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# Danfoss District Heating Application Handbook

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# Introduction

- With the today's focus on energy efficiency it is important that we in the district heating industry take active stand on promoting and use the best DH application available
- To do that we must have a good base for discussion and choosing the correct applications
- For more than 35 years, Danfoss has been taking an active role working in close cooperation with customers to offer the right solutions for district heating systems
- It is this expertise that we want to share with the district heating community to put our weight to future energy efficient district heating networks



# The target group

- Targeted users
  - Designers/planners
  - District heating utilities
  - Universities/educational institutes
  - Standardisation organisations
- Potential usage
  - Training material for
    - Employees
    - Consultants
    - DH companies
  - Base for discussion with customers
- Although the target group is wide we believe it can serve them all at different levels.



# Purpose of the handbook

- The aims of the handbook are
  - Give a clear and comprehensive introduction to different applications that are currently being used in district heating schemes, with a special focus on applications recommended by Danfoss
  - List up and give support to the benefits and limitations of the applications
  - Benchmark the applications using quantitative and qualitative measures
- The intention of the handbook is not to give product-specific information or detailed theory behind the components or applications

# The handbook



### 4. 1.1 Application

indirectly connected room heating and instantaneous domestic hot water application

Indirectly connected room heating application for indirect room heating and hot water production

Instantaneous TRM production with hot water tap

**How it works**

The TRM system provides a compact and efficient solution for indirect room heating and hot water production. The TRM system is designed to be installed in a central location, such as a boiler room or a utility room, and is connected to the heating system and the hot water tap. The TRM system is designed to be installed in a central location, such as a boiler room or a utility room, and is connected to the heating system and the hot water tap.

Depending on the demand TRM control, the TRM system can be used for indirect room heating and hot water production. The TRM system is designed to be installed in a central location, such as a boiler room or a utility room, and is connected to the heating system and the hot water tap.

TRM system type	TRM system type
TRM 100	TRM 100
TRM 150	TRM 150
TRM 200	TRM 200
TRM 250	TRM 250
TRM 300	TRM 300

### Danfoss Recommended Application

Control options

**Electronic control**

The TRM system is controlled by a Danfoss TRM control unit. The TRM control unit is connected to the TRM system and provides a range of control options. The TRM control unit is connected to the TRM system and provides a range of control options.

**Self-acting control**

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### 4. 1.1 Indirectly connected room heating and instantaneous domestic hot water application

**Key application benefits**

**Heating TRM system**

- ✓ Compact design and easy installation
- ✓ High efficiency and low energy consumption
- ✓ High reliability and long service life
- ✓ High flexibility in the design of the TRM system
- ✓ Suitable for use in a wide range of applications

**Domestic hot water TRM system**

- ✓ Compact design and easy installation
- ✓ High efficiency and low energy consumption
- ✓ High reliability and long service life
- ✓ High flexibility in the design of the TRM system
- ✓ Suitable for use in a wide range of applications



# The handbook structure

- The main categories of the handbook are:
  - Presentation of general principles of regulation in DH applications
  - DHW applications
  - HE applications
  - Supply to flat stations applications
- After introducing these main applications different combinations of the main applications are presented



# Distinguishing between applications

- All applications are prioritized using the following symbols:

## Danfoss recommendations



Danfoss recommended application



Primary alternative to Danfoss recommended application



Secondary alternative to Danfoss recommended application



# How can the handbook be used?

- Serve as a common platform for communication of solutions for district heating across markets and target groups
- For training and strengthening the knowledge of different applications
- It can be used to draw out the main benefits and limitations of the different applications in a systematical way
- Be a tool that others can use as ground work for further work that suits their specific markets/region



# Application matrix



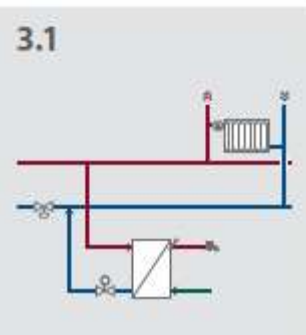
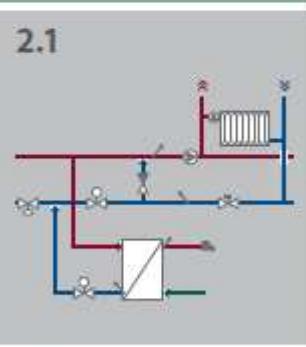
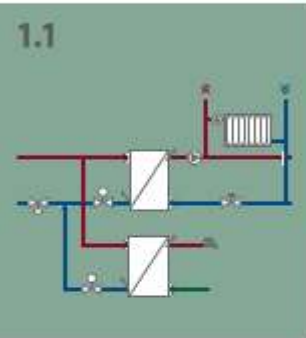
**4**  
 Directly and indirectly  
 connected room  
 heating and instantane-  
 ous domestic hot  
 water heat exchanger  
 applications

■ The application

provides an overview of all applications

## Application type overview

<b>1</b> Domestic hot water applications	<b>2</b> Directly and indirectly connected room heating applications	<b>3</b> Supply system to flat station
0.1	1.0	1.F
0.2	2.0	2.F
0.3	3.0	3.F



<b>5</b> Directly and indirectly connected room heating and domestic hot water charging applications	<b>6</b> Directly and indirectly connected room heating and domestic hot water cylinder applications	<b>7</b> Two-step applications	<b>8</b> Indirectly connected room heating and secondary side connected domestic hot water charging tank application	<b>9</b> Indirectly connected room heating and secondary side connected domestic hot water cylinder application
	1.3	1.1.1	S.1.2	S.1.3
	2.3	1.1.2		
	3.3			

- Danfoss-recommended application
- Primary alternative to Danfoss-recommended application
- Secondary alternative to Danfoss-recommended application
- Not recommended by Danfoss



# How can the handbook be used?

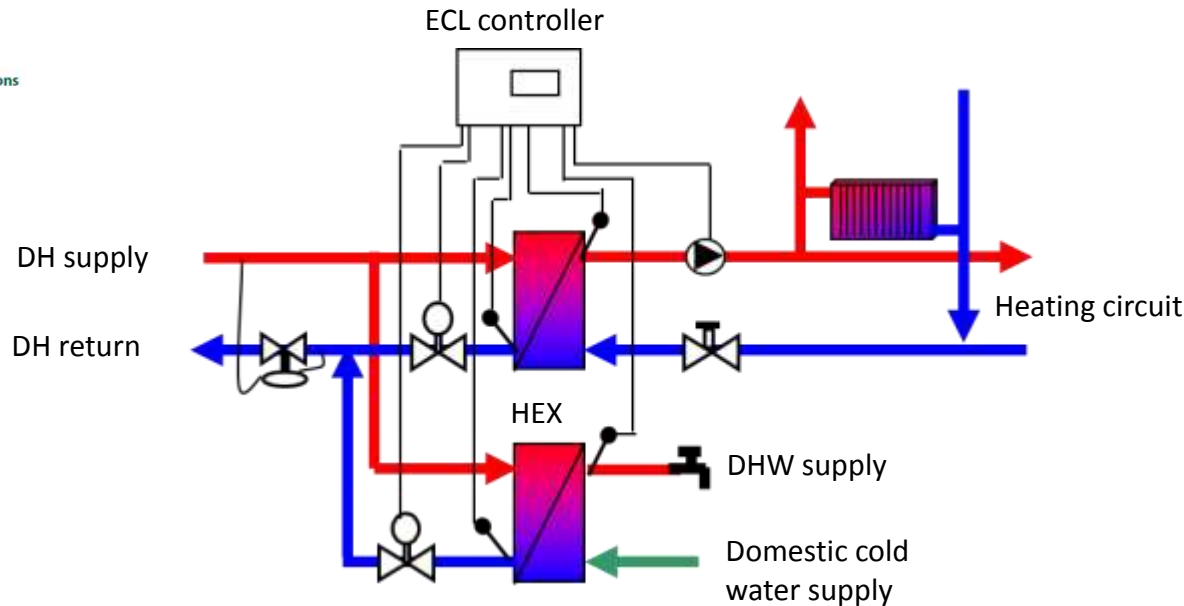
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# Indirect HE and instantaneous DHW

Danfoss recommendations



### Areas of use:

One-family houses  
 Multi-family houses  
 Commercial buildings

### DH system types:

PN10 & PN16 bar	$T \leq 60^{\circ}\text{C}$
PN10 bar	$T \leq 90^{\circ}\text{C}$
PN10 & PN16 bar	$T < 110^{\circ}\text{C}$
PN16 bar	$T \geq 110^{\circ}\text{C}$
PN25 bar	$T \geq 110^{\circ}\text{C}$

### Typical markets:

Almost all markets

- The heat exchanger physically separates the DH network and the HE circuit. The application minimizes the risk of contamination of DH water plus the risks and consequences of leakage in apartments. The secondary flow temperature is adapted to the heat demand of the building.
- DHW is instantaneously prepared with a heat exchanger. The heat exchanger physically separates the DHW and DH water.
- The application can supply unlimited amount of hot water at constant temperature, which is prepared close to the tapping point when demanded, and hence reduces the risk of legionella and other bacterial growth.
- Depending on the desired DHW comfort level and the applied DHW controller, the heat exchanger and the supply line can be kept either hot or cold during idle time.
- The heating system is typically controlled by an electronic weather compensator. The DHW system can be either electronically or self-acting controlled, for small systems it is typically self-acting controlled.





# Where can you access the handbook?

- The handbook can be accessed through Danfoss webpage at the site:

[www.heating.danfoss.com/dhapplication](http://www.heating.danfoss.com/dhapplication)

- We also have few copies at the Danfoss stand where you are welcome to come by and have a talk with us



# Thank you for the Attention

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