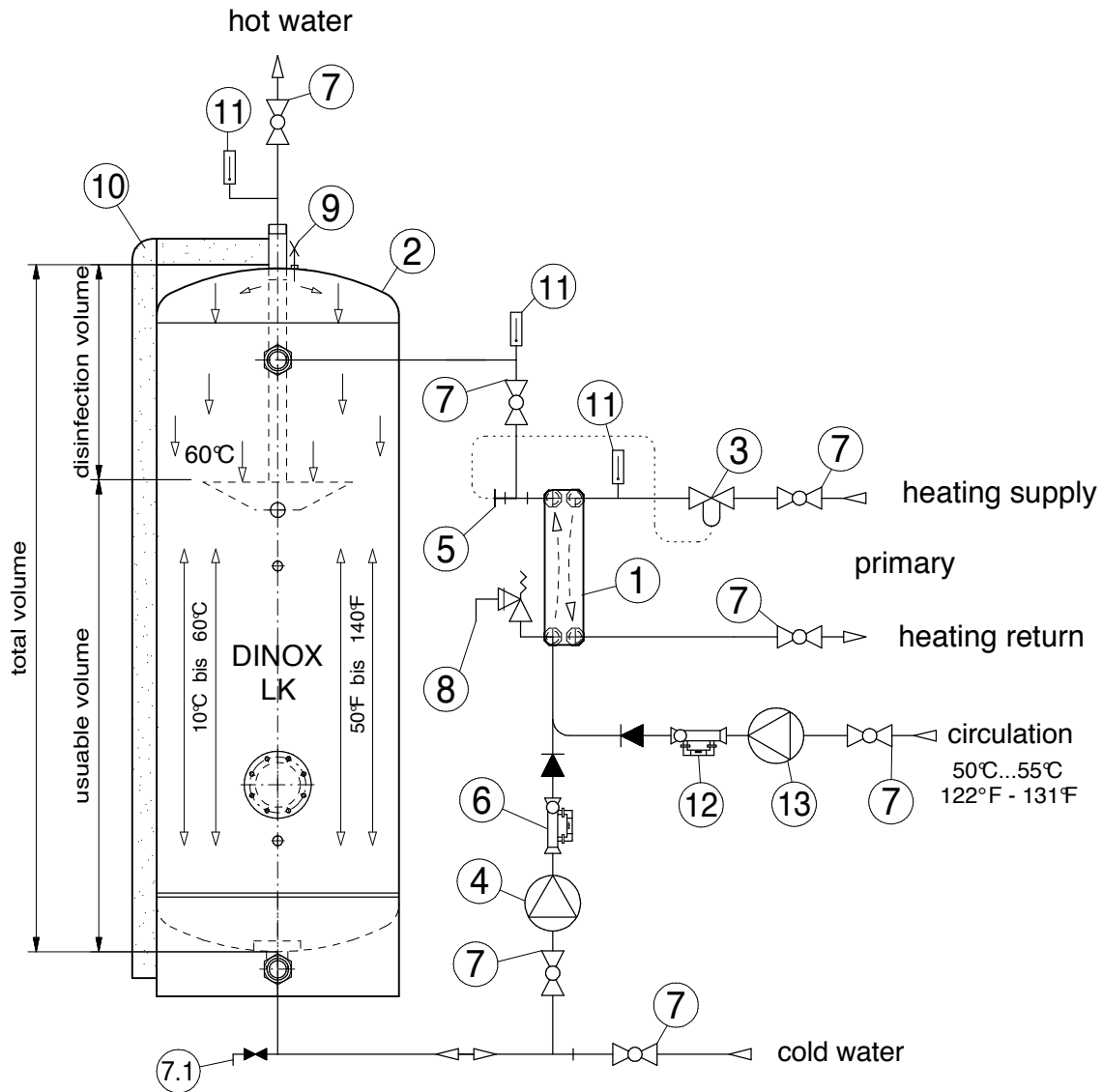
The safety and regulation devices are to be examined regularly. Once a year, the system has to be checked in all functions. This has to be done by a specialized company, in accordance with the DIN 1988 part 8 (German rule).

heat exchangers - hot water systems - district heating stations

## DMS - KWS - K- System LK - min

Legionellae minimising hot water system with thermal disinfection in stationary dwell time of the 60°C/140°F heated water within LK - storage tank

Pre-mounted and wired according to customers demand



- |   |   |     |                         |
|---|---|-----|-------------------------|
| 1 | Plate heat exchanger                      | 7.1 | Draine valve            |
| 2 | Stainless steel hot water storage tank LK | 8   | Safety valve            |
| 3 | Water temperature regulator               | 9   | Venting                 |
| 4 | Charging pump                             | 10  | Insulation              |
| 5 | Sensor connection point                   | 11  | Thermometer             |
| 6 | Taco-Setter                               | 12  | Taco-Setter circulation |
| 7 | Ball valve                                | 13  | Circulation pump        |

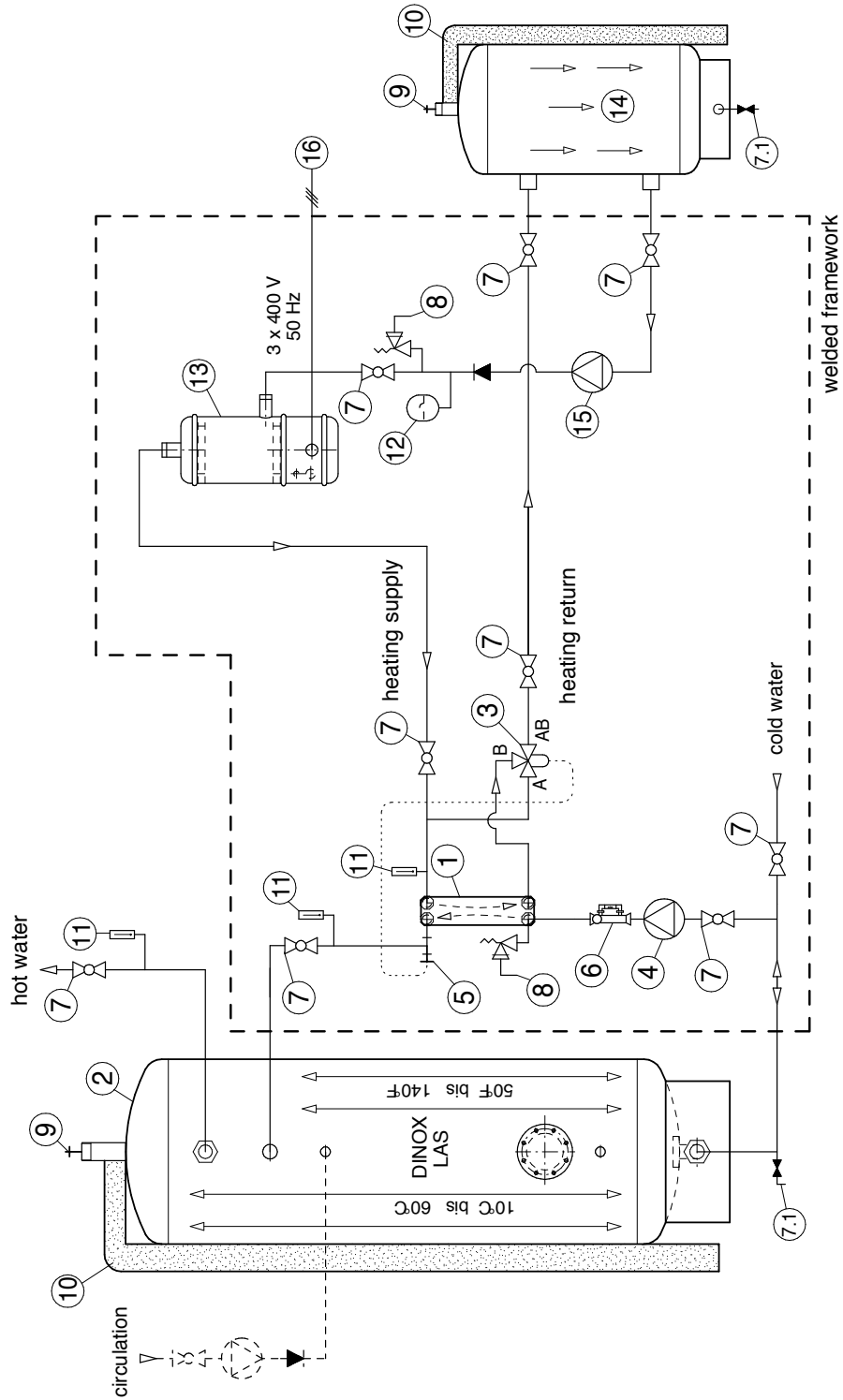
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heat exchangers - hot water systems - district heating stations

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## DMS - KWS - K- System

with electric-heater type Elektra (9-48 kW) - one heater - higher capacity two or more heaters detailed designed to customers request - tailor made pre-mounted and wired



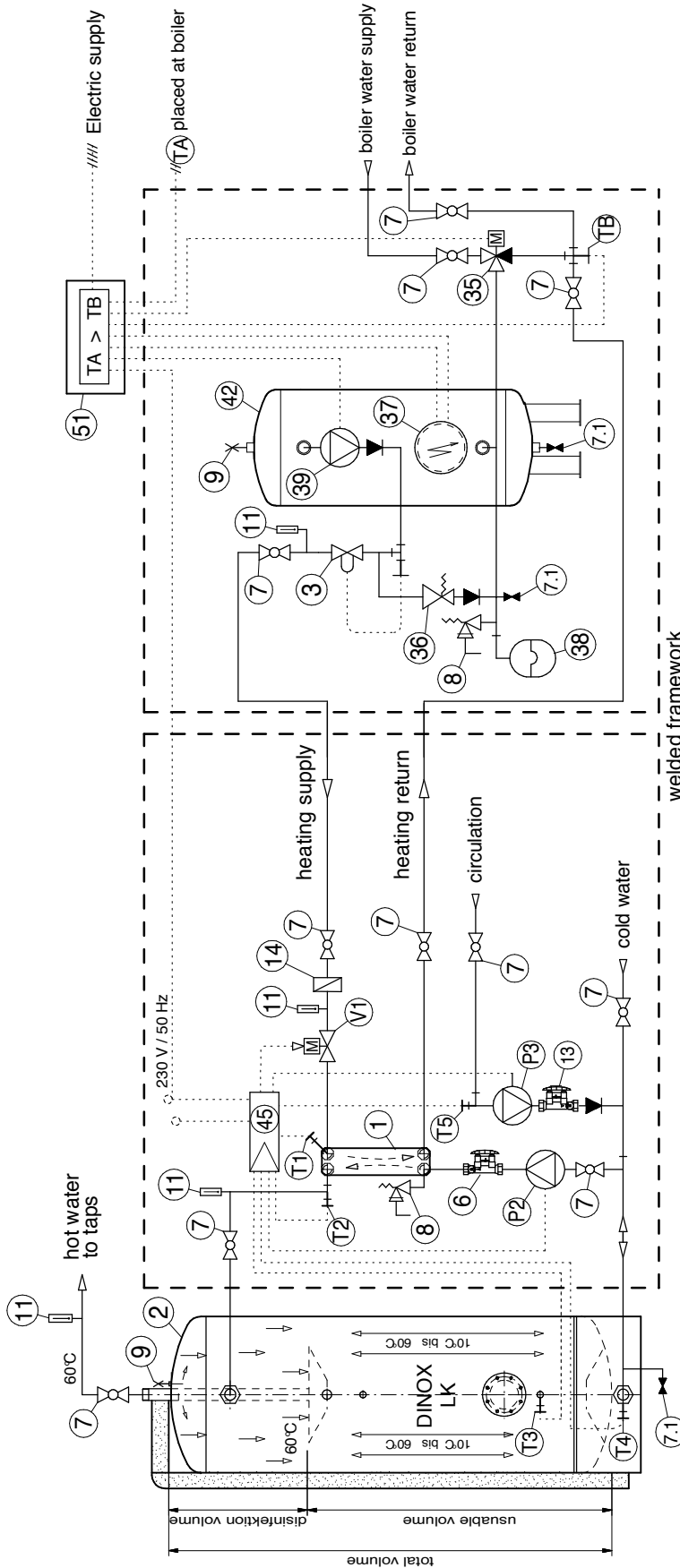
- |   |  |     |              |    |                        |
|---|--|-----|--------------|----|------------------------|
| 1 | Plate heat exchanger                   | 7   | Ball valve   | 12 | Expansion tank         |
| 2 | Stainless steel hot water storage tank | 7.1 | Draine valve | 13 | Electric heater        |
| 3 | Water temperature regulator 3-way      | 8   | Safety valve | 14 | Primary hot water tank |
| 4 | Charging pump                          | 9   | Venting      | 15 | Charging pump primary  |
| 5 | Sensor connection point                | 10  | Insulation   | 16 | CC - Control Cabinet   |
| 6 | Taco-Setter                            | 11  | Thermometer  |    |                        |

heat exchangers - hot water systems - district heating stations

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# DMS - KWS - K - LK - min - System - indirect electric heated

Legionellae minimising hot water system with thermal disinfection in stationary dwell time of the 60°C/140°F heated water within LK - storage tank detailed designed to customers request - tailor made pre-mounted and wired

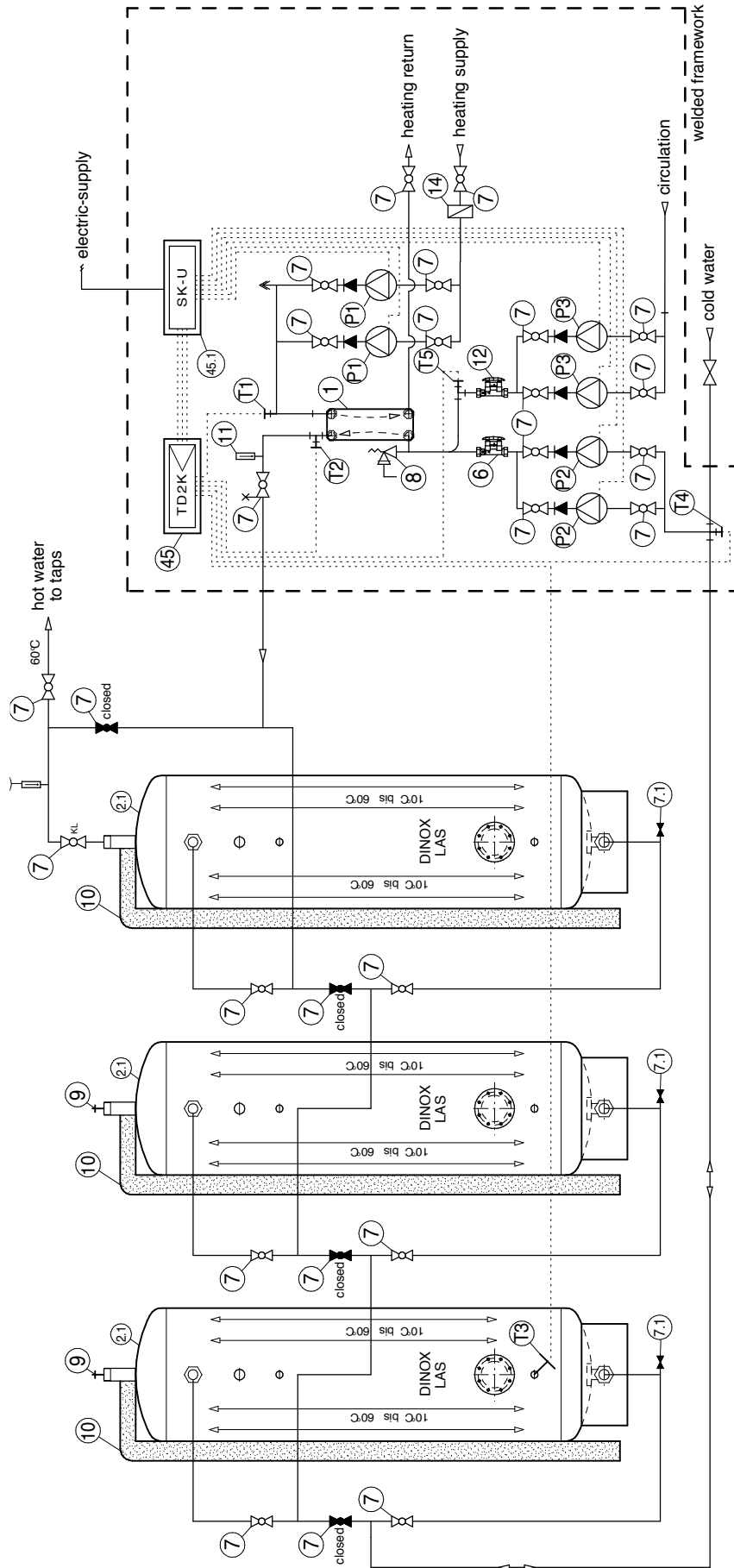


- |     |   |    |                                     |    |                                 |
|-----|---|----|-------------------------------------|----|---------------------------------|
| 1   | Plate heat exchanger                      | 35 | Motorized switching ball valve      | V1 | Motorized valve                 |
| 2   | Stainless steel hot water storage tank LK | 36 | Overflow valve                      | TA | Sensor boiler water             |
| 3   | Water temperature regulator               | 37 | Electric heater                     | TB | Sensor return Legiomim system   |
| 4   | Charging pump                             | 38 | Expansion tank                      | T1 | Sensor heating supply           |
| 6   | Taco-Setter                               | 39 | Pump electric heater                | T2 | Sensor hot water supply         |
| 7   | Ball valve                                | 42 | Primary hot water tank              | T3 | Sensor storage tank loading ON  |
| 7.1 | Drain valve                               | 45 | Thermomdrive microprocessor control | T4 | Sensor storage tank loading OFF |
|     |   | 51 | Control cabinet                     | T5 | Sensor circulation return       |

## heat exchangers - hot water systems - district heating stations

### DMS - KWS - K-3 - TD2K - RD - System

detailed designed to customers request - tailor made pre-mounted and wired



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- P1 Primary pump capacity controlled
- P2 Charging pump capacity controlled
- P3 Circulation pump capacity controlled
- T1 Sensor heating supply
- T2 Sensor hot water supply
- T3 Sensor storage tank loading ON
- T4 Sensor storage tank loading OFF
- T5 Sensor circulation return

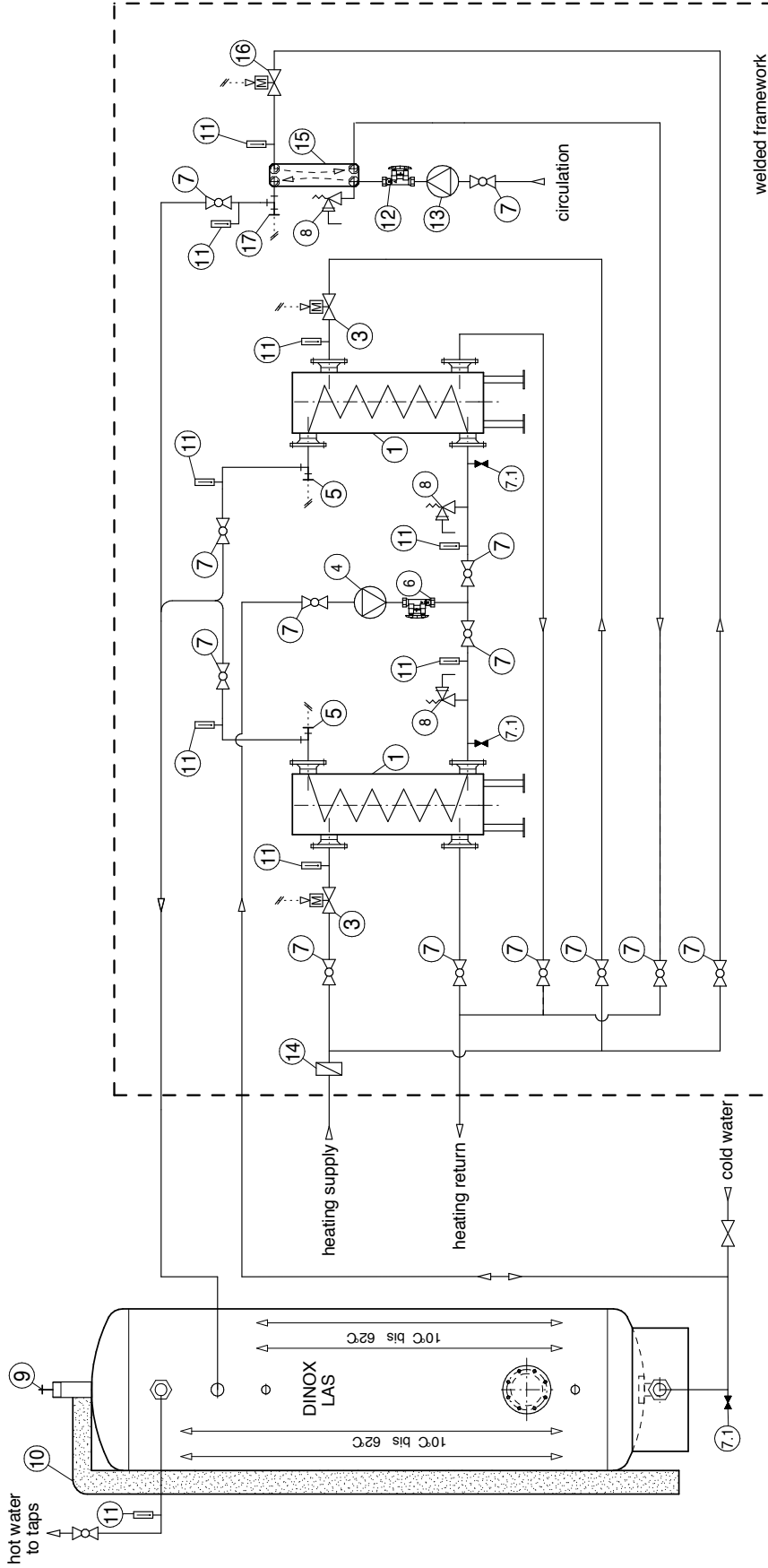
- 10 Insulation
- 11 Thermometer
- 12 Taco-Setter circulation
- 14 Non-return Valve
- 45 Thermodrive microprocessor control
- 45.1 Pump switch board

- 1 Plate heat exchanger
- 2.1 Stainless steel hot water storage tank
- 6 Taco-Setter
- 7 Ball valve
- 7.1 Drain valve
- 8 Safety valve
- 9 Venting

heat exchangers - hot water systems - district heating stations

# KWS - K - 1000 / 2 - RWU - ZWU - System

detailed designed to customers request - tailor made pre-mounted and wired



- |     |  |    |   |
|-----|--|----|---|
| 1   | Shell and coil heat exchanger          | 12 | Taco-Setter circulation                 |
| 2   | Stainless steel hot water storage tank | 13 | Circulation pump                        |
| 3   | Water temperature regulator            | 14 | Non return valve                        |
| 4   | Charging pump                          | 15 | Plate heat exchanger circulation        |
| 5   | Sensor point heating supply            | 16 | Circulation water regulator             |
| 6   | Taco-Setter                            | 17 | Sensor point heating supply circulation |
| 7   | Ball valve                             |    |   |
| 7.1 | Drain valve                            |    |   |
| 8   | Safety valve                           |    |   |
| 9   | Venting                                |    |   |
| 10  | Insulation                             |    |   |
| 11  | Thermometer                            |    |   |

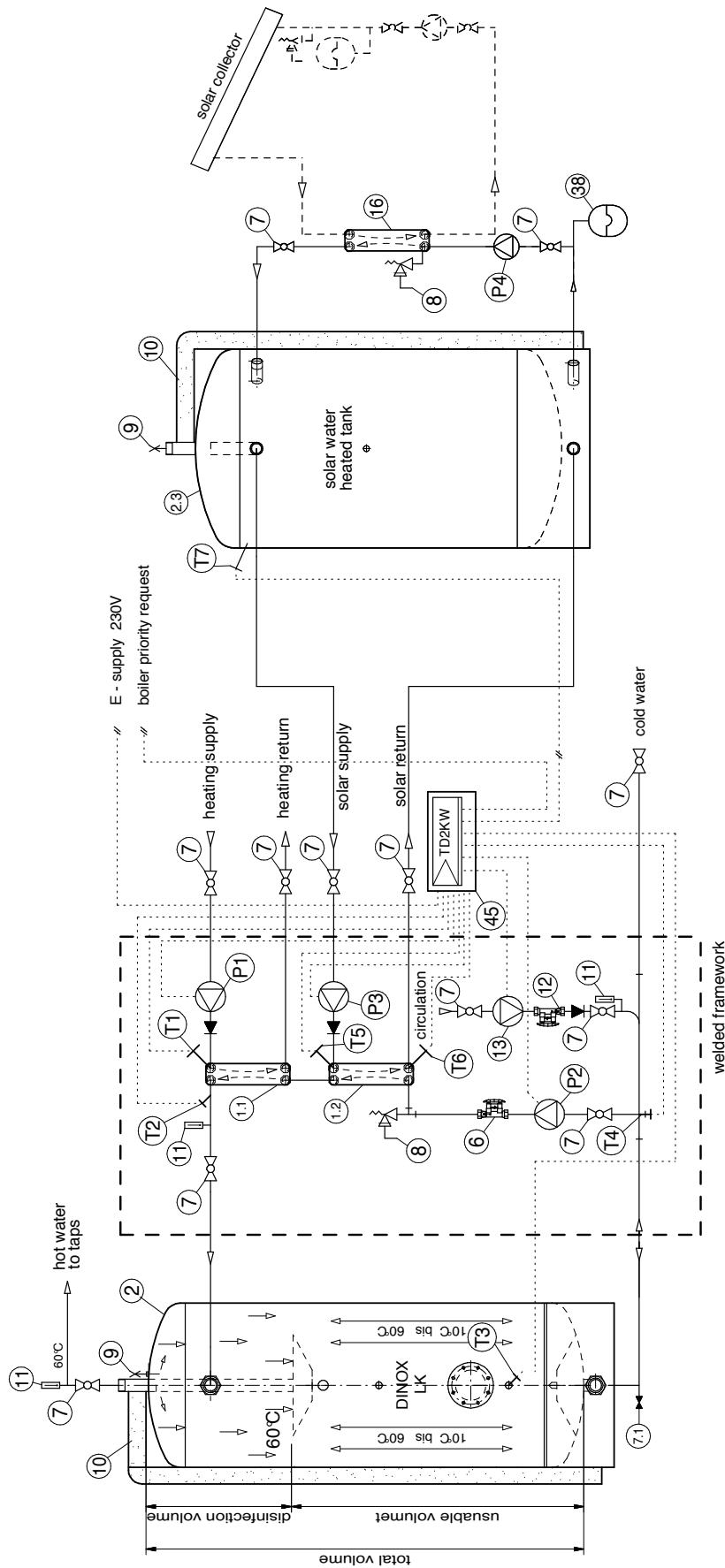
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heat exchangers - hot water systems - district heating stations

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# Hot Water System Boiled - and Solar - Water heated

pre-mounted frame construction, stainless steel pipework, internal wired designed and constructed according to customers demand



- 1.1 Plate heat exchanger-boiler water supplied
- 1.2 Plate heat exchanger-solar water supplied
- 2 Stainless steel hot water storage tank LK
- 2.3 Primary water tank-solar water heated
- 6 Taco-Setter
- 7 Ball valve
- 7.1 Drain valve
- 8 Safety valve
- 9 Venting
- 10 Insulation
- 11 Thermometer
- 12 Taco-Setter circulation
- 13 Circulation pump
- 16 Plate heat exchanger-solar water heated
- 38 Expansion tank
- 45 Thermotrive microprocessor control
- P1 Primary pump capacitycontrolled boilerwater
- P2 Charging pump capacitycontrolled
- P3 Primary pump capacitycontrolled solarwater
- P4 Charging pump solar water
- T1 Sensor heating supply-boilerwater
- T2 Sensor hot water supply
- T3 Sensor storage tank loading ON
- T4 Sensor storage tank loading OFF
- T5 Sensor heating supply-solar heater
- T6 Sensor return solar heater water
- T7 Sensor solar heater water tank load