ESBE SYSTEM UNITS

CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00



GRA311 GRA211, GRA231 GRA212, GRA232 GRF111 GRF121

PRODUCT DESCRIPTION

The mixing groups are used for the temperature control, mixing function, in heating systems. This means that the heating water prepared in the heating source is mixed down to the desired set temperature, which is then delivered to the heating receiver, e.g. underfloor heating. The units GRxx00 are equipped with rotating mixing valves and actuators. The temperature control, mixing function, is performed based on a signal from an external controller. The mixed temperature is then a result of the controller parameters setting. For example, if the external controller is a weather compensated controller, the mixed temperature will be calculated based on the controller's heating curve settings. The groups are used in systems with controllers, and it depends on the controller type and functions which level of comfort that will be delivered.

Products are equipped with two shut-off valves with colour coded thermometers, a check valve placed on the return line from the heating circuit and an insulation shell. All circulation units are equipped with 3-way rotary mixing valves with progressive characteristic for smooth and precise temperature control, and actuators series ARA600.

When designing the circulation unit product line ESBE focused on performance, design, user friendly usage and environment. This applies to everything from manufacturing, materials to packaging.

VERSIONS

ESBE mixing function circulation units are available in three different version; standard design with and without pump, and a compact design for areas with limited space .

SERIES GRA200

The ESBE series GRA200 is a circulation unit equipped with a pump and a 3-way rotary mixing valve with progressive characteristic. The series comes in two sizes, DN25 and DN32 with the possibility of pump choice, Wilo or Grundfos. The pumps can be set to constant speed, variable pressure or constant pressure. The Grundfos pumps come with AutoADAPT feature which adjust the available pump pressure and the flow to the current system requirements.

The circulation units comes with two different versions of actuator; GRA210 with assembled 3-point 230V AC actuator series ARA661, and GRA230 with assembled proportional 24V AC/DC actuator series ARA639. The Series GRA200 has an ESBE QuickFIT interface between actuator and valve that allows for assembly or disassembly of the actuator from the valve without any tools.

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

SERIES GRA300

The ESBE series GRA300 is a compact but powerful circulation unit design for applications where space matters, however there is no room for compromises. The GRA300 is a DN20 circulation unit with performance equals the corresponding DN25 groups. This could be possible by adjusting the pump curves and consider the pressure losses in the group. By putting focus on performance, we achived the smallest circulation unit with unique pump curves which are covering low and high demands.

The GRA300 is equipped with a Wilo pump which can be set to variable or constant pressure, and iPWM1/2. It is also equipped with 3-way rotary mixing valve with progressive characteristic and an assembled 3-point 230V AC actuator series ARA661. Series GRA300 also has an ESBE QuickFIT interface between actuator and valve that allows for assembly or disassembly of the actuator from the valve without any tools.

SERIES GRF100

The ESBE series GRF100 is a circulation unit with mixing function, available in size DN25, designed to be used with almost any 180mm pump available on the market. The circulation unit is equipped with an insulation shell which can be adjusted according to pump design, even if the pump is delivered with its own insulation.

ESBE have put a lot of effort to make the adjustment process easy and clear, and to make the result of product adjustment like factory assembly.

The series GRF100 are equipped with a 3-way rotary mixing valve with progressive characteristic. It comes in two versions; GRF111 which can be equipped with your prefered actuator or controller, and GRF121 which comes with assembled 3-point 230V AC actuator series ARA661.

SERVICE AND MAINTENANCE

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

KEY BENEFITS

- High class insulation of hydronic parts
- Compact design
- Pre tested and ready to use
- Ready for 180mm pumps - applies to GRF100
- Adjustable insulation shell - applies to GRF100
- Symmetric design for left/right pump placement - applies to GRA200 and GRF100
- Designed to last and perform
- High-end product finish

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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

RELATED ACCESSORIES

ESBE Manifold

Manifolds for Series GRF100 and GRA200. See separate data sheet for further detailed information.

Manifolds for 1, 2, or 3 circulation units with integrated hydraulic separation.

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 hydraulic separation function.

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

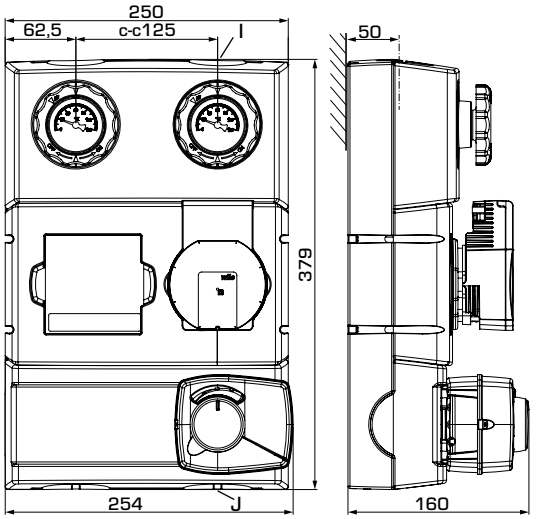
Manifold for Series GRA300 without integrated hydraulic separation function. See separate data sheet for further detailed information.

Art. No.	
66000500	GMA321- for 2 units
66000600	GMA331 - for 3 units

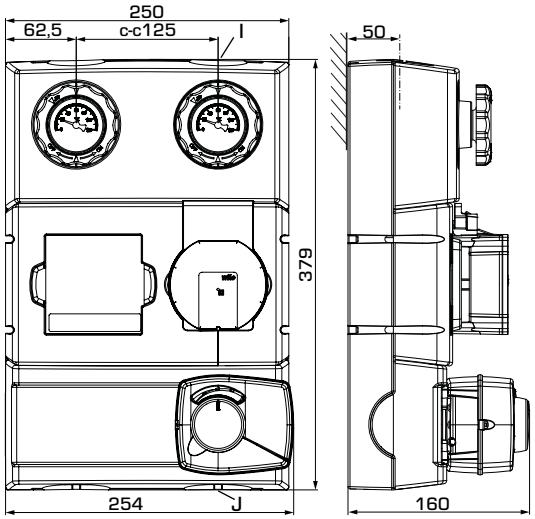
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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

PRODUCT ASSORTMENT



GRA211, GRA231



GRA212, GRA232

SERIES GRA210

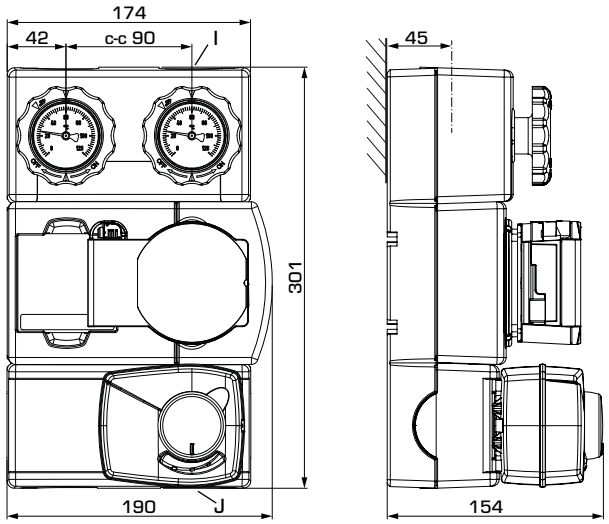
Art. No.	Reference	DN	Pump	Connections		Weight [kg]	Note	Replaces
				I	J			
61042100	GRA211	25	Wilo PARA 25/6	G 1"	G 1½"	5,8	230V, 3 point control signal	61040100
61042200		32	Wilo PARA25/8	G 1¼"	G 1½"	6,2		61040400
61042300	GRA212	25	Grundfos UPM3 AUTO 25-50	G 1"	G 1½"	5,9		61040500
61042400		32	Grundfos UPM3 AUTO25-70	G 1¼"	G 1½"	6,1		61040600

SERIES GRA230

Art. No.	Reference	DN	Pump	Connections		Weight [kg]	Note	Replaces
				I	J			
61042500	GRA231	25	Wilo PARA 25/6	G 1"	G 1½"	5,8	24V, Proportional control signal	61043200
61042600		32	Wilo PARA 25/8	G 1¼"	G 1½"	6,2		61043300
61042700	GRA232	25	Grundfos UPM3 AUTO 25-50	G 1"	G 1½"	5,9		61043400
61042800		32	Grundfos UPM3 AUTO 25-70	G 1¼"	G 1½"	6,1		61043500

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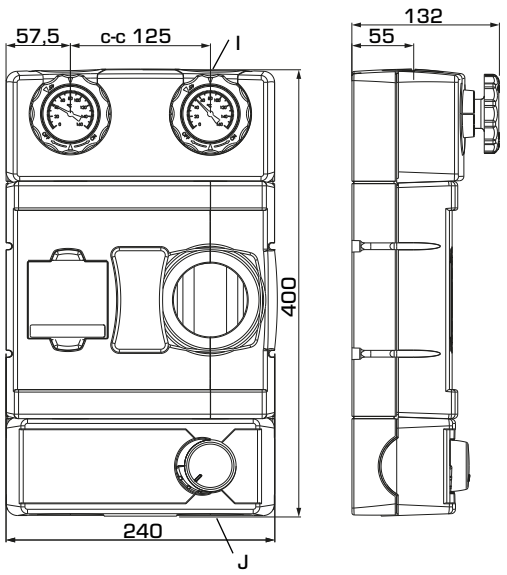
CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00



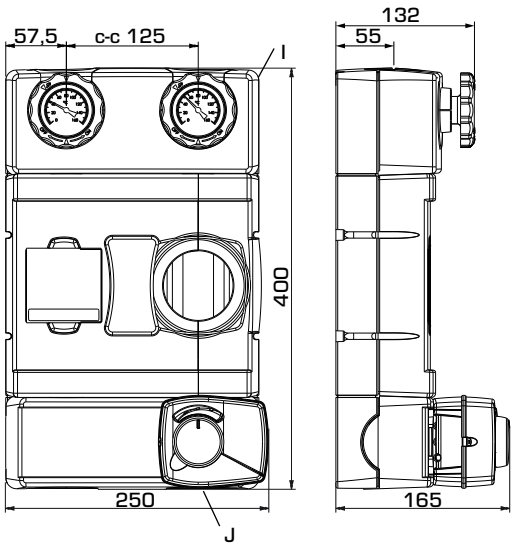
GRA311

SERIES GRA300

Art. No.	Reference	DN	Pump	Connections		Weight [kg]	Replaces	Note
				I	J			
61043600	GRA311	20	Wilo PARA STG 15/8	G ¾"	G 1"	4,4	61043100	



GRF111



GRF121

SERIES GRF100

Art. No.	Reference	DN	Connections		Weight [kg]	Note
			I	J		
61240100	GRF111	25	G 1"	G 1½"	3,2	
61241100	GRF121	25	G 1"	G 1½"	3,8	230V, 3 point control signal

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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

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

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 GRA211

Media temperature: max. +100°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type, DN25: Wilo PARA 25-130/6-43/SC
DN32: Wilo PARA 25-130/8-75/SC
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption – Wilo PARA 25/6: 3-43 W
– Wilo PARA 25/8 10-75 W
Enclosure rating: IP X4D
Insulation class: F
EEI (Energy Efficiency Index) - Wilo PARA 25/6: <0,20
- Wilo PARA 25/8: <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)

Actuator type: ARA661
Control signal: 3-point
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 5 VA
Running time 90°: 120s
Enclosure rating: IP41
Protection class: II

Material, in contact with water

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

Conformities and certificates

LVD 2014/35/EU
EMC 2014/30/EU
RoHS3 2015/863/EU
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014

Series GRA212

Media temperature: max. +110°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type, DN25: Grundfos UPM3 AUTO 25-50 130
DN32: Grundfos UPM3 AUTO 25-70 130
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption – Grundfos UPM3 AUTO 25-50: 4-33 W
– Grundfos UPM3 AUTO 25-70 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)

Actuator type: ARA661
Control signal: 3-point
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 5 VA
Running time 90°: 120s
Enclosure rating: IP41
Protection class: II

Material, in contact with water

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

Conformities and certificates

LVD 2014/35/EU
EMC 2014/30/EU
RoHS3 2015/863/EU
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014

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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

TECHNICAL DATA Visit esbe.eu for further detailed information.

Series GRA231

Media temperature: max. +100°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type, DN25: Wilo PARA 25-130/6-43/SC
DN32: Wilo PARA 25-130/8-75/SC
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption - Wilo PARA 25/6: 3-43 W
- Wilo PARA 25/8 10-75 W
Enclosure rating: IP X4D
Insulation class: F
EEI (Energy Efficiency Index) - Wilo PARA 25/6: <0,20
- Wilo PARA 25/8: <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)

Actuator type: ARA639
Control signal: proportional
Feedback signal: 2-10 V
Power supply: 24 ± 10% V AC/DC, 50/60 Hz
Power consumption - Operation, AC: 5 W
DC: 2,5 W
Power consumption - Dimensioning, AC: 11 VA
DC: 6 VA
Running time 90°: 15/30/60/120s
Enclosure rating: IP41
Protection class: II

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
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014
EAC UK CA

Series GRA232

Media temperature: max. +110°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type, DN25: Grundfos UPM3 AUTO 25-50 130
DN32: Grundfos UPM3 AUTO 25-70 130
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption - Grundfos UPM3 AUTO 25-50: 4-33 W
- Grundfos UPM3 AUTO 25-70 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)

Actuator type: ARA639
Control signal: proportional
Feedback signal: 2-10 V
Power supply: 24 ± 10% V AC/DC, 50/60 Hz
Power consumption - Operation, AC: 5 W
DC: 2,5 W
Power consumption - Dimensioning, AC: 11 VA
DC: 6 VA
Running time 90°: 15/30/60/120s
Enclosure rating: IP41
Protection class: II

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
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014
EAC UK CA

Series GRA300

Media temperature: max. +100°C
min. +5°C
Ambient temperature: max. +55°C
min. 0°C
Pump type, DN20: Wilo PARA STG 15-130/8-60/0
Power supply: 230 ± 10% V AC, 50/60 Hz
Power consumption: 2-60 W
Enclosure rating: IP X4D
Insulation class: F
EEI (Energy Efficiency Index): <0,20
Valve type: Mixing valve VRG438
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%

* Differential pressure 100kPa (1 bar)

Actuator type: ARA661
Control signal: 3-point
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 5 VA
Running time 90°: 120s
Enclosure rating: IP41
Protection class: II

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
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014
EAC UK CA

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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

TECHNICAL DATA Visit esbe.eu for further detailed information.

Series GRF111

Media temperature: max. +100°C*
min. +5°C*
Ambient temperature: max. +60°C*
min. 0°C*
*consider data for choosen pump
Pump type: N/A
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)

Material, in contact with water
Components: Brass, Steel
Sealing material: PTFE, Aramid fibre, EPDM

Conformities and certificates
PED 2014/68/EU, article 4.3
EnEV2014

Series GRF121

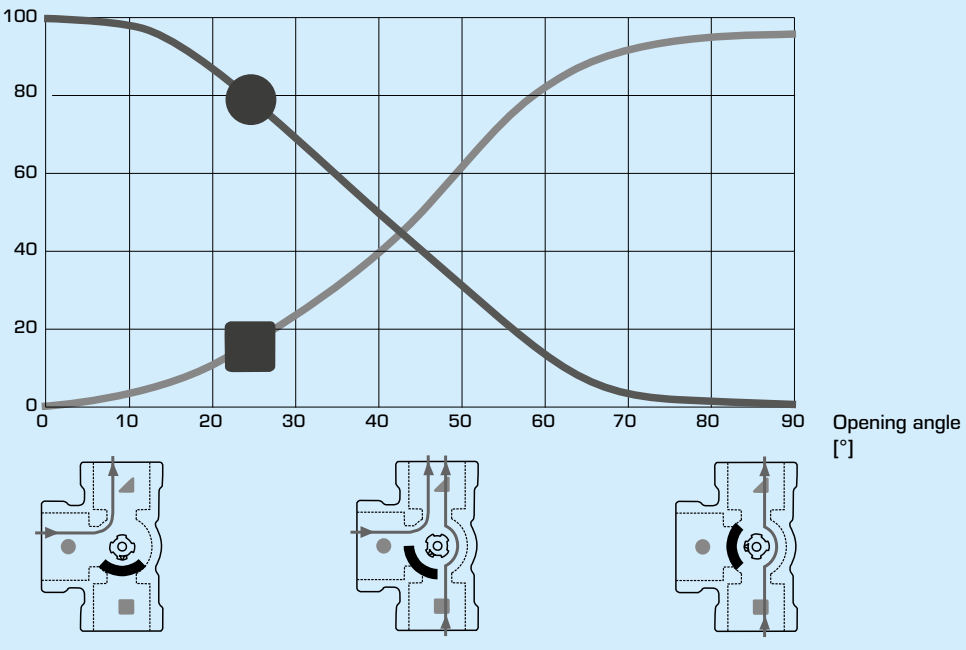
Media temperature: max. +100°C*
min. +5°C*
Ambient temperature: max. +55°C*
min. 0°C*
*consider data for choosen pump
Pump type: N/A
Valve type: Mixing valve VRG432
Max. differential pressure drop: 100kPa (1bar)
Close off pressure: 200 kPa (2 bar)
Leakrate in % of flow*: < 0,05%
* Differential pressure 100kPa (1 bar)

Actuator type: ARA661
Control signal: 3-point
Power supply: 230 ± 10% V AC, 50 Hz
Power consumption: 5 VA
Running time 90°: 120s
Enclosure rating: IP41
Protection class: II

Material, in contact with water
Components: Brass, Steel
Sealing material: PTFE, Aramid fibre, EPDM

Conformities and certificates
LVD 2014/35/EU
EMC 2014/30/EU
RoHS3 2015/863/EU
PED 2014/68/EU, article 4.3
ErP 2015
EnEV 2014

VALVE CHARACTERISTICS, MIXING VALVE VRG432



WIRING

Please see the Installation Instruction

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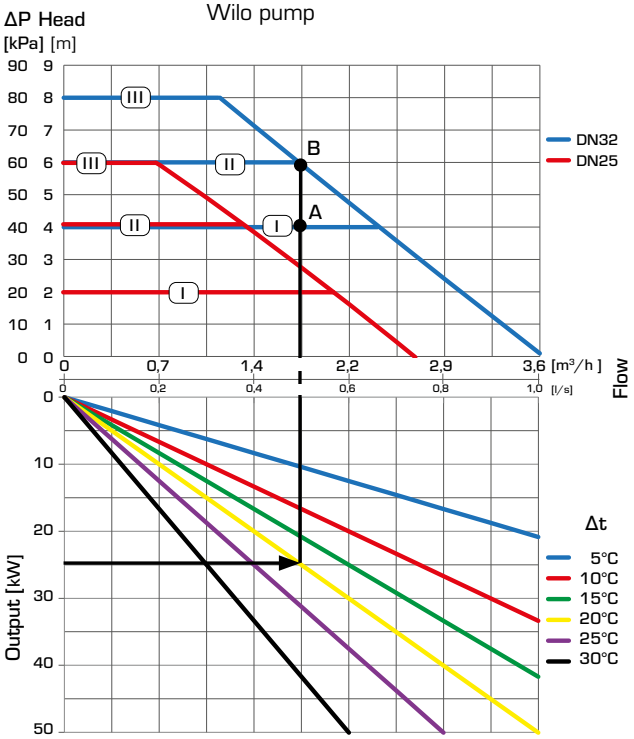
CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

DIMENSIONING, PUMP CAPACITY DIAGRAM

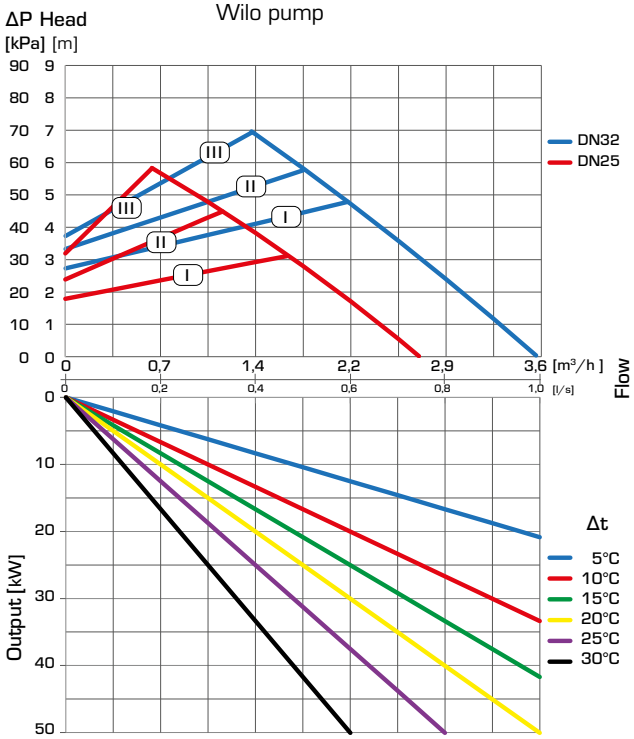
Example: Start with the heat demand of the heating circuit (e.g. 25 kW) and move horizontally to the right in the diagram to the Δt = 20°C (temperature difference between flow and return of the heating circuit). Next go up and find the possible duty points.

Setting I gives duty point A with a residual head of 40 kPa for DN32. Setting II and III gives duty point B with a residual head of 59 kPa for DN32.

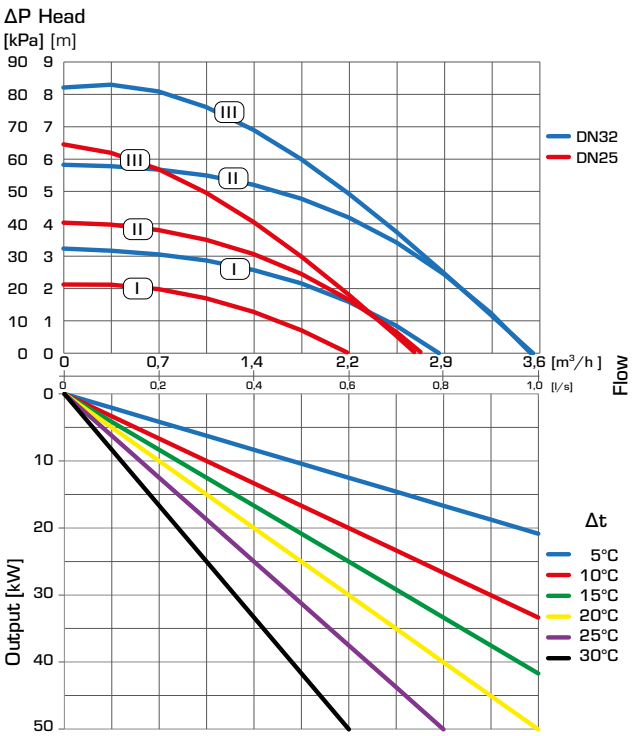
SERIES GRA211 – Constant differential pressure, Wilo pump



SERIES GRA211 – Variable differential pressure, Wilo pump



SERIES GRA211 – Constant speed, Wilo pump



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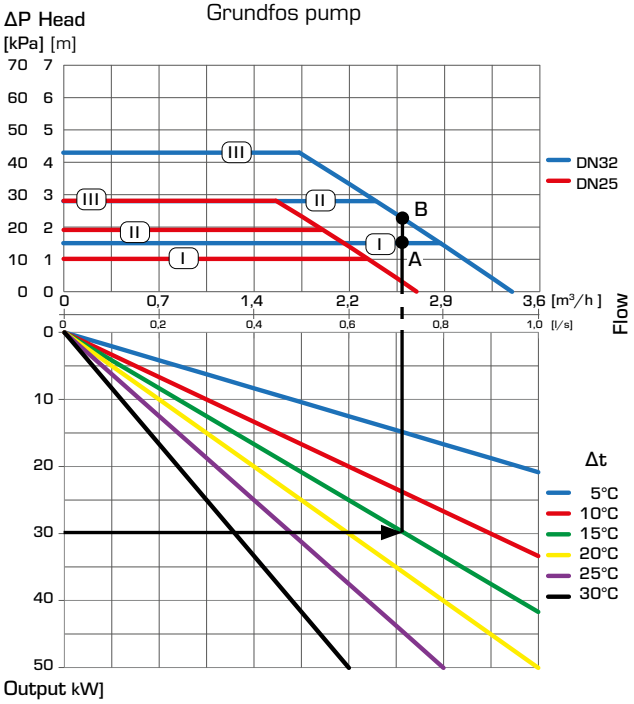
CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

DIMENSIONING, PUMP CAPACITY DIAGRAM

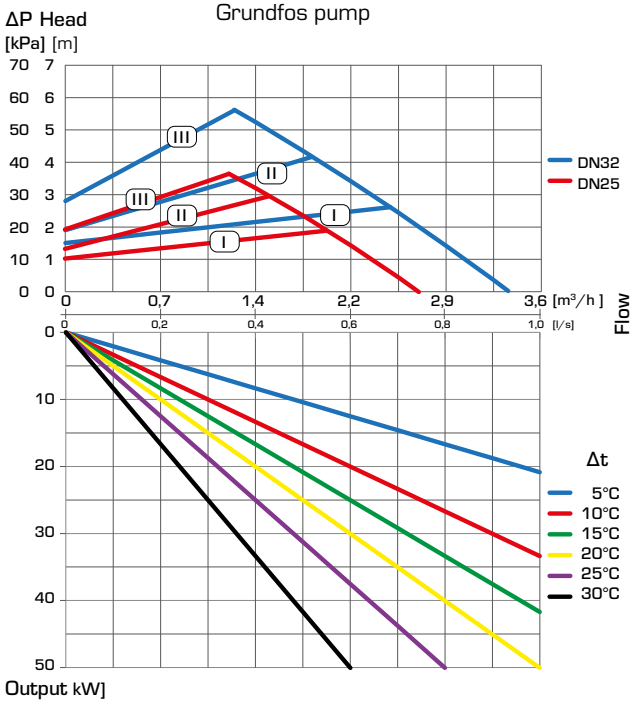
Example: Start with the heat demand of the heating circuit (e.g. 30 kW) and move horizontally to the right in the diagram to the Δt = 15°C (temperature difference between flow and return of the heating circuit). Next go up and find the possible duty points.

Setting I gives duty point A with a residual head of 15 kPa for DN32. Setting II and III gives duty point B with a residual head of 23 kPa for DN32.

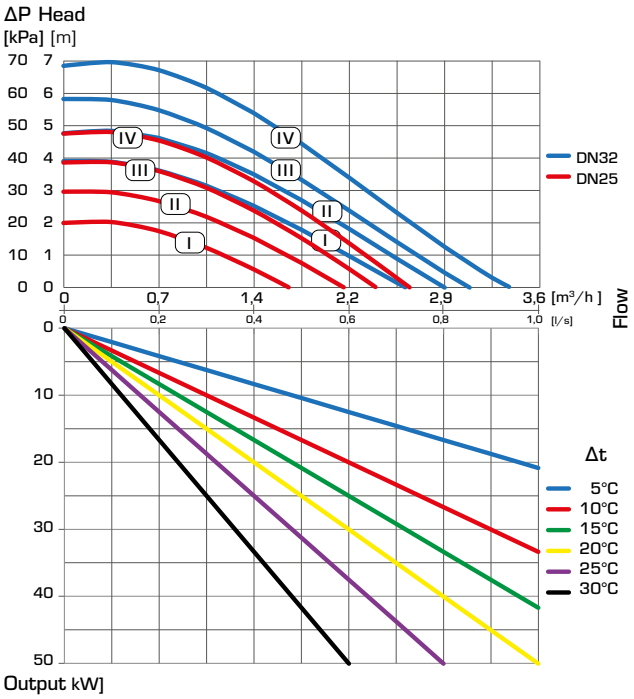
SERIES GRA212 – Constant differential pressure, Grundfos pump



SERIES GRA212 – Variable differential pressure, Grundfos pump



SERIES GRA212 – Constant speed, Grundfos pump



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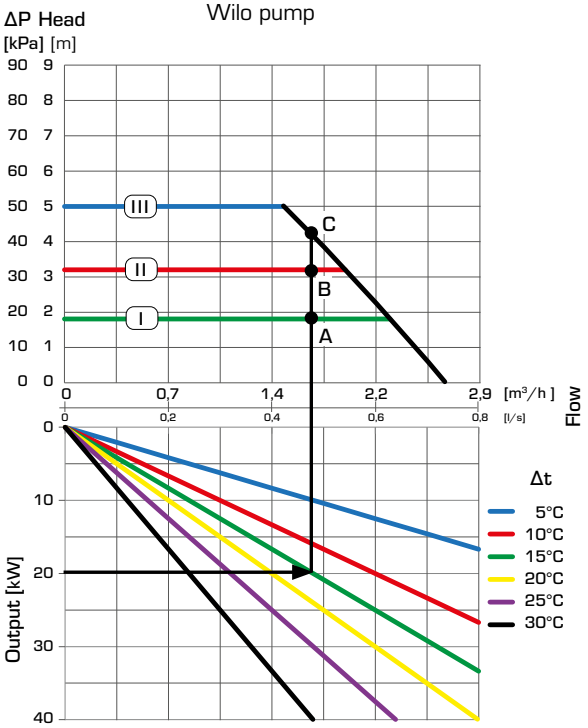
CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

DIMENSIONING, PUMP CAPACITY DIAGRAM

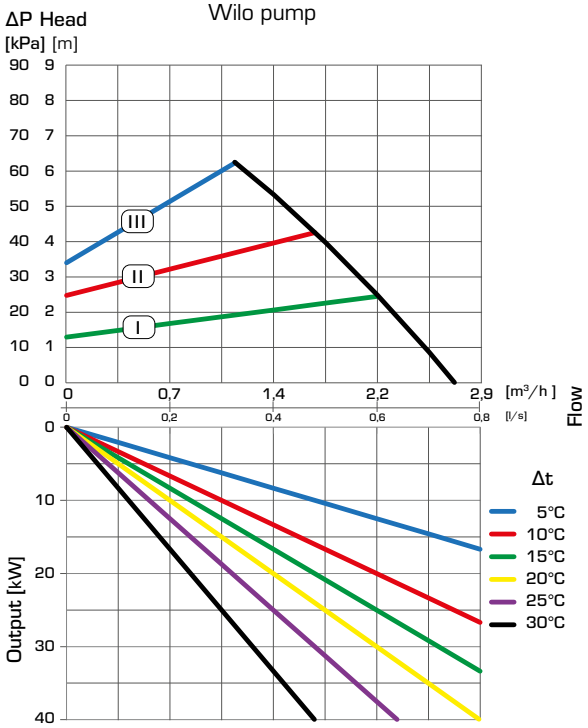
Example: Start with the heat demand of the heating circuit (e.g. 20 kW) and move horizontally to the right in the diagram to the choosen Δt, which is the temperature difference between flow and return of the heating circuit (e.g. 15°C). Next go up and find the possible duty points.

Setting I gives duty point A with a residual head of 18 kPa. Setting II gives duty point B with a residual head of 32 kPA and III gives duty point C with a residual head of 43 kPa.

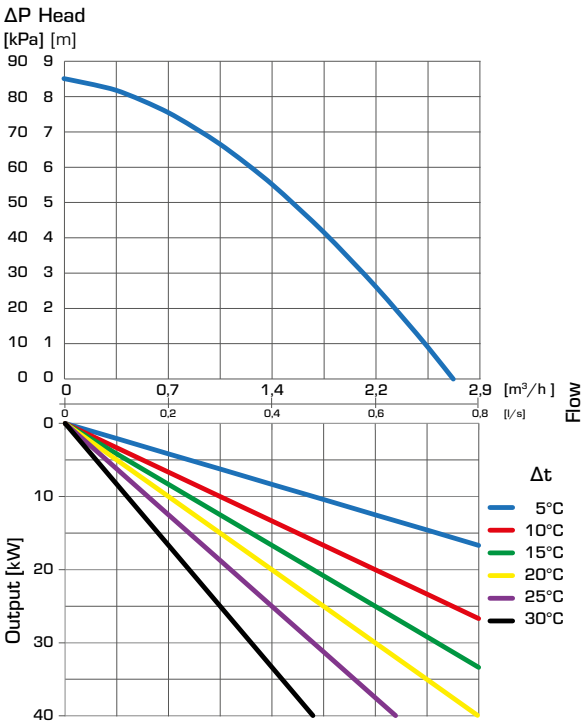
SERIES GRA311 – Constant differential pressure, Wilo pump



SERIES GRA311 – Variable differential pressure, Wilo pump



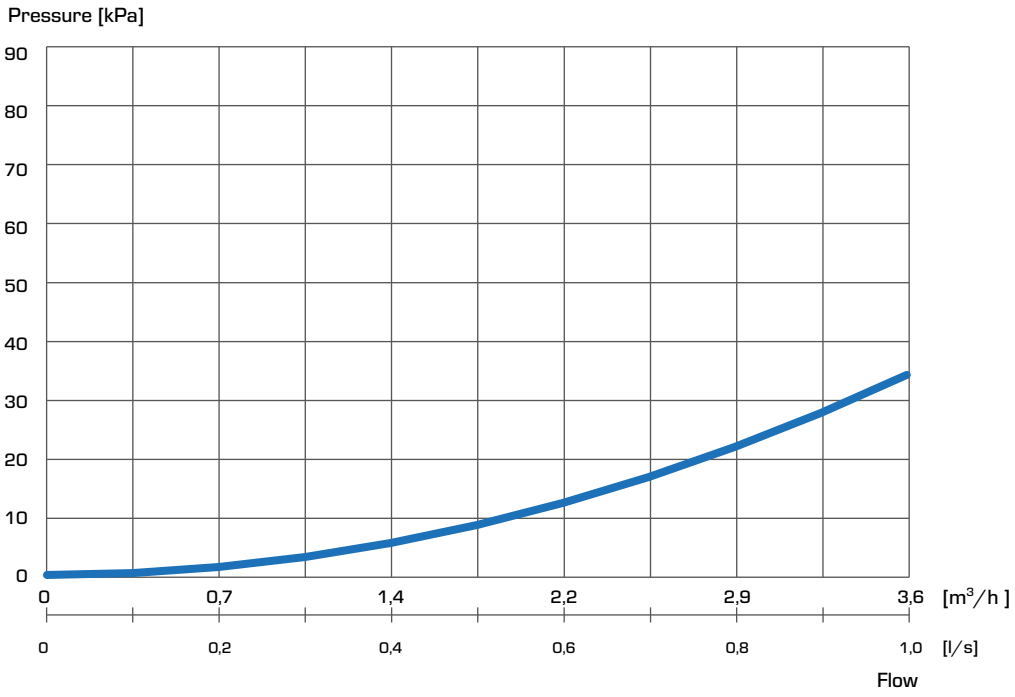
SERIES GRA311 – Ext iPWM 1/ iPWM 2, Wilo pump



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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

DIMENSIONING, CIRCULATION UNIT CHARACTERISTICS - PRESSURE LOSSES GRF1X1

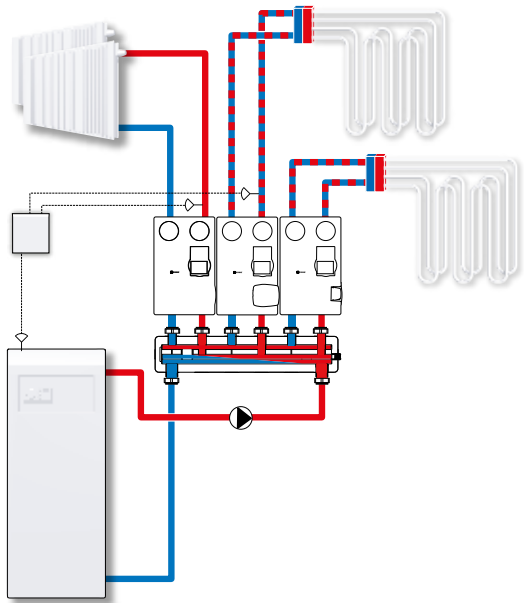


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CIRCULATION UNIT
MIXING FUNCTION, SERIES GRxX00

INSTALLATION EXAMPLES

1



The primary function of the motorized mixing unit (GRx) is flow temperature control, mixing function. The Series GRx are used in heating systems with controllers. The motorized mixing units need an external controller which will measure the flow temperature and control the actuator according to the system needs. The circulation units series GRx are the perfect choice for applications where mixing function is required, and the temperature comfort is set by an external controller.

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.

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