ESBE SYSTEM UNITS

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

GRC221 GRC222

GRC241 GRC242

PRODUCT DESCRIPTION

The ESBE circulation units Series GRC200 are designed for applications, where precision of mixing and high temperature comfort is required. The mixing groups are equipped with controllers and are used in application where an indoor temperature control via mixing function is desired. An example of such application can be a heat pump serving several zones which are equipped with GRC200 circulation units. The units adjusts the heating water temperature to the required temperature for the heating circuit based on the heating curve or measured indoor temperature. For the optimal control and energy management the GRC200 series can control the circuit pump (different working principles are available). The Circulation Mixing Unit ensures the best regulation performances independent from flow rate and low oversizing risk thanks to the progressive valve characteristic, as well as the perfect heating curve characteristic.

The series GRC200 are equipped with a rotary progressive mixing valve, controller series CRx200, two shut-off valves with thermometers, check valve, high class insulation shell and high efficiency circulation pump. The temperature control, mixing function, is performed based on the heating curve and/or measured indoor temperature. The secondary function of the controller CRx200 is pump control which depends on the chosen working principle.

The compact design of the units has been thought through and focus put on components such as pump, valve and controller resulted in high performance of the circulation units.

VERSIONS

Series GRC220

The ESBE series GRC220 are circulation units equipped with a pump, a rotary progressive mixing valve and a weather compensating controller with pump control series CRC217. The series comes in two sizes, DN25 and DN32, with two possible pump choices, Wilo or Grundfos. The pumps can be set to constant speed, variable pressure or constant pressure. The Series GRC220 are factory pre-assembled and are ready to be installed in the system.

ESBE recommends enabling pump control in the controller CRC217 for the best performance and energy management (pump control via PWM signal).

The controller series CRC217 can be upgraded to the weather compensated with indoor temperature control version by adding an upgrade kit (see related accessories: CRB913 art. no. 17055500 & CRB916 art. no. 17056400).

Series GRC240

The ESBE series GRC240 are circulation units equipped with a pump, a rotary progressive mixing valve and a weather compensating - indoor temperature controller with pump control series CRD227. The series comes in two sizes, DN25 and DN32, with two possible pump choices, Wilo or Grundfos. The pumps can be set to constant speed, variable pressure, or constant pressure. The Series GRC220 are factory pre-assembled and are ready to be installed in the system.

ESBE recommends enabling pump control in the controller CRD227 for best performance and energy management (pump control via PWM signal).

Controller Series CRx200

The circulation units are available with two versions of CRx200 controllers. The GRC220 series are equipped with CRC217, a weather compensating controller which can be easily updated to CRD227, a combined weather and indoor temperature controller. The upgrade can be done thanks to the upgrade kit available as accessory: CRB913 art. no. 17055500 & CRB916 art. no. 17056400. The CRD227 controller is a standard equipment of GRC240 series.

The controllers CRC217 and CRD227 includes all features implemented in CRx200 controller platform such as ESBEs Smart Software and Self-Adaptive System.

The ESBE Smart Software and Self-Adaptive System are responsible for an advanced heating curve adaptation; in other words, the heating curve will be built and shaped ideal for the specific building, system requirements and weather conditions. Thanks to Smart Software features there is only one setting to be performed and it is the room temperature.

The Controller consist of three main parts: actuator, wireless room unit and outdoor sensor.

- Actuator unit connected to the room display unit by wireless radio connection for easy installation.
- Room display unit which contains the indoor temperature sensor and in which all settings, such as day to day climate adjustments as well as the internal day and weekly program, are set.

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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

The controllers CRC217 and CRD227 primary function is indoor climate control. Secondary function is the pump control for optimal system performance and energy management. There are 8 available pump control modes:

- Pump control Off – pump is not controlled by CRx2x7, pump working mode needs to be set on the pump.
- Pump stop – Pump control via valve angle. The pump runs in constant speed until the valve position reach its lower limit. When the valve reach its lower limit, a timer is started. If the valve angle is still in lower limit after the time limit has passed the pump will stop.
- Pump control ΔT (difference between supply temperature and return temperature) – two different modes:
  - a) Pump control with regulation to achieve constant ΔT.
  - b) Pump control with regulation to achieve a ΔT dependent on supply temperature.
- Pump control ΔT & pump stop – combined function of pump stop and ΔT control. Meaning that, ΔT regulation of pump speed when the water regulation is fulfilled plus pump is stopped if the valve angle is lower than the minimum angle.
- Pump control ΔT & flow limit – pump will be controlled according to the ΔT. However if the set flow limit is reached the controller will not allow the pump to work with higher speed.
- Pump control ΔT & flow limit & pump stop – pump will be controlled according to the ΔT. However, if the set flow limit is reached the controller will not allow the pump to work with higher speed, and when the valve reach lower limit the pump will be turned off after a time limit.
- Flow control – Pump regulation independent of temperature. The pump will regulate to achieve the set flow.
- Flow control & pump stop – Pump regulation independent of temperature. The pump will regulate to achieve the set flow. However, when the valve reach the lower limit the pump will be turned off after a time limit.

SERVICE AND MAINTENANCE
The circulation unit does not require any specific maintenance under normal conditions.

KEY BENEFITS
- Highly efficient circulation pumps
- High class insulation of hydraulic parts
- Progressive valve characteristic
- Quick-FIT interface between controller and valve
- Weather compensated controller (GRC220)
- Combined weather and indoor temperature controller (GRC240)
- Pump control via PWM signal with 8 different working modes
- Possible controller upgrade
- ESBE Smart Software & Self-Adaptive System
- Compact design
- Tested, pre-assembled and ready to use
- Designed to last and perform
- High-end product finish

RELATED ACCESSORIES
See separate data sheet for further detailed information.

ESBE Manifold
Manifold for 1, 2, or 3 circulation units. With integrated separator function.

Art. No.	
66001100	GMA411- for 1 unit
66001600	GMA521 - for 2 units
66001700	GMA531 - for 3 units

Manifold for 2, 3, 4 or 5 circulation units. Without integrated separator function.

Art. No.	
66001200	GMA421- for 2 units
66001300	GMA431 - for 3 units
66001400	GMA441 - for 4 units
66001500	GMA451 - for 5 units

OPTIONAL EQUIPMENT - UPGRADE KIT FOR CONTROLLERS

Art. No.	
17055500	CRB913 Room unit, wireless
17056400	CRB916 Communication radio module, wireless

OPTIONAL EQUIPMENT

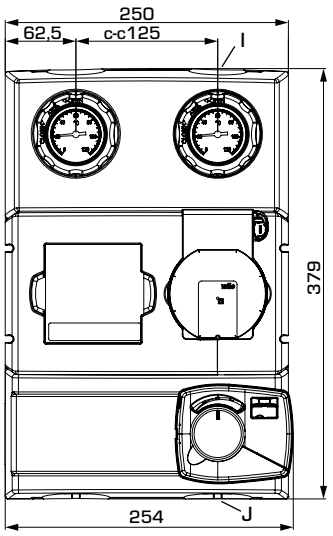
Art. No.	
17056200	CRA915 UK Plug

SPARE PARTS

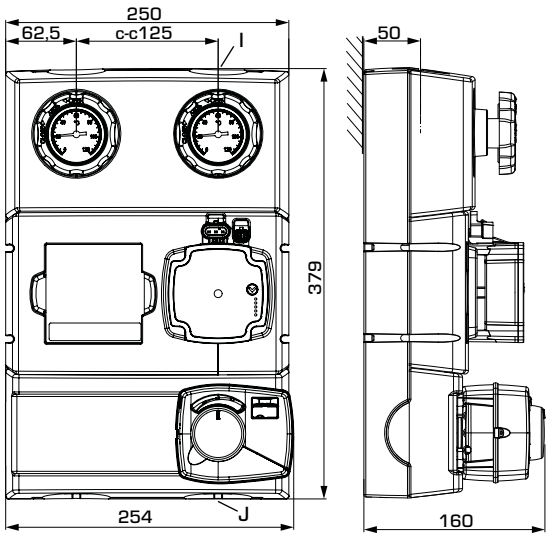
Art. No.	
67007000	GSP963 Controller CRC217 QF W (GRC221)
67007100	GSP963 Controller CRC217 QF G (GRC222)
67007200	GSP964 Controller CRD227 QF W (GRC241)
67007300	GSP964 Controller CRD227 QF G (GRC242)
67005700	GSP932 Pump Wilo STG 25/8 (GRC221, GRC241)
67000500	GSP907 Pump Grundfos UPM3 25-70 (GRC222, GRC242)

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

PRODUCT ASSORTMENT



GRC221/GRC241



GRC222/GRC242

SERIES GRC220

Art. No.	Reference	DN	Pump	Controller	Connections I	Connections J	Weight [kg]	Replaces	Note
61044100	GRC221	25	Wilo PARA STG 25/130/8-60/0	CRC217	G 1"	G 1½"	6,1	61040200	
61044200		32			G 1¼"	G 1½"	6,3	61040700	
61044300	GRC222	25	Grundfos UPM3 Hybride 25-70 130		G 1"	G 1½"	6,0	61040900	
61044400		32			G 1¼"	G 1½"	6,3	61041100	

SERIES GRC240

Art. No.	Reference	DN	Pump	Controller	Connections I	Connections J	Weight [kg]	Replaces	Note
61044500	GRC241	25	Wilo PARA STG 25/130/8-60/0	CRD227	G 1"	G 1½"	6,3	61041300	With Room display unit
61044600		32			G 1¼"	G 1½"	6,7	61041400	
61044700	GRC242	25	Grundfos UPM3 Hybride 25-70 130		G 1"	G 1½"	6,2	61041500	
61044800		32			G 1¼"	G 1½"	6,4	61041600	

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

TECHNICAL DATA

Visit esbe.eu for further detailed information.

The Circulation unit, in general

Pressure class: PN 10
Working pressure: 1,0 MPa (10 bar)
Connections, Internal thread (G), ISO 228/1
External thread (G), ISO 228/1
Insulation: EPP λ 0,036 W/mK

EnEV2014

Media: Heating water (in accordance with VDI2035)
Water / Glycol mixtures, max. 50%.
(water / glycol mixtures are affecting the pump performance. In case of Applications where water / glycol mixtures are used, pump performance should be considered.

Series GRC221

Media temperature: max. +100°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type: Wilo PARA STG 25-130/8-60/0
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption: 10-75 W
Enclosure rating: IP X4D
Insulation class: F
EEI (Energy Efficiency Index): <0,21
Valve type: Mixing valve VRG432
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%

* Differential pressure 100kPa (1 bar)

Controller type: CRC217
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 10 VA
Running time at max. speed: 30s
Enclosure rating: IP41
Protection class: II
ErP Temperature control class: III
Energy efficiency contribution: 1,5%

Material, in contact with water

Components: Brass, Cast iron, Steel
Sealing material: PTFE, Aramid fibre, EPDM

Conformities and certificates

CE
LVD 2014/35/EU
EMC 2014/30/EU
RoHS3 2015/863/EU
ErP 2009/125/EU

UKCA
SI 2016 No. 1101
SI 2016 No. 1091
SI 2012 No. 3032
SI 2010 No. 2617

PED 2014/68/EU, article 4.3 / SI 2016 No. 1105 (UK)

Series GRC222

Media temperature: max. +110°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type: Grundfos UPM3 Hybride 25-70 130
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption: 2-52 W
Enclosure rating: IP 44
Insulation class: N/A
EEI (Energy Efficiency Index): <0,20
Valve type: Mixing valve VRG432
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%

* Differential pressure 100kPa (1 bar)

Controller type: CRC217
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 10 VA
Running time at max. speed: 30s
Enclosure rating: IP41
Protection class: II
ErP Temperature control class: III
Energy efficiency contribution: 1,5%

Material, in contact with water

Components: Brass, Cast iron, Steel
Sealing material: PTFE, Aramid fibre, EPDM

Conformities and certificates:

CE
LVD 2014/35/EU
EMC 2014/30/EU
RoHS3 2015/863/EU
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UKCA
SI 2016 No. 1101
SI 2016 No. 1091
SI 2012 No. 3032
SI 2010 No. 2617

PED 2014/68/EU, article 4.3 / SI 2016 No. 1105 (UK)

WIRING

Please see the Installation Instruction

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

TECHNICAL DATA Visit esbe.eu for further detailed information.

Series GRC241

Media temperature: max. +100°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type: Wilo PARA STG 25-130/8-60/0
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption: 10-75 W
Enclosure rating: IP X4D
Insulation class: F
EEI (Energy Efficiency Index): <0,21
Valve type: Mixing valve VRG432
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%

* Differential pressure 100kPa (1 bar)

Controller type: CRD227
Power supply - Actuator unit: 230 ± 10% V AC, 50 Hz
Room display unit, wireless: 2x 1,5 V LR6/AA
Power consumption: 10 VA
Running time at max. speed: 30s
Battery endurance, wireless room display unit: 1 year
Enclosure rating - Actuator unit:: IP41
Room display unit, wireless: IP20
Protection class: II
ErP Temperature control class: VII
Energy efficiency contribution: 3,5%
Radio frequency (wireless room unit): 868 MHz
ITU region 1 approved acc. to EN 300220-2

Material, in contact with water

Components of: Brass, Cast iron, Steel
Sealing material of: PTFE, Aramid fibre, EPDM

Conformities and certificates

CE: LVD 2014/35/EU, EMC 2014/30/EU, RoHS3 2015/863/EU, ErP 2009/125/EU
UKCA: SI 2016 No. 1101, SI 2016 No. 1091, SI 2012 No. 3032, SI 2010 No. 2617

PED 2014/68/EU, article 4.3 / SI 2016 No. 1105 (UK)

Series GRC242

Media temperature: max. +110°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type: Grundfos UPM3 Hybride 25-70 130
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption: 2-52 W
Enclosure rating: IP 44
Insulation class: N/A
EEI (Energy Efficiency Index): <0,20
Valve type: Mixing valve VRG432
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%

* Differential pressure 100kPa (1 bar)

Controller type: CRD227
Power supply – Actuator unit: 230 ± 10% V AC, 50 Hz
– Room display unit, wireless: 2x 1,5 V LR6/AA
Power consumption: 10 VA
Running time at max. speed: 30s
Battery endurance, wireless room display unit: 1 year
Enclosure rating – Actuator unit:: IP41
– Room display unit, wireless: IP20
Protection class: II
ErP Temperature control class: VII
Energy efficiency contribution: 3,5%
Radio frequency (wireless room unit): 868 MHz
ITU region 1 approved acc. to EN 300220-2

Material, in contact with water

Components: Brass, Cast iron, Steel
Sealing material: PTFE, Aramid fibre, EPDM

Conformities and certificates

CE: LVD 2014/35/EU, EMC 2014/30/EU, RoHS3 2015/863/EU, ErP 2009/125/EU
UKCA: SI 2016 No. 1101, SI 2016 No. 1091, SI 2012 No. 3032, SI 2010 No. 2617

PED 2014/68/EU, article 4.3 / SI 2016 No. 1105 (UK)

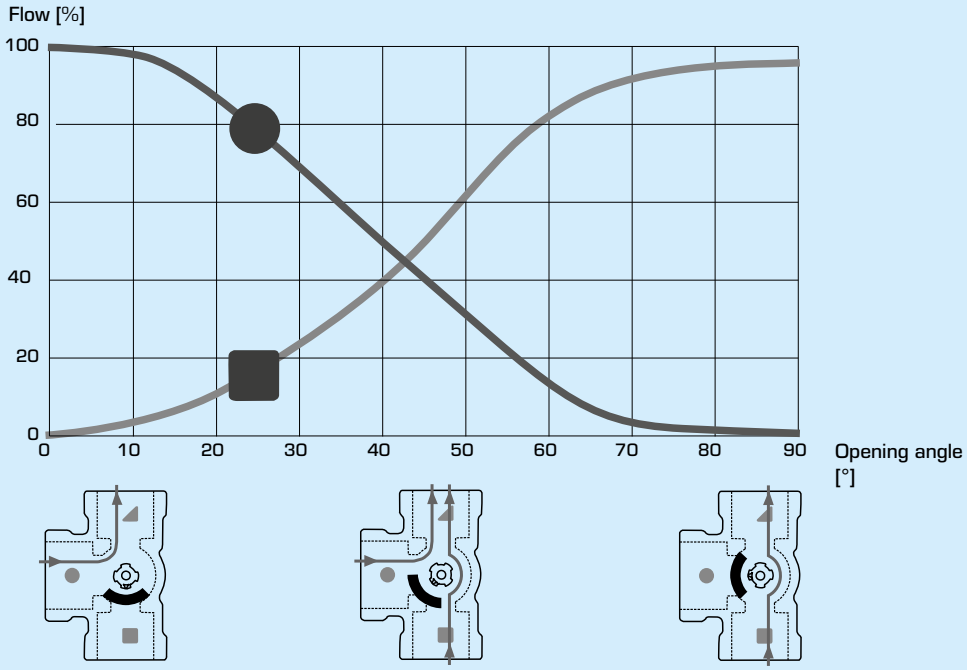
WIRING

Please see the Installation Instruction

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

TECHNICAL DATA Visit esbe.eu for further detailed information.

VALVE CHARACTERISTICS

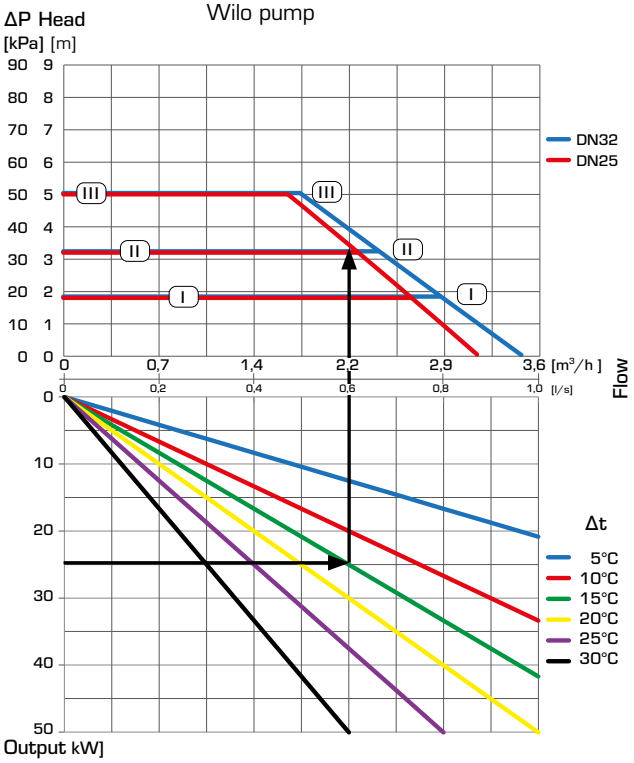


CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

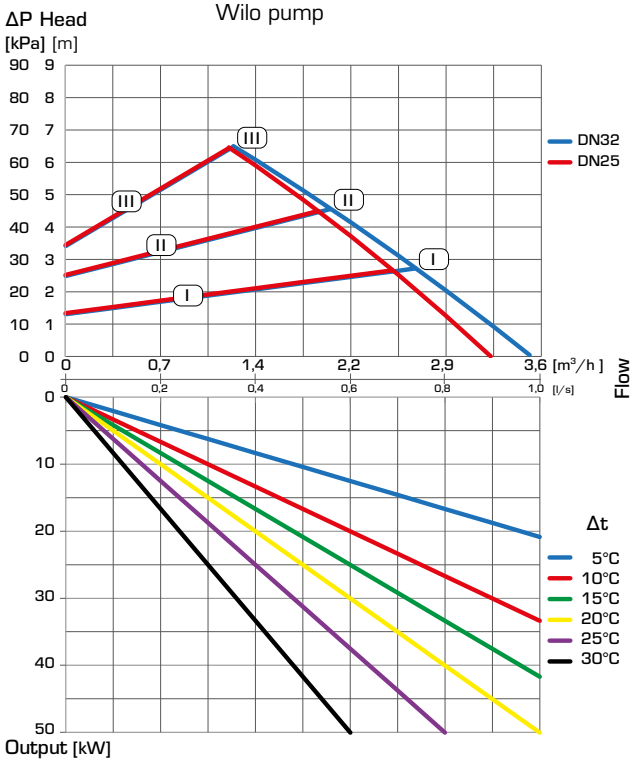
DIMENSIONING, PUMP CAPACITY DIAGRAM

Example: Start with the heat demand of the heating circuit (e.g. 25 kW) and move horizontally to the right in the diagram to the Δt = 15°C (temperature difference between flow and return of the heating circuit). Next go up and find the working point and read the available pressure of the pump on the left.

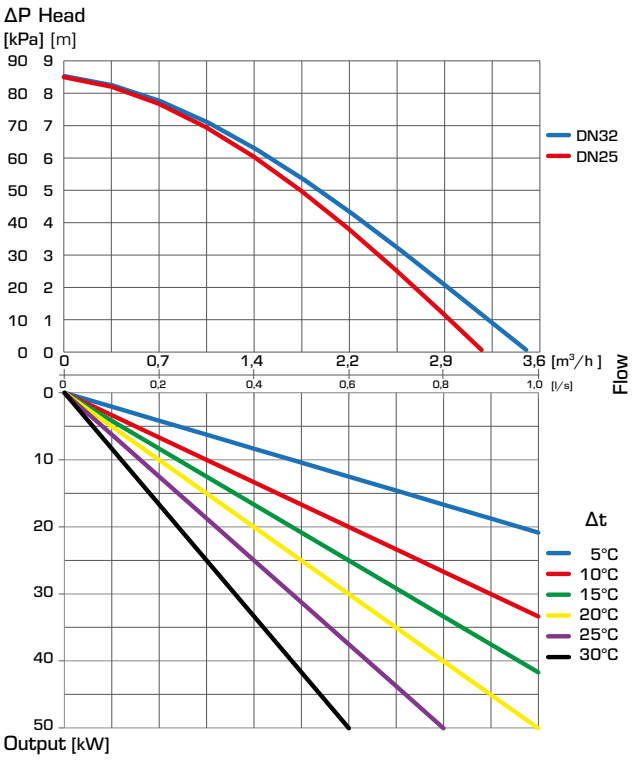
SERIES GRC2x1 – Constant differential pressure, Wilo pump



SERIES GRC2x1 – Variable differential pressure, Wilo pump



SERIES GRC2x1 – PWM, Wilo pump

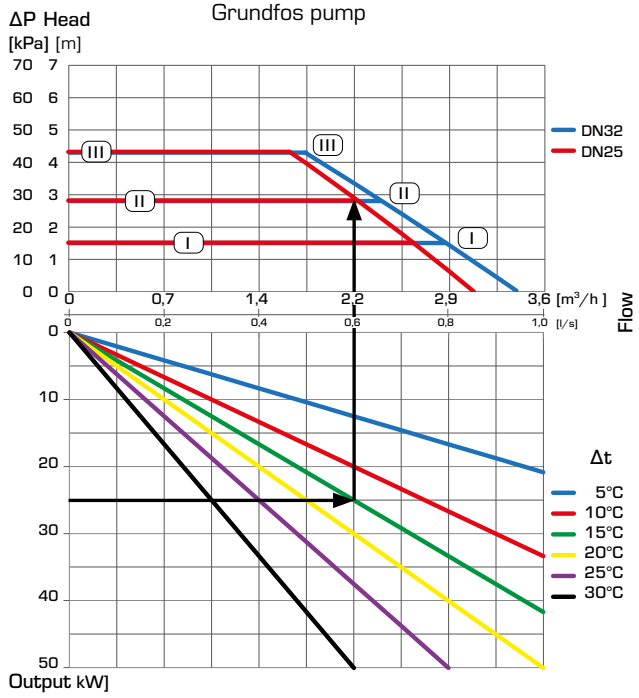


CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

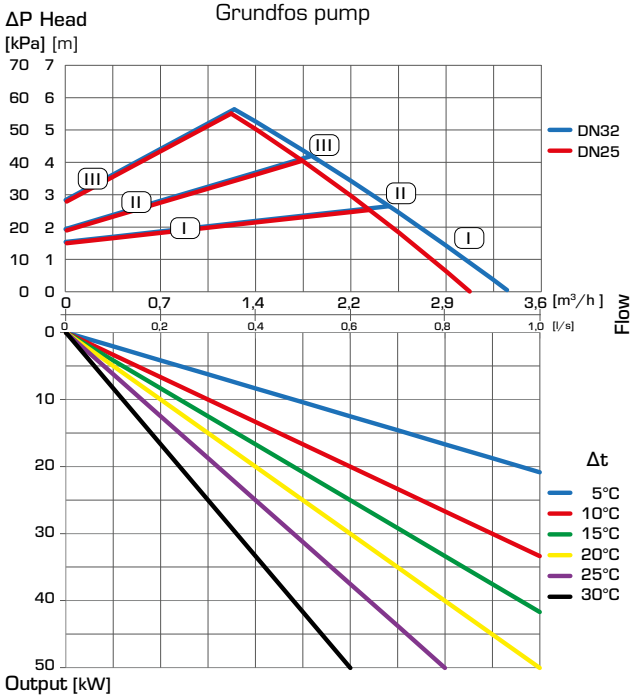
DIMENSIONING, PUMP CAPACITY DIAGRAM

Example: Start with the heat demand of the heating circuit (e.g. 25 kW) and move horizontally to the right in the diagram to the Δt = 15°C (temperature difference between flow and return of the heating circuit). Next go up and find the working point and read the available pressure of the pump on the left.

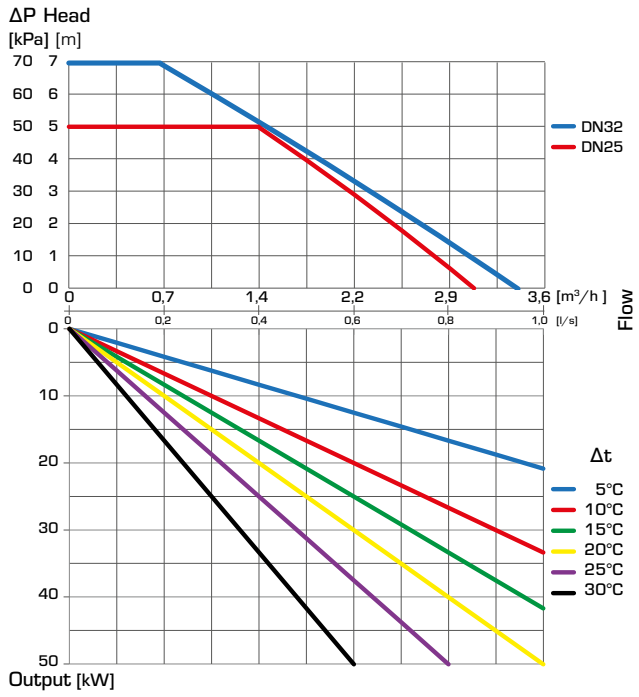
SERIES GRC2x2 – Constant differential pressure, Grundfos pump



SERIES GRC2x2 – Variable differential pressure, Grundfos pump

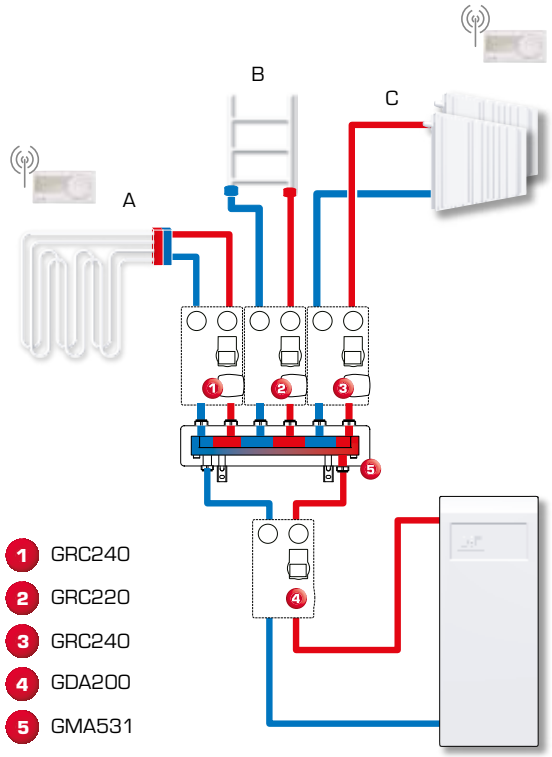


SERIES GRC2x2 – PWM, Grundfos pump



CIRCULATION UNIT
MIXING FUNCTION, SERIES GRC200

INSTALLATION EXAMPLE



The circulation unit series GRC200 in a heating system with a heat pump.
The heating circuits A & C are equipped with GRC240 and the heating circuit B is equipped with GRC220.

The GRC240 units are controlling the heating circuits according to the heating curve and the indoor temperature, as well as controlling the pump according to ΔT with pump on/off function.

The GRC220 unit is controlling the heating circuit according to the heating curve and controlling the pump according to ΔT with pump on/off function.

The benefits of using the circulation units series GRC200 in this application are:

- High indoor temperature comfort thanks to ESBE Smart Control and Self-Adaptive System
- Controlling the ΔT, return temperature to the heat pump to maximize the COP (Coefficient of Performance) and system performance
- Controlling the pump on/off for energy savings in case when heat is not required.

The shown applications are only examples of product use!
Before using the product in any application, the regional and national regulations need to be checked.