Flexible Heat Exchanger Stations
Type DSE

General description and application

Heat exchanger stations are designed for hydronic separation of LTHW and CHW systems. Suitable for district energy connections, commercial buildings, and renewable applications, the stations come complete with all relevant items to enable heat transfer, balance, control, and service of the primary to secondary system connection.

The stations can be installed individually, or in parallel as duty/duty or duty/standby supplies. PN25 versions are available on request for use as tall building or high pressure system breakers.

The stations include:
- A heat exchanger to transfer the energy between systems
- A controller which can provide individual heat exchanger control, be linked to control multiple units, and be connected to a building management system over-ride
- Pressure independent control valve for flow and motorised control in a dynamic pressure system
- An MID approved ultrasonic energy meter for measurement, monitoring, and billing accurate consumption data
- A commissioning valve for measurement of flow
- A secondary side safety valve
- Primary and secondary strainers
- Ball or butterfly isolation valves

The stations are factory tested to the pressure equipment directive (PED)

Typical Uses
- District heating building connections
- Commercial building hydronic separation
- Tall building pressure breakers

General Operating Parameters
*other parameters are available on request

<table>
<thead>
<tr>
<th>Station Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipework Sizes</td>
</tr>
<tr>
<td>Maximum permissible supply temperature</td>
</tr>
<tr>
<td>PN Rating</td>
</tr>
<tr>
<td>Flow Rate Range</td>
</tr>
<tr>
<td>Maximum Differential Pressure (Primary)</td>
</tr>
<tr>
<td>Safety Valve Rating (secondary)</td>
</tr>
<tr>
<td>Pipes and pipe fittings, flanges</td>
</tr>
<tr>
<td>Heat Exchanger</td>
</tr>
<tr>
<td>Insulation</td>
</tr>
</tbody>
</table>

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**Function**

The heat is drawn from the primary heat source, commonly a boiler, district heating supply, or CHP, through the isolation valve, strainer, balancing valve, and heat exchanger, then back via the return pipe to the primary heat source.

On the secondary side of the stations, the flow enters and passes through the isolation valve and strainer, to the heat exchanger, where is gains energy to supply the building with heat or cooling water. A safety valve is located on the secondary flow to ensure an excess of pressure is not experienced on the secondary system. This can be provided with the required opening pressure.

A pressure independent control valve balances and limits flow through the pipework, to achieve the required secondary outlet temperature. The flow control is independent of pressure fluctuations in the system and the motorised valve element has full authority control at all load conditions.

The energy meter is positioned on the return, with two sensors, one on the flow, one on the return. The energy meter measures the volumetric flow rate, and the difference in temperature between flow and return, to calculate the energy used by the connection. The meter is supplied with an m-bus output to feed the energy usage to the building management system or meter reading system.

The controller senses the secondary return temperature, and modulates the control valve to achieve the desired secondary flow temperature. An outdoor sensor can be added to provide weather compensation. A number of applications can be provided by one controller, with an application key supplied with the station to control the station as per the application.

The station is provided with fully isolation provided by ball or fully lagged butterfly valves, temperature and pressure gauges, test points, and drain points.

**Station Flow Rate and Capacities**

<table>
<thead>
<tr>
<th>Pipework Size</th>
<th>Code</th>
<th>Connection</th>
<th>Max Design Flow Rate (l/s)</th>
<th>Min Design Flow Rate (l/s)</th>
<th>Capacity kW LTHW ∆T 20 (*1)</th>
<th>Capacity kW LTHW ∆T 30 (*1)</th>
<th>Capacity kW CHW ∆T 6 (*1)</th>
<th>Max Primary Station ΔP (*2)</th>
<th>Max Secondary Station ΔP (*2)</th>
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<tbody>
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<td>0.82</td>
<td>172</td>
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<td>85 kPa</td>
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<td>692</td>
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Notes *1: These figures are primary duty at the max design flow rate and the ∆T described
Notes *2: These figures are at maximum capacity, with a heat exchanger selected to lose 30 kPa. If you require a lower pressure loss please discuss this with your Danfoss representative.

Please note, this is a generic specification and not necessarily related to your project. For exact specification, please refer to the bill of materials, and specification pages for your project.
Product Sheet  Standard Heat Exchanger Stations  Type DSE

Unit Schematic

Key Components

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<th>Type</th>
<th>Position</th>
<th>Type</th>
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<td>Pressure Gauge</td>
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<td>Secondary Return Drain Point</td>
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<td>Strainer</td>
<td>183</td>
<td>Air vent</td>
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<td>20</td>
<td>Sensor for energy meter</td>
<td>184</td>
<td>Immersion Sensor</td>
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<td>24</td>
<td>Hydronic Balancing valve</td>
<td>186</td>
<td>Safety valve</td>
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<td>26</td>
<td>Air vent</td>
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<td>31</td>
<td>Primary Return Drain Point</td>
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<td>Isolation Valve</td>
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<td>48</td>
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Component Types

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<th>DN65</th>
<th>DN80</th>
<th>DN100</th>
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<th>DN125-2</th>
<th>DN125-3</th>
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<th>DN200</th>
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<td>M80 0-16 Bar</td>
<td>M80 0-16 Bar</td>
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<td>Drain Points</td>
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<td>IVR 954</td>
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<td>IVR 954</td>
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<td>IVR 954</td>
</tr>
</tbody>
</table>

Note 1: The heat exchanger selections will vary depending on duty requirement and temperature requirements.

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Unit Components

The heat exchanger stations come skid mounted, pressure tested to PED standards, pre-wired, and ready to install. This datasheet is for standard units which can be amended as per your requirements.

Heat Exchanger Data

Danfoss heat exchangers are specially selected to match your design application. Where possible, Danfoss offer Micro Plate Heat Exchangers which are a revolutionary technology, characterized by their unique plate pattern. MPHE’s enable heat to be transferred more efficiently than any previous model of heat exchanger. The exchangers come with specially manufactured insulation to reduce energy loss.

**Technical Data:**
- Max working pressure: 16 Bar
- Pressure Test Standard: (PED) 97/23/EC
- Min Working Temperature: -10 °C
- Max Working Temperature: 150 °C

**Materials:**
- Plate: Stainless steel EN1.4404 (AISI316L) & EN 1.4301 (AISI 304)
- Gasket Type: Glue free
- Gasket Material: EPDM

Controller

Danfoss stations can be supplied complete with an in-built controller, within a specially manufactured control panel. The panel features an ECL 210 controller and a pump output, 3ph, for up to 2x pumps with motors 400 W-4 kW.

The ECL 210 controller, senses the temperature using the ESMU 100 temperature sensor, and modulates the pressure independent control valve, to achieve the desired secondary flow temperature.

The unit is supplied, pre-wired to the sensor and actuator. An ESMT outdoor sensor is included to enable weather compensation.

The controller application is determined using an application key and will be supplied with a key, suitable for the project application. Master/slave configurations are available.

Ultrasonic Energy Meter

An MID, ultrasonic energy meter can be provided with the station. This provides billing accurate measurement of the energy the station uses. Accurate to ±1%, the Sonometer 30 and 31, provide a high dynamic range of 1:100 (qi:qp) and can be used with glycol mixtures. The meters are suitable for LTHW and CHW.

The meters come with m-bus protocol communication outputs to enable them to be linked to an automatic meter reading or building management system.

DN125+ stations come with 602 ultraflow meters.

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<table>
<thead>
<tr>
<th><strong>Product Sheet</strong></th>
<th><strong>Standard Heat Exchanger Stations</strong></th>
<th><strong>Type DSE</strong></th>
</tr>
</thead>
</table>

### Pressure Independent Control Valve

Danfoss AB-QM pressure independent control valves, are a world leading technology in the world of balancing and motorised control valves. Recognised as being the ideal solution for balance and control in variable flow systems, they feature a pressure controller, built into a high authority control valve, to combine balancing and control into a single valve.

Commissioning the valve is simple, with setting ring located at the valve neck, the desired flow rate is calculated as a percentage of the valve flow capacity. This percentage is set, and the valve commissioned in seconds.

The valve is supplied with a pre-wired AMV 435 actuator, which is linked back to the controller.

### Strainer

Danfoss FVF strainers are designed for heating, district heating and cooling systems. The strainer removes and retains foreign particles like welding beads, swarf, sand, and any other items carried by the medium.

The strainer protects the sensitive items in the station such as the control valve, energy meter and heat exchangers.

A ball valve can be attached to the strainer, to enable quick and simple removal of particles from the system.

### Balancing Valve

The stations can feature a manual balancing valve, for flow measurement and gives the potential for a double regulating function.

DN40 and 50 stations feature an MSV-BD, variable orifice double regulating valve, with 360º rotating test points and an additional drain point.

DN65+stations have MSV-F2 type balancing valves, with position indicator, locking function and an integrated stroke limiter.

### Safety Valves

Two safety valves can be provided on the secondary flow, to ensure over-pressure on the secondary circuit does not damage key components. The setting of the valves should be specified at the time of order.

### Isolation Valves

DN40 and DN50 stations are provided with BSP internal threaded isolation valves, type IVR 954.

DN65-125 stations are provided with Danfoss VFY-LH manual butterfly valves. These are fully lugged and provided with polyamid coated discs and stainless shafts.

DN150-200 stations are provided with Danfoss VFY-LG gear operated, fully lugged butterfly valves.

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Example Applications

Single DN65 District Heating Connection

2x DN50 Stations connected in a Duty/Standby arrangement
Datasheet Standard Heat Exchanger Stations Type DSE

### Additional Key Technical Information

<table>
<thead>
<tr>
<th>Component Type</th>
<th>DN40</th>
<th>DN50</th>
<th>DN65</th>
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<td>Safety Valve Max Setting</td>
<td>5 Bar</td>
<td>5 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
<td>10 Bar</td>
</tr>
<tr>
<td>Safety Valve Capacity (each) m³/h @ max setting</td>
<td>3</td>
<td>3</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Strainer kVs</td>
<td>33</td>
<td>54</td>
<td>95</td>
<td>140</td>
<td>201</td>
<td>340</td>
<td>340</td>
<td>340</td>
<td>526</td>
<td>870</td>
</tr>
<tr>
<td>Strainer mesh size mm</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
</tr>
</tbody>
</table>

### Station Commissioning

The stations are supplied with minimal commissioning requirement. It is not a requirement for a Danfoss representative to commission the station. A representative will be able to advise on the commissioning process, and it is expected that the installer will commission the station.

Full commissioning instructions are available.

### Maintenance

It is necessary to check and maintain the substation on a regular basis in order to keep it in good operating condition.

A general maintenance inspection of equipment should take place at least twice per year, with a full service inspection at least once per year.

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