

SOLAR THERMAL | HEATING
ACCESSORIES | BUILDING MANAGEMENT
VISUALISATION
MADE IN GERMANY



Our products

Perfectly matched...



The RESOL product portfolio encompasses solar thermal, DHW and heating controllers, pump stations, accessories, apps for visualisation and monitoring as well as the VBus.net Internet portal. Whether you're looking for a reliable partner in developing innovative new solutions or a sophisticated product portfolio to tap into – you've come to the right place!

Discover our product portfolio:



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RESOL – Your partner in control technology

Steady

- 40 years of experience
- More than 100 employees
- More than 20 distributors and subsidiaries worldwide
- Our products control more than 3 million systems in over 60 countries



Flexible

- Adaption to your Corporate Design and target markets, even for the smallest batches
- Individual customisation of all our soft- and hardware is possible
- Pre-connected cables and sensors to suit your requirements
- Our product managers will support you in any question that may arise



High-class products

- All products are tested in our in-house EMC and hydraulics laboratory
- Controls after each individual manufacturing step warrant a 100 % quality assurance
- ISO:9001 certification and many awards
- All processes under one roof – products 100 % Made in Germany



Your product – developed with us!
 Contact us, we will be glad to be there for you!










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Solar and system controllers

- 40 years of experience in the solar thermal and control technology field
- From simple differential temperature controllers up to controllers for solar thermal and combined systems
- Optimum collaboration of solar, arrangement and heating system parts
- Different energy-saving and efficiency-boosting functions
- Many pre-programmed optional functions from bypass to zone loading
- Data logging, storing and firmware updates via SD memory card

Survey of solar controllers: Hardware

	SIMPLE SOLAR CONTROLLERS						
							
	DeltaSol® A/AX/AX HE	DeltaSol® AL E HE	DeltaSol® CS/2, CS/4	DeltaSol® BS/2, BS/4	DeltaSol® SLL	DeltaSol® CS Plus	DeltaSol® BS Plus
Max. number of collector fields	1	1	1	1	2 ¹	2 ¹	2 ¹
Max. number of stores	1	1	1	1	2 ¹	2 ¹	2 ¹
Weather-compensated heating circuits	-	-	-	-	-	-	-
External heat exchanger	-	-	-	-	-	-	-
Speed control of standard pumps	-	✓	✓	✓	✓	✓	✓
Speed control of HE pumps	✓ [AX HE]	✓	✓	-	✓	✓	-
■ via integrated PWM output	✓ [AX HE]	✓	✓	-	✓	✓	-
■ via PSW adapter	-	-	-	✓	-	-	✓
Hardware							
Temperature sensor inputs	2	4	4	4	4	4	4
Sensor type	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000, Pt500, KTY	Pt1000	Pt1000
Inputs for Grundfos Direct Sensors™	-	digital	digital	-	-	digital	-
Input for CS10 irradiation sensor	-	-	-	-	-	-	-
Impulse inputs for V40 flowmeter	-	-	-	-	1	-	-
Relay outputs in total	1	3	1 [CS/2], 2 [CS/4]	1 [BS/2], 2 [BS/4]	3	2	2
■ semiconductor relays (speed control)	-	1	1 (1) [CS/2], 2 (1) [CS/4]	1 (1) [BS/2], 2 (1) [BS/4]	2 (2)	2 (2)	2 (2)
■ electromechanical relay	1	-	-	-	-	-	-
■ potential-free relay with changeover contact	-	-	-	-	-	-	-
■ potential-free relay with normally open contact	-	-	-	-	1	-	-
■ potential-free high-current relay	-	2	-	-	-	-	-
PWM outputs	1 [AX HE]	1	1	-	2	2	-
■ convertible to 0-10V	-	-	-	-	-	-	-
Real-time clock	-	✓	✓ [CS/4]	✓ [BS/4]	✓	✓	✓
Data interface	-	VBus®	VBus®	VBus®	VBus®	VBus®	VBus®
Energy-efficient SMPS	✓ [AX HE]	✓	✓	✓	✓	✓	✓
Power supply	220 ... 240V~/115V~/100 ... 240V~ [AX HE]	100 ... 240V~	100 ... 240V~	100 ... 240V~	100 ... 240V~	100 ... 240V~	100 ... 240V~

¹ system-dependent

³ via convertible impulse inputs

² via EM Extension module(s) in total



CONTROLLERS FOR SOLAR THERMAL & COMBINED SYSTEMS

SYSTEM CONTROLLERS



DeltaSol® SL

DeltaSol® BX L

DeltaSol® BX

DeltaSol® SLT

DeltaSol® BX Plus

DeltaSol® MX

2

2

2

2

2¹

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3

2

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4 (5³)

5

5

4 (5³)

8 (9³)

12 (15³)

Pt1000, Pt500, KTY

Pt1000

Pt1000

Pt1000, Pt500, KTY

Pt1000, Pt500, KTY

Pt1000, Pt500, KTY

analogue

-

analogue

analogue

digital

analogue, digital

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14

3 (3)

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4 (4)

13 (13)

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VBus®, MicroSD card

VBus®, SD card

VBus®, SD card

VBus®, MicroSD card,
LAN (optional)

VBus®, SD card

VBus®, SD card

✓

✓

✓

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✓

✓

100 ... 240 V~

100 ... 240 V~








100 ... 240 V~

100 ... 240 V~

100 ... 240 V~

100 ... 240 V~

Survey of solar controllers: Software

	SIMPLE SOLAR CONTROLLERS						
							
	DeltaSol® A/AX/AX HE	DeltaSol® AL E HE	DeltaSol® CS2,CS/4	DeltaSol® BS2,BS/4	DeltaSol® SLL	DeltaSol® CS Plus	DeltaSol® BS Plus
Heat quantity measurement							
■ with flowmeter	-	✓	✓	✓	✓	✓ ¹	✓ ¹
■ with V40 flowmeter	-	-	-	-	✓	-	-
■ with Grundfos Direct Sensors™	-	VFD	VFD	-	-	VFD	-
Software functions							
Antifreeze function for solar circuit	✓	✓	✓	✓	✓	✓	✓
Collector minimum limitation	✓ ¹ [AX/AX HE]	✓	✓	✓	✓	✓	✓
Collector emergency shutdown	-	✓	✓	✓	✓	✓	✓
Store maximum limitation	✓ ¹ [AX/AX HE]	✓	✓	✓	✓	✓	✓
Store set temperature	-	-	-	-	✓	-	-
Store emergency shutdown	✓ [AX HE]	✓	✓	✓	✓	✓	✓
Drainback option	-	✓	✓ ¹	✓ ¹	✓ ¹	✓ ¹	✓ ¹
Tube collector function	-	✓	✓ [CS/4]	✓ [BS/4]	✓	✓	✓
■ with adjustable time frame, interval	-	✓	✓ [CS/4]	✓ [BS/4]	✓	✓	✓
Additional ΔT control	-	-	-	-	✓	✓ ¹	✓ ¹
Thermostat function	-	✓	✓ ¹ [CS/4]	✓ ¹ [BS/4]	✓ ¹	✓ ¹	✓ ¹
Target temperature	-	-	-	-	-	-	-
Heat dump function	-	-	✓ ¹ [CS/4]	✓ ¹ [BS/4]	✓ ¹	✓ ¹	✓ ¹
Heat exchange	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
Store loading in layers	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
Priority loading	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
■ Parallel loading	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
■ Store sequence control	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
■ Progressive loading	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
■ Successive loading	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
■ Spreaded loading	-	-	-	-	✓ ¹	✓ ¹	✓ ¹

¹ system-dependent



CONTROLLERS FOR SOLAR THERMAL & COMBINED SYSTEMS

SYSTEM CONTROLLERS



DeltaSol® SL



DeltaSol® BX L



DeltaSol® BX



DeltaSol® SLT



DeltaSol® BX Plus



DeltaSol® MX

✓

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Survey of solar controllers: Software

	SIMPLE SOLAR CONTROLLERS						
							
	DeltaSol® A/AX/AX HE	DeltaSol® AL E HE	DeltaSol® CS/2, CS/4	DeltaSol® BS/2, BS/4	DeltaSol® SLL	DeltaSol® CS Plus	DeltaSol® BS Plus
Software functions							
Solar circuit bypass	-	-	-	-	-	-	-
Irradiation-dependent bypass	-	-	-	-	-	-	-
Irradiation switch	-	-	-	-	-	-	-
Backup heating suppression	-	✓	-	-	✓	-	-
Parallel relay	-	-	-	-	solar	-	-
Twin pump for solar circuit	-	-	-	-	-	-	-
Cooling functions and cooling mode	-	✓	✓	✓	✓	✓	✓
Flow rate monitoring	-	-	-	-	-	-	-
Pressure monitoring	-	-	-	-	-	-	-
Function control	-	✓	✓	✓	✓ VDI 2169	✓	✓
Error relay	-	-	-	-	-	-	-
DHW hygiene functions	-	✓	✓ ¹ [CS/4]	✓	✓	✓ ¹	✓
■ DVGW legionella protection	-	-	-	-	-	-	-
■ Thermal disinfection	-	✓	✓ ¹ [CS/4]	✓ ¹ [BS/4]	✓	✓ ¹	✓ ¹
DHW heating	-	✓	✓ ¹ [CS/4]	✓ ¹ [BS/4]	✓	✓ ¹	✓ ¹
Heating circuit return preheating	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
Boiler loading/ Zone loading	-	-	-	-	-	-	-
Solid fuel boiler	-	-	-	-	✓ ¹	✓ ¹	✓ ¹
Mixer control weather-compensated	-	-	-	-	-	-	-
Mixer control with target temperature	-	-	-	-	-	-	-
Circulation	-	-	-	-	-	-	-
Function block	-	-	-	-	-	-	-
Heating circuit antifreeze function	-	-	-	-	-	-	-
Chimney sweeper function for the heating circuit	-	-	-	-	-	-	-
Room thermostats	-	-	-	-	-	-	-

¹ system-dependent

² via EM Extension module(s)



CONTROLLERS FOR SOLAR THERMAL & COMBINED SYSTEMS

SYSTEM CONTROLLERS



DeltaSol® SL

DeltaSol® BX L

DeltaSol® BX



DeltaSol® SLT

DeltaSol® BX Plus

DeltaSol® MX

-	-	-	✓	✓	✓
-	-	-	-	✓	✓
-	-	-	-	✓	✓
✓	-	-	✓	✓	✓
solar	solar	solar	solar, freely selectable	solar, freely selectable	solar, freely selectable
-	-	-	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	-	✓	✓	✓	✓
✓	-	✓	✓	✓	✓
✓ VDI 2169	✓	✓	✓ VDI 2169	✓ VDI 2169	✓
-	-	-	✓	✓	✓
✓	✓	✓	✓	✓	✓
-	-	-	-	-	-
✓	✓ ¹	✓ ¹	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	-	✓ ¹	✓	✓	✓
-	-	-	✓	✓	✓
✓	-	✓ ¹	✓	✓	✓
-	-	-	-	✓ ²	✓
-	-	-	✓	✓	✓
-	-	-	✓	✓	✓
-	-	-	✓	✓	✓
-	-	-	✓	✓	✓
-	-	-	-	✓ ²	✓
-	-	-	-	✓ ²	✓
-	-	-	-	✓ ²	✓



rosenthal design 



Differential temperature controller for solar, heating & air conditioning systems

- Adjustable temperature difference 2 ... 16 K, hysteresis 1.6 K
- Antifreeze function adjustable by jumper / DIP switch
- Maximum or minimum temperature limitations adjustable by DIP switches (*DeltaSol*[®] AX/AX HE)
- Protection against dripping water
- Speed control of a high-efficiency pump with adjustable minimum speed (*DeltaSol*[®] AX HE)

Manuals available:



DeltaSol[®] A series

The *DeltaSol*[®] A, *DeltaSol*[®] AX and *DeltaSol*[®] AX HE controllers are the simplest solution for all differential controls. The version *DeltaSol*[®] A is equipped with an adjustable temperature difference and an antifreeze function.

The *DeltaSol*[®] AX presents an extended version which is additionally equipped with an adjustable target temperature for minimum or maximum temperature limitation.

Equipped with an electromechanical relay and a PWM output, the *DeltaSol*[®] AX HE controller manages the speed control of a high-efficiency pump.

The enclosed silicone sealing cord guarantees a protection against dripping water.

Customised and OEM versions are available on request. Please contact our sales team.

RESOL *DeltaSol*[®] A

Price bracket A | Article no.: **115 211 23**

RESOL *DeltaSol*[®] A – Full kit

Incl. 2 Pt1000 sensors (1 x FKP6, 1 x FRP6)

Price bracket A | Article no.: **115 211 33**

Also available as 12V~ and 115V~ versions!

As above, but with minimum or maximum temperature limitation:

RESOL *DeltaSol*[®] AX

Price bracket A | Article no.: **115 211 73**

RESOL *DeltaSol*[®] AX – Full kit

Incl. 2 Pt1000 sensors (1 x FKP6, 1 x FRP6)

Price bracket A | Article no.: **115 211 83**

Also available as 12V~, 12V=, 24V= and 115V~ versions!

As above, but with a PWM output for speed control of a high-efficiency pump:

RESOL *DeltaSol*[®] AX HE

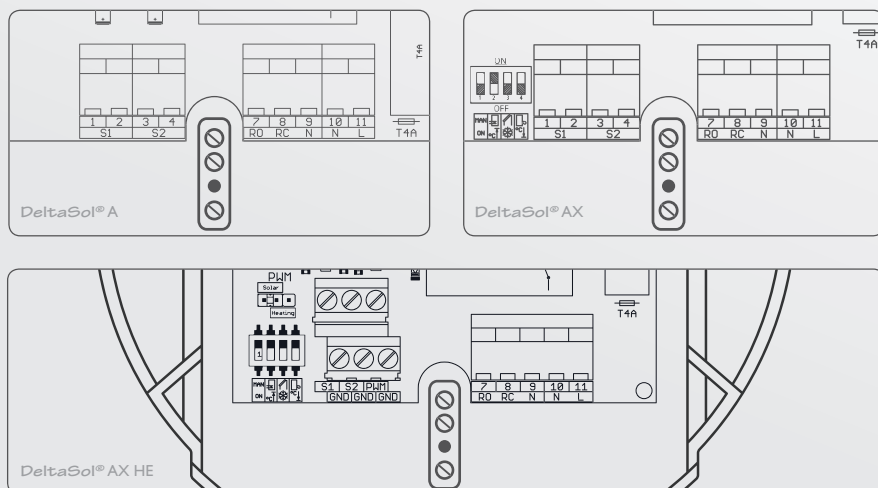
Price bracket A | Article no.: **115 213 43**

RESOL *DeltaSol*[®] AX HE – Full kit

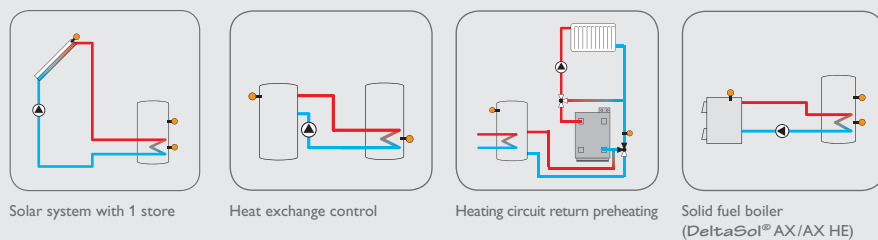
Incl. 2 Pt1000 sensors (1 x FKP6, 1 x FRP6)

Price bracket A | Article no.: **115 213 53**

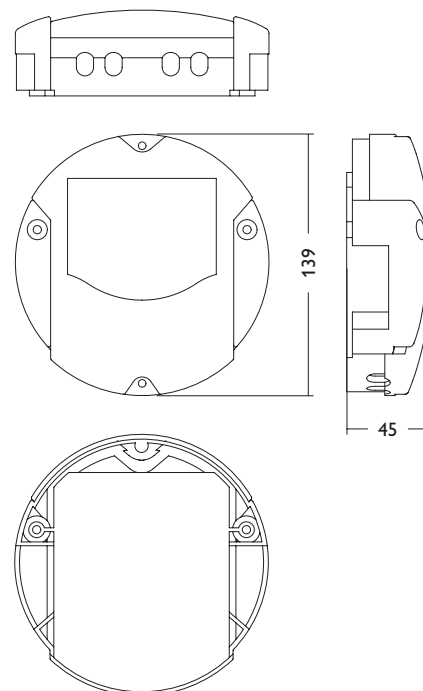
ELECTRICAL CONNECTION



EXAMPLES



TECHNICAL DATA



- Inputs:** 2 Pt1000 temperature sensors
- Outputs:** 1 electromechanical relay (changeover), 1 PWM output (*DeltaSol*[®] AX HE)
- PWM frequency:** 1000 Hz (*DeltaSol*[®] AX HE)
- PWM voltage:** 11.0 V (*DeltaSol*[®] AX HE)
- Switching capacity:**
4 (1) A 240 V~ (electromechanical relay)
- Total switching capacity:** 4 A 240 V~
- Power supply:** 220 ... 240 V~ (50 ... 60 Hz), 100 ... 240 V~ (50 ... 60 Hz) (*DeltaSol*[®] AX HE)
- Supply connection:** type Y attachment
- Standby:** 1.35 W (*DeltaSol*[®] A), 1.36 W (*DeltaSol*[®] AX), 0.39 W (*DeltaSol*[®] AX HE)
- Mode of operation:** type 1.B action
- Rated impulse voltage:** 2.5 kV
- Functions:** antifreeze function, *DeltaSol*[®] AX/AX HE additionally with maximum or minimum temperature limitation
- Housing:** plastic, PC-ABS and PMMA
- Mounting:** wall mounting
- Indication / Display:** 1 operating control LED
- Operation:** 1 potentiometre and 1 jumper (*DeltaSol*[®] A), 2 potentiometres and 4 DIP switches (*DeltaSol*[®] AX), 3 potentiometres, 4 DIP switches and 1 jumper (*DeltaSol*[®] AX HE)
- Ingress protection:** IP 20 / EN 60529 (with IP 22 seal)
- Protection class:** II
- Ambient temperature:** 0 ... 40 °C
- Pollution degree:** 2
- Dimensions:** Ø 139 mm, depth 45 mm

ACCESSORIES

HR230 Auxiliary relay



Single-phase, suitable for all RESOL controllers (see page 50)

Price bracket A | Article no.:
280 002 60

HRG2 Housing



For up to 2 HR230 Auxiliary relays (see page 50)

Price bracket A | Article no.:
280 003 10

HR230/3 Auxiliary relay



Three-phase, suitable for all RESOL controllers (see page 50)

Price bracket A | Article no.:
280 033 50

HRG3 Housing



For 1 HR230/3 Auxiliary relay (see page 50)

Price bracket A | Article no.:
280 033 60

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.:
180 110 70



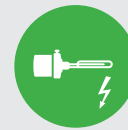
DeltaSol® AL E HE

The DeltaSol® AL E HE controller is especially designed for standard solar systems with a high-efficiency pump and an electric backup heating.

It is equipped with a PWM output and two high-current relays to which an electric immersion heater of up to 3 kW (230 V~) can be connected. The heater can be directly connected to the controller without the need of auxiliary relays.

For data communication, the controller has a RESOL VBus®.

Customised and OEM versions are available on request. Please contact our sales team.



For electric immersion heaters!



The simple solution for your DHW supply!

- Direct connection of an electric immersion heater up to 3 kW (230V~)
- DHW heating with rapid heat-up and thermal disinfection
- Time and temperature control of the electric backup heating
- Solar backup heating suppression
- Heat quantity measurement via VFD Grundfos Direct Sensor™
- PWM output for the speed control of a high-efficiency pump
- Quick access to the holiday and the manual modes
- Status display for a bidirectional HE pump
- Drainback option and tube collector function
- Commissioning menu

RESOL DeltaSol® AL E HE

Price bracket A | Article no.: **115 325 93**

RESOL DeltaSol® AL E HE – Full kit

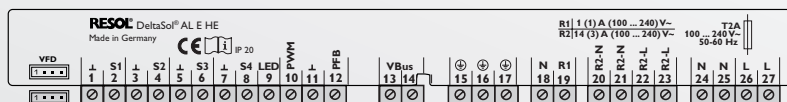
Incl. 3 Pt1000 sensors (1 x FKP6, 2 x FRP6)

Price bracket A | Article no.: **115 326 03**

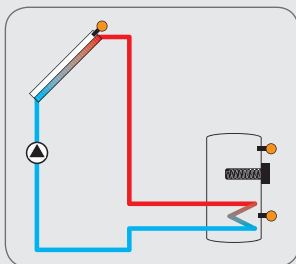
Manuals available:



ELECTRICAL CONNECTION

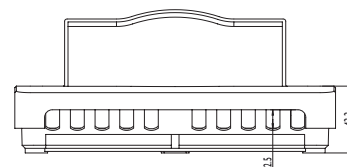
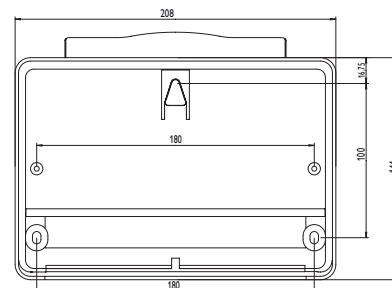
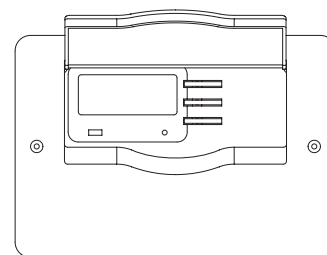


EXAMPLE



Solar system with electric backup heating (application example)

TECHNICAL DATA



Inputs:

for 4 Pt1000 temperature sensors, thereof 1 x RCTT, 1 x Grundfos Direct Sensor™ VFD, 1 x PWM feedback

Outputs: 1 semiconductor relay, 2 high-current relays for electric immersion heater, 1 PWM output

PWM frequency: 512 Hz

PWM voltage: 10 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

14 (3) A 240 V~/24 V== (potential-free high-current relay)

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.67 W

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

VBus® current supply: 35 mA

Functions: function control, operating hours counter, tube collector function, heat quantity measurement, time-controlled thermostat function, DHW heating with rapid heat-up, thermal disinfection, holiday mode and backup heating suppression

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: System-Monitoring-Display for system visualisation, 16-segment display, 7-segment display, 8 symbols for system states, background illumination and operating control LED

Operation: 3 push buttons and 1 slide switch

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 144 x 208 x 43 mm

ACCESSORIES

RESOL KM2 Communication module



Incl. RESOL service CD, network cable and mains adapter; VBus® cable pre-connected (see page 66)

Price bracket A | Article no.: **180 012 10**

RESOL SD3 Smart Display



Display module with 3 displays for collector and store temperature as well as for heat quantity (see page 70)

Price bracket A | Article no.: **180 004 90**

VFD Grundfos Direct Sensor™



Digital sensors in different versions (see page 90)

RESOL AM1



Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

RESOL RCTT Remote control



Activating the rapid heat-up function without accessing the controller menu (see page 81)

Price bracket A | Article no.: **136 000 60**

For a survey of accessories see page 48!

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® CS series

The controllers of the *DeltaSol*® CS series are used for speed control of a HE pump in small standard solar thermal and heating systems.

They are equipped with up to 2 PWM outputs as well as with an input for a VFD Grundfos Direct Sensor™ which enables precise heat quantity measurement. The commissioning menu ensures an easy and quick configuration.

The *DeltaSol*® CS series is available in 4 versions, depending on the demands. Details concerning the number of the relays as well as additional functions are shown in the technical data.

Customised and OEM versions are available on request. Please contact our sales team.



HE pump control



VBus.net



RPT

High-efficiency even for small systems!

DeltaSol® CS series

- 1 input for a VFD Grundfos Direct Sensor™
- Heat quantity measurement
- Commissioning menu
- Drainback option

DeltaSol® CS/4, CS Plus

- 3 basic system layouts (*DeltaSol*® CS/4), 10 basic system layouts (*DeltaSol*® CS Plus) to choose from
- Tube collector function, thermal disinfection function

RESOL *DeltaSol*® CS

Price bracket A | Article no. CS/2: **115 004 73**

Price bracket A | Article no. CS/4: **115 004 53**

RESOL *DeltaSol*® CS – Full kit

Incl. 3 Pt1000 sensors (1 x FKP6, 2 x FRP6)

Price bracket A | Article no. CS/2: **115 004 63**

Price bracket A | Article no. CS/4: **115 004 43**

RESOL *DeltaSol*® CS Plus

Price bracket A | Article no.: **115 003 13**

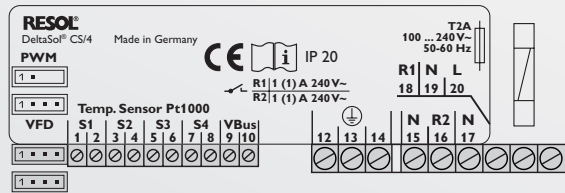
RESOL *DeltaSol*® CS Plus – Full kit

Incl. 4 Pt1000 sensors (2 x FKP6, 2 x FRP6)

Price bracket A | Article no.: **115 003 03**

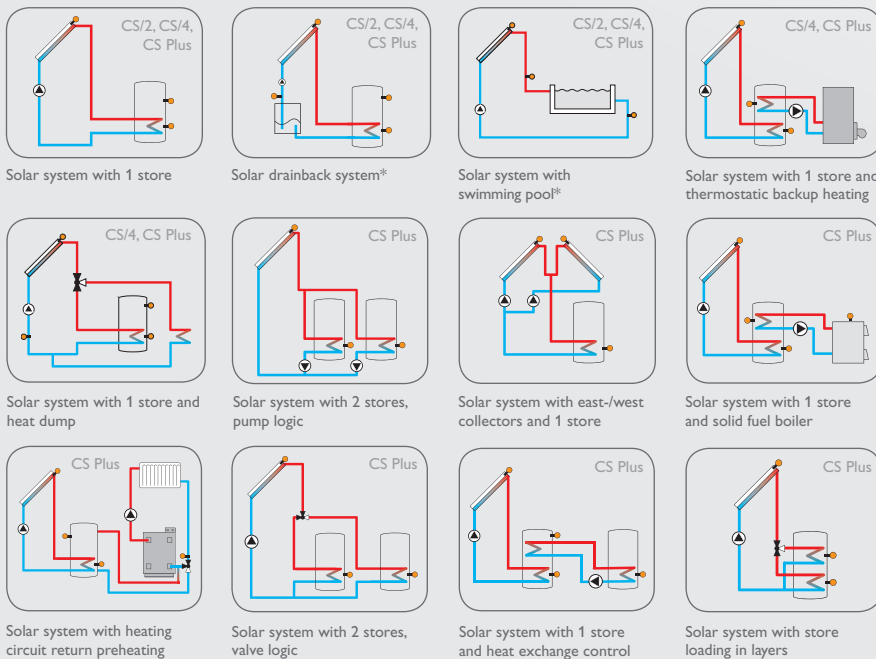
A PWM adapter cable is included with the controller. For our range of Grundfos Direct Sensors™ see page 90!

ELECTRICAL CONNECTION



Example DeltaSol® CS/4

EXAMPLES



* Application examples

ACCESSORIES

RESOL Moisture-proof housing (IP 66/67)



Moisture-proof housing for controller installation outdoors or in highly humid locations (without controller)

Price bracket B | Article no.: **290 028 70**

VFD Grundfos Direct Sensor™



Digital sensors in different versions (see page 90)

RESOL KM2 Communication module



Incl. RESOL service CD, network cable and mains adapter, VBus® cable pre-connected (see page 66)

Price bracket A | Article no.: **180 012 10**

RESOL AM1



Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

RESOL VBus®/USB interface adapter



PC connection kit for RESOL controllers with VBus® incl. Service CD (see page 69)

Price bracket B | Article no.: **180 008 50**

RESOL SP10

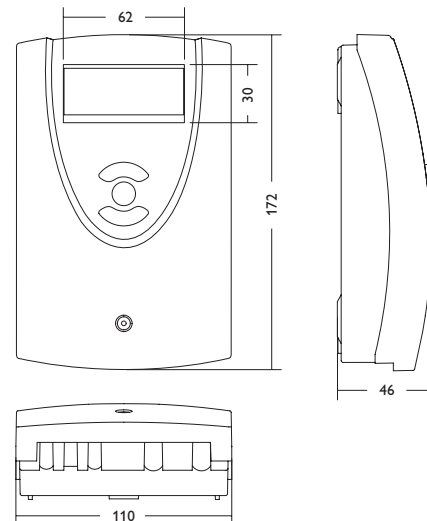


Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 4 Pt1000 temperature sensors, 1 VFD Grundfos Direct Sensor™

Outputs: 1 semiconductor relay, 1 PWM output (CS/2), 2 semiconductor relays, 1 PWM output (CS/4), 2 semiconductor relays, 2 PWM outputs (CS Plus)

PWM frequency: 512 Hz

PWM voltage: 10.5 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

Total switching capacity:

1 A 240 V~ (CS/2)

2 A 240 V~ (CS/4, CS Plus)

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.57 W (CS/2), 0.59 W (CS/4), 0.59 W (CS Plus)

Temperature controls class:

I (CS/4, CS Plus)

Energy efficiency contribution:

1 % (CS/4, CS Plus)

Mode of operation: type 1.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

VBus® current supply: 35 mA

Functions: tube collector function and thermostat function (CS/4, CS Plus), function control, operating hours counter; speed control, drainback option and heat quantity measurement

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: System-Monitoring-Display for system visualisation, 16-segment and 7-segment display, 8 symbols for indication of system status

Operation: 3 push buttons

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 172 x 110 x 46 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® BS series

The RESOL controllers for standard solar thermal systems. The DeltaSol® BS series provides a clear operating concept.

The intuitive commissioning menu leads you through the initial configuration in only a few steps.

The system selected is shown on the display, the status of the individual components is indicated by means of flashing codes.

The DeltaSol® BS series is available in 3 versions, depending on the demands. Details concerning the number of the relays as well as additional functions are shown in the technical data.

Customised and OEM versions are available on request. Please contact our sales team.



cTUVus
certified!*



User-friendly and versatile!

DeltaSol® BS series

- Drainback option
- Heat quantity measurement
- Function control
- Commissioning menu
- Unit °C and °F selectable
- HE pump control via adapter

DeltaSol® BS/4, BS Plus

- 3 basic system layouts (DeltaSol® BS/4), 10 basic system layouts (DeltaSol® BS Plus) to choose from
- Tube collector function, thermal disinfection function, time-controlled thermostat function

RESOL DeltaSol® BS

Price bracket A | Article no. BS/2: **115 412 33**
Price bracket A | Article no. BS/4: **115 425 13**

RESOL DeltaSol® BS – Full kit

Incl. 3 Pt1000 sensors (1 x FKP6, 2 x FRP6)
Price bracket A | Article no. BS/2: **115 412 43**
Price bracket A | Article no. BS/4: **115 425 23**

RESOL DeltaSol® BS Plus

Price bracket A | Article no.: **115 422 03**

RESOL DeltaSol® BS Plus – Full kit

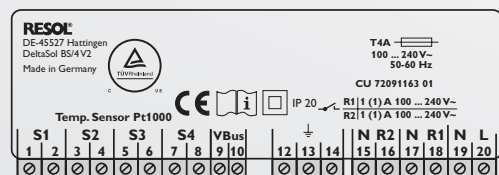
Incl. 4 Pt1000 sensors (2 x FKP6, 2 x FRP6)
Price bracket A | Article no.: **115 422 13**



Visit www.resol.de/videos for a product video about this controller

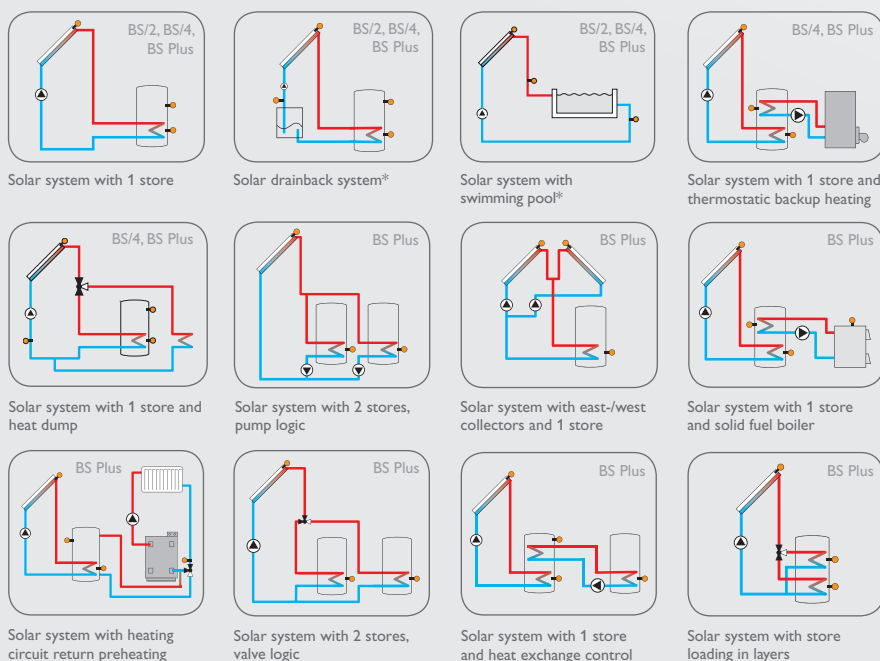
* The cTUVus certification confirms that the controller is certified to UL 60730-1:2009 and CSA B60730.1:2002.

ELECTRICAL CONNECTION



Example DeltaSol® BS/4

EXAMPLES



* Application examples

ACCESSORIES

RESOL Moisture-proof housing (IP 66/67)


Moisture-proof housing for controller installation outdoors or in highly humid locations (without controller)

Price bracket B | Article no.: **290 028 70**

RESOL PSW Basic


Pump signal converter (see page 77)

Price bracket B | Article no.: **180 010 50**

RESOL SP10


Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

Auxiliary relay HR230


Single-phase, suitable for all RESOL controllers (see page 50)

Price bracket A | Article no.: **280 002 60**

RESOL VBus®/USB interface adapter


PC connection kit for RESOL controllers with VBus® incl. Service CD (see page 69)

Price bracket B | Article no.: **180 008 50**

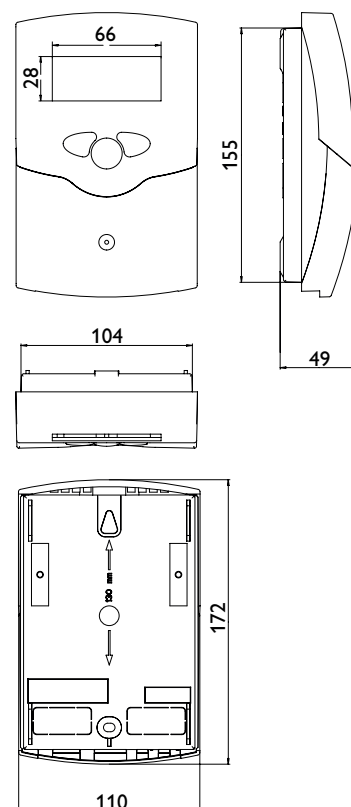
RESOL SD3 Smart Display


Display module for the living area with 3 displays for collector and store temperature as well as for heat quantity (see page 70)

Price bracket A | Article no.: **180 004 90**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 4 Pt1000 temperature sensors

Outputs: 1 semiconductor relay (BS/2), 2 semiconductor relays (BS/4, BS Plus)

Switching capacity:
1 (1) A 240 V~ (semiconductor relay)

Total switching capacity:
1 A 240 V~ (BS/2),
2 A 240 V~ (BS/4, BS Plus)

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby:
0.45 W (BS/2), 0.74 W (BS/4), 0.38 W (BS Plus)

Temperature controls class: I (BS/4, BS Plus)

Energy efficiency contribution: 1% (BS/4, BS Plus)

Mode of operation: type 1.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

VBus® current supply: 35 mA

Functions: function control, operating hours counter, tube collector function (BS/4, BS Plus), heat quantity measurement and pump speed control

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: System-Monitoring-Display for system visualisation, 16-segment and 7-segment display, 8 symbols for indication of system status and operating control LED

Operation: 3 push buttons

Ingress protection: IP 20/EN 60529

Protection class: II

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 172 x 110 x 49 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® SLL

The RESOL DeltaSol® SLL is the smallest controller of the SL series. Its equipment is optimised for small and medium-sized solar thermal and heating systems, 10 pre-configured basic systems are available. The DeltaSol® SLL is also the first controller of its category to offer the automatic function control according to the VDI 2169 directive.

Additionally, it is equipped with a potential-free extra-low voltage relay for backup heating demand and a V40 flowmeter input for heat quantity measurement.



HE pump control



VBus.net



RPT

Versatile and easy to operate!

- Microbuttons for quick access to the manual mode and the holiday function
- 3 relay outputs (incl. 1 potential-free extra-low voltage relay)
- 4 inputs for Pt1000, Pt500 or KTY temperature sensors
- 1 V40 impulse input
- 2 PWM outputs for the speed control of high-efficiency pumps
- 10 basic system layouts to choose from
- Automatic function control according to VDI 2169

RESOL DeltaSol® SLL

Price bracket A | Article no.: **115 431 53**

RESOL DeltaSol® SLL – Full kit

Incl. 3 Pt1000 sensors (1 x FKP6, 2 x FRP6)

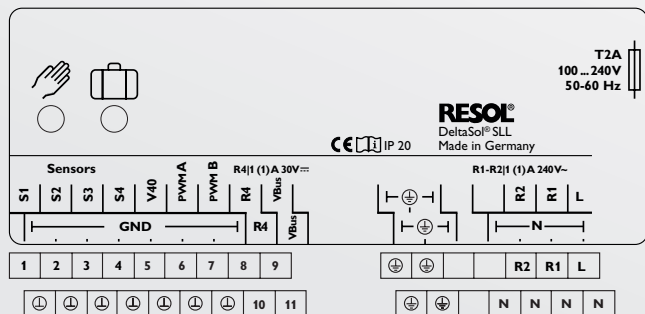
Price bracket A | Article no.: **115 431 63**

Customised and OEM versions are available on request. Please contact our sales team.

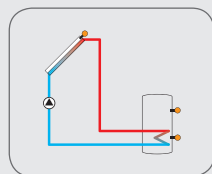
Manuals available:



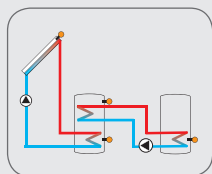
ELECTRICAL CONNECTION



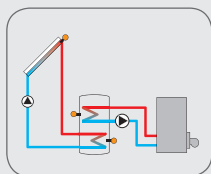
EXAMPLES



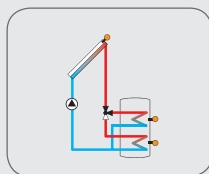
Solar system with 1 store



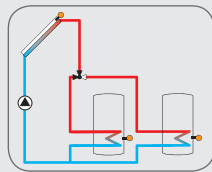
Solar system with 1 store and heat exchange control



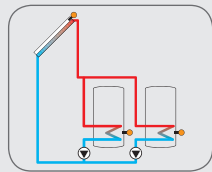
Solar system with 1 store and thermostatic backup heating



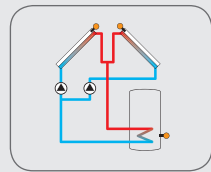
Solar system with store loading in layers



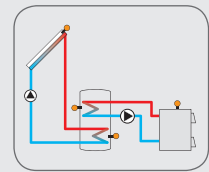
Solar system with 2 stores, valve logic



Solar system with 2 stores, pump logic



Solar system with east-/west collectors and 1 store



Solar system with 1 store and solid fuel boiler

ACCESSORIES

RESOL KM2 Communication module



Incl. RESOL service CD, network cable and mains adapter; VBus® cable pre-connected (see page 66)

Price bracket A | Article no.: **180 012 10**

RESOL V40



V40 flowmeter in different versions (see page 84)

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

RESOL AM1

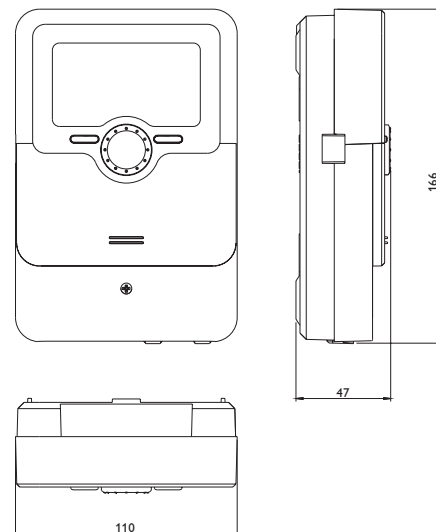


Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 4 inputs for Pt1000, Pt500 or KTY temperature sensors, 1 V40 impulse input

Outputs: 2 semiconductor relays, 1 potential-free extra-low voltage relay, 2 PWM outputs

PWM frequency: 1000 Hz

PWM voltage: 10.5 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

1 (1) A 30 V~ (potential-free relay)

Total switching capacity: 2 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.66 W

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

VBus® current supply: 60 mA

Functions: operating hours counter, tube collector function, thermostat function, pump speed control, heat quantity measurement, adjustable system parameters and optional functions (menu-driven), balance and diagnostics function, function control according to VDI 2169

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: System-Monitoring-Display for system visualisation, 16-segment-display, 8 symbols for indication of the system status, operating control LED (Lightwheel®)

Operation: 4 push buttons and 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 110 x 166 x 47 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® SL

With its versatile software, the RESOL DeltaSol® SL can control even complex systems easily and reliably. 27 pre-configured system layouts with up to 3 hydraulic variants each facilitate the commissioning and enable the adaptation to the individual system requirements.

The operation via 2 main buttons and 1 adjustment dial, the Lightwheel®, follows the well-known operating concept.

The manual mode and the holiday function can be activated by pressing a single button.



Modern design, many application possibilities!

- Integrated MicroSD card slot
- 4 relay outputs (incl. 1 potential-free extra-low voltage relay)
- 4 inputs for Pt1000, Pt500 or KTY temperature sensors
- Input for 1 analogue Grundfos Direct Sensor™
- 1 V40 impulse input (also usable as a Pt1000, Pt500 or KTY temperature sensor input)
- 2 PWM outputs for the speed control of high-efficiency pumps
- 27 basic system layouts with up to 3 hydraulic variants each to choose from
- Automatic function control according to VDI 2169

RESOL DeltaSol® SL

Price bracket A | Article no.: **115 003 33**

RESOL DeltaSol® SL – Full kit

Incl. 4 Pt1000 sensors (2 x FKP6, 2 x FRP6)

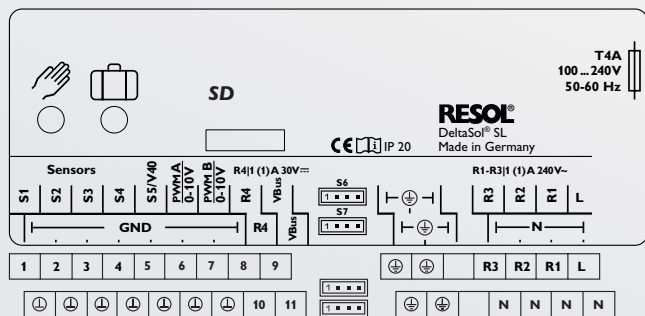
Price bracket A | Article no.: **115 003 43**

Customised and OEM versions are available on request. Please contact our sales team.

Manuals available:

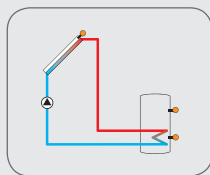


ELECTRICAL CONNECTION

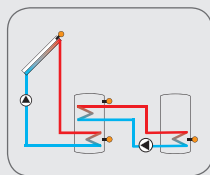


Sensor 6: Grundfos Direct Sensor™, Sensor 7: FlowRotor

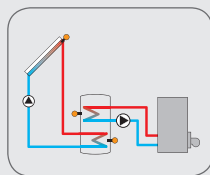
EXAMPLES



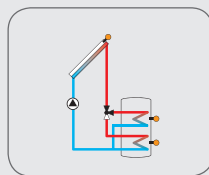
Solar system with 1 store



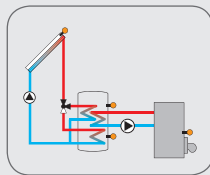
Solar system with 1 store and heat exchange control



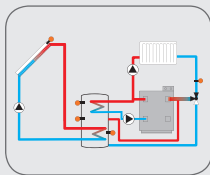
Solar system with 1 store and thermostatic backup heating



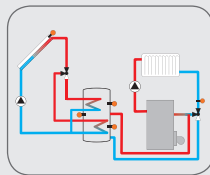
Solar system with store loading in layers



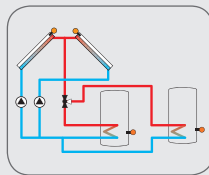
Solar system with store loading in layers and solid fuel boiler



Solar system with 1 store, heating circuit return preheating and thermostatic backup heating



Solar system with store loading in layers and heating circuit return preheating



Solar system with east-/west collectors and 2 stores (valve logic)

ACCESSORIES

RESOL DL2 Datalogger



For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected (see page 67)

Price bracket A | Article no.: **180 007 10**

MicroSD card



MicroSD card, 4 GB memory capacity, incl. adapter

Price bracket C | Article no.: **180 007 41**

VFS/RPS Grundfos Direct Sensor™



Analogue sensors in different versions (see page 90)

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

RESOL AM1

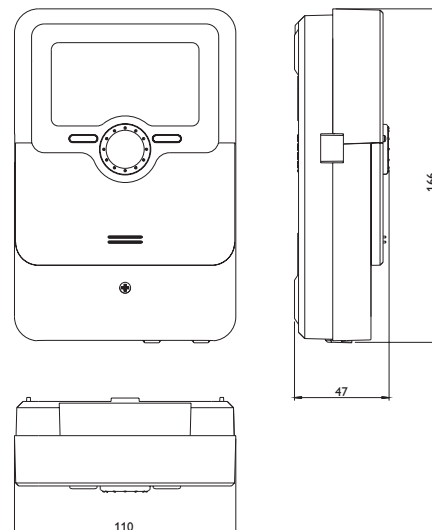


Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 4 inputs for Pt1000, Pt500 or KTY temperature sensors, 1 analogue Grundfos Direct Sensor™, 1 FlowRotor, 1 V40 impulse input (also usable as a Pt1000, Pt500 or KTY temperature sensor input)

Outputs: 3 semiconductor relays, 1 potential-free extra-low voltage relay, 2 PWM outputs (switchable to 0-10 V)

PWM frequency: 512 Hz

PWM voltage: 10.8 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

1 (1) A 30 V= (potential-free relay)

Total switching capacity: 3 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.69 W

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOLVBus®, MicroSD card slot

VBus® current supply: 60 mA

Functions: operating hours counter, tube collector function, thermostat function, pump speed control, heat quantity measurement, adjustable system parameters and optional functions (menu-driven), balance and diagnostics function, function control according to VDI 2169

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication / Display: System-Monitoring-Display for system visualisation, 16-segment-display, 8 symbols for indication of the system status, operating control LED (Lightwheel®)

Operation:

4 push buttons and 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20 / EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 110 x 166 x 47 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® BX/BX L

The DeltaSol® BX is equipped with 26 pre-programmed basic systems for a broad range of 1- and 2-store systems. Pre-defined functions facilitate system parameterisation.

The DeltaSol® BX L has been especially developed as an economical solution for multi-store solar thermal systems. It features pre-programmed system layouts for a range of 2- and 3-store systems and special functions such as an extended priority and loading logic.

With the integrated SD card slot, system data can easily be logged and transferred to a computer.

Customised and OEM versions are available on request. Please contact our sales team.



cTUVus
certified!*



Complex systems simply mastered!

- 4 relay outputs and 5 Pt1000 temperature sensor inputs
- 2 inputs for analogue Grundfos Direct Sensors™ (DeltaSol® BX)
- 2 PWM outputs for the speed control of high-efficiency pumps
- 26 basic systems to choose from (DeltaSol® BX), 9 basic systems (DeltaSol® BX L)
- For 2- and 3-store systems (DeltaSol® BX L)
- Drainback option (DeltaSol® BX)
- Thermal disinfection function, heat dump function
- Unit °C and °F selectable

RESOL DeltaSol® BX

Price bracket A | Article no.: **115 450 03**

RESOL DeltaSol® BX – Full kit

Incl. 5 Pt1000 sensors (2 x FKP6, 3 x FRP6)

Price bracket A | Article no.: **115 450 13**

RESOL DeltaSol® BX L

Price bracket A | Article no.: **115 000 03**

RESOL DeltaSol® BX L – Full kit

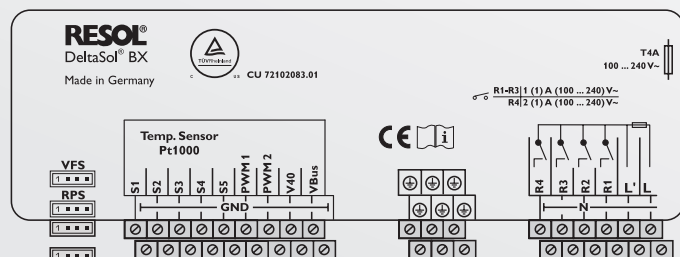
Incl. 5 Pt1000 sensors (2 x FKP6, 3 x FRP6)

Price bracket A | Article no.: **115 000 13**

An SD card is included with the controller. For our range of Grundfos Direct Sensors™ (DeltaSol® BX only) see page 90!

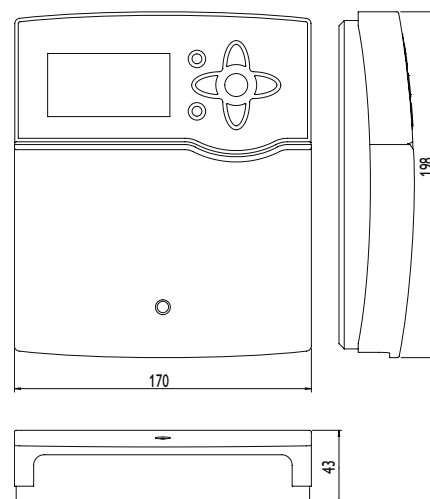
* The cTUVus certification confirms that the controller is certified to UL 60730-1:2009 and CSA B60730.1:2002.

ELECTRICAL CONNECTION



Example DeltaSol® BX

TECHNICAL DATA



Inputs: 5 Pt1000 temperature sensors, 1 V40 impulse input, 2 Grundfos Direct Sensors™ (analogue; DeltaSol® BX only)

Outputs: 3 semiconductor relays, 1 electromechanical relay and 2 PWM outputs

PWM frequency: 512 Hz

PWM voltage: 10.8 V

Switching capacity:

- 1 (1) A 240 V~ (semiconductor relay)
- 2 (1) A 240 V~ (electromechanical relay)

Total switching capacity: 4 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.58 W (DeltaSol® BX), 0.58 W (DeltaSol® BX L)

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, SD card slot

VBus® current supply: 35 mA

Functions: ΔT control, pump speed control, heat quantity measurement, operating hours counter for the solar pump, tube collector function, thermostat function, store loading in layers, priority logic, heat dump function, thermal disinfection function, function control

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: System-Monitoring-Display for system visualisation, 16-segment display, 7-segment display, 8 symbols, operating control LED (directional pad) and background illumination

Operation: 7 push buttons

Ingress protection: IP 20/EN 60529

Protection class: I

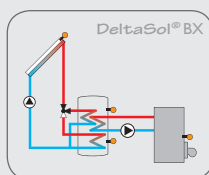
Ambient temperature: 0 ... 40 °C

Pollution degree: 2

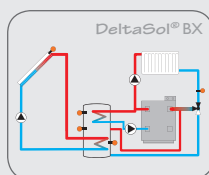
Dimensions: 198 x 170 x 43 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!

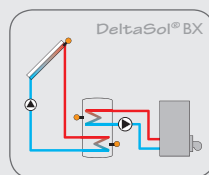
EXAMPLES



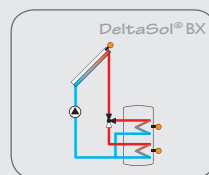
Solar system with store loading in layers and solid fuel boiler



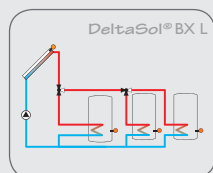
Solar system with 1 store, heating circuit return preheating and thermostatic backup heating



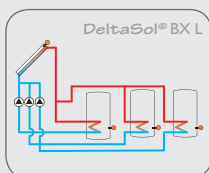
Solar system with 1 store and thermostatic backup heating



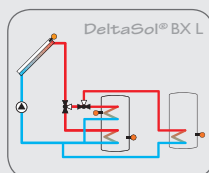
Solar system with store loading in layers



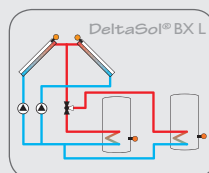
3-store solar system with valve logic and heat exchange control



3-store solar system with pump logic and heat exchange control



Solar system with store loading in layers and 2 stores



Solar system with east-/west collectors and 2 stores (valve logic)

ACCESSORIES

RESOL DL2 Datalogger



For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected (see page 67)

Price bracket A | Article no.: **180 007 10**

VFS/RPS Grundfos Direct Sensor™



Analogue sensors in different versions (DeltaSol® BX only, see page 90)

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

RESOL AM1



Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

For a survey of accessories see page 48!



DeltaSol[®] SLT

The DeltaSol[®] SLT effortlessly controls even complex systems and enables adaptation to the individual system requirements. Numerous pre-programmed optional functions such as thermal disinfection or zone loading can be combined and parameterised. It is also possible to directly choose from 27 pre-programmed basic systems.

The operation via 2 main buttons and 1 adjustment dial, the Lightwheel[®], follows the well-known operating concept.

The manual mode and the holiday function can be activated by pressing a single button.



DeltaSol[®] SLT with LAN interface



Freely configurable compact-class controller

- 4 relay outputs (incl. 1 potential-free extra-low voltage relay)
- 4 inputs for Pt1000, Pt500 or KTY temperature sensors
- Input for 1 analogue Grundfos Direct Sensor[™]
- 1 V40 impulse input (also usable as a Pt1000, Pt500 or KTY temperature sensor input)
- 2 PWM outputs for the speed control of high-efficiency pumps
- Numerous pre-programmed optional functions
- 27 basic system layouts to choose from
- Automatic function control according to VDI 2169
- MicroSD card slot, LAN interface (optional), mini-USB port

RESOL DeltaSol[®] SLT

Price bracket A | Article no.: **115 005 33**

RESOL DeltaSol[®] SLT – Full kit

Incl. 4 Pt1000 sensors (2 x FKP6, 2 x FRP6)

Price bracket A | Article no.: **115 004 93**

RESOL DeltaSol[®] SLT with LAN interface

Price bracket A | Article no.: **115 004 03**

RESOL DeltaSol[®] SLT with LAN interface – Full kit

Incl. 4 Pt1000 sensors (2 x FKP6, 2 x FRP6)

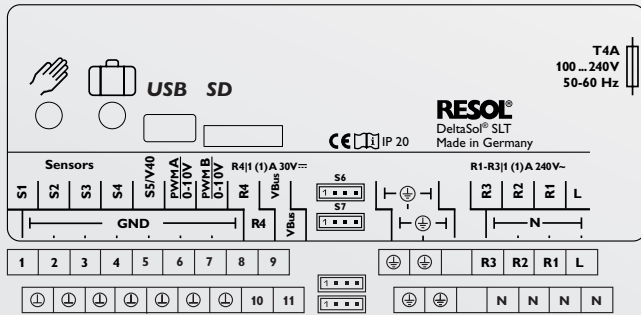
Price bracket A | Article no.: **115 004 13**

Customised and OEM versions are available on request. Please contact our sales team.

Menu languages:

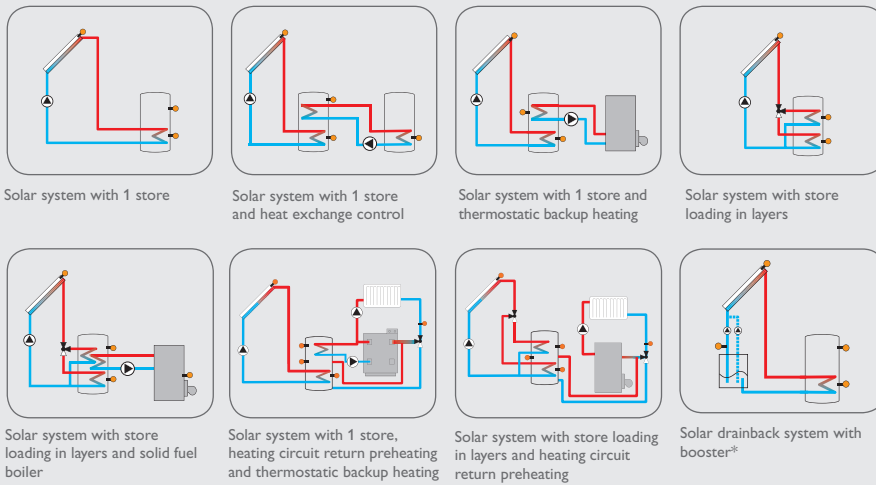


ELECTRICAL CONNECTION



Sensor 6: Grundfos Direct Sensor™, Sensor 7: FlowRotor

EXAMPLES



* Application examples

ACCESSORIES

RESOL DL2 Datalogger



For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected (see page 67)

Price bracket A | Article no.: **180 007 10**

RESOL DL3 Datalogger



For visualisation via VBus.net, incl. SD card, mains adapter, network and VBus® cable (see page 68)

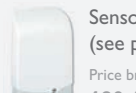
Price bracket A | Article no.: **180 009 90**

VFS/RPS Grundfos Direct Sensor™



Analogue sensors in different versions (see page 90)

RESOL SP10



Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

MicroSD card



MicroSD card, 4 GB memory capacity, incl. adapter

Price bracket C | Article no.: **180 007 41**

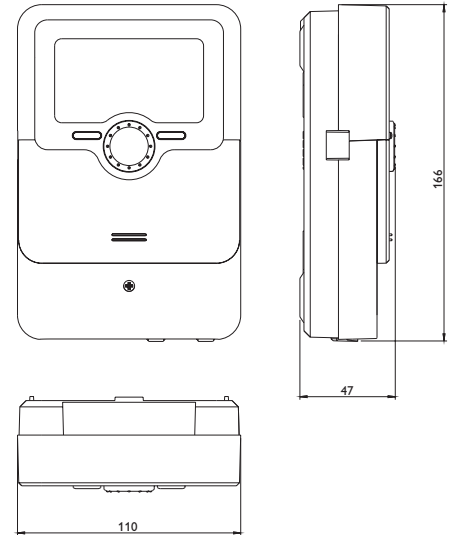
RESOL V40



V40 flowmeter in different versions (see page 84)

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 4 inputs for Pt1000, Pt500 or KTY temperature sensors, 1 analogue Grundfos Direct Sensor™, 1 FlowRotor, 1 V40 impulse input (also usable as a Pt1000, Pt500 or KTY temperature sensor input)

Outputs: 3 semiconductor relays, 1 potential-free extra-low voltage relay, 2 PWM outputs (switchable to 0-10 V)

PWM frequency: 512 Hz

PWM voltage: 10.8 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)
1 (1) A 30 V== (potential-free relay)

Total switching capacity: 3 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.68 W (without LAN interface), 1.43 W (with LAN interface)

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, MicroSD card slot, LAN interface (optional), mini-USB port

VBus® current supply: 60 mA

Functions: operating hours counter, tube collector function, zone loading, heat exchange, speed control, heat quantity measurement, adjustable system parameters and optional functions (menu-driven), balance and diagnostics function, function control according to VDI 2169

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: full graphic display, operating control LED (Lightwheel®)

Operation: 4 push buttons and 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 110 x 166 x 47 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



DeltaSol® BX Plus

The RESOL DeltaSol® BX Plus is a system controller for multi-store solar and heating systems. The intuitive commissioning menu leads you through the system configuration by requiring the most important adjustments directly after connecting the controller.

For an optimum overview, all sensor and relay allocations are listed in the service menu.

Customised and OEM versions are available on request. Please contact our sales team.

Visit www.resol.de/videos for a product video about this controller

rosenthal design 



HE pump control



VBus.net



RPT



More possibilities!

- 8 sensor inputs and 5 relay outputs
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via SD card
- Pre-programmed optional functions such as drainback option, time-controlled thermostat function, thermal disinfection
- Up to 2 extension modules via RESOL VBus® connectable (21 sensors and 15 relays in total)
- 2 inputs for digital Grundfos Direct Sensors™
- 2 PWM outputs for speed control of high-efficiency pumps
- Automatic function control according to VDI 2169: Flow rate and pressure monitoring, warnings for too high ΔT values, interchanged flow and return pipes and night circulation
- Modulating heating control with 0-10V boiler control (with EM Extension Module)

RESOL DeltaSol® BX Plus

Price bracket A | Article no.: **115 001 33**

RESOL DeltaSol® BX Plus – Full kit

Incl. 5 Pt1000 sensors (2 x FKP6, 3 x FRP6)

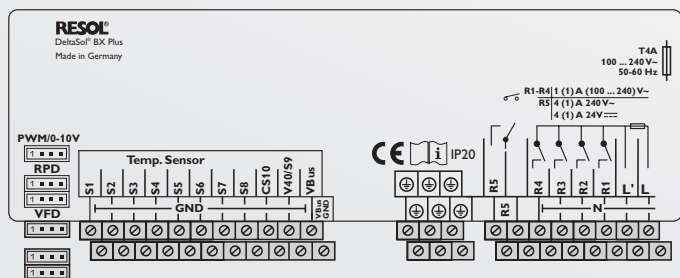
Price bracket A | Article no.: **115 001 43**

An SD card as well as a PWM/0-10V adapter cable are included with the controller. For our range of Grundfos Direct Sensors™ see page 90!

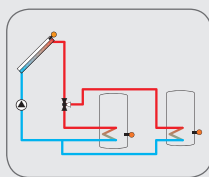
Menu languages:



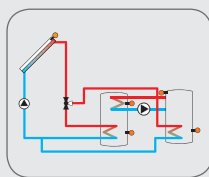
ELECTRICAL CONNECTION



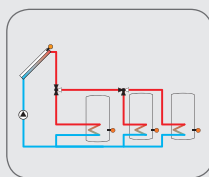
EXAMPLES



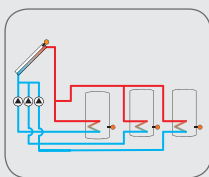
2-store system with valve logic, 1 pump, 3 sensors and 3-port valve



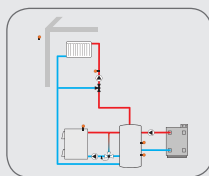
2-store solar system with valve logic and heat exchange control



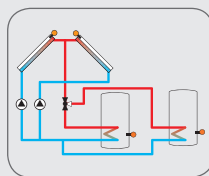
Solar system with 3 stores, 3-port-valve logic



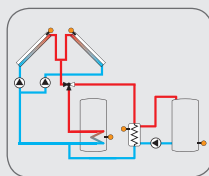
3-store solar system with pump logic and heat exchange control



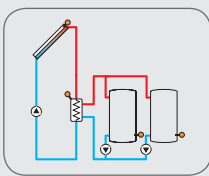
1 mixed heating circuit with solid fuel boiler and backup heating (demand)



Solar system with east-/west collectors and 2 stores (valve logic)



Solar system with east-/west collectors, 2 stores and external heat exchanger, 3-port valve control



Solar system with 2 stores and external heat exchanger, pump logic

ACCESSORIES

RESOL DL2 Datalogger



For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected (see page 67)

Price bracket A | Article no.: **180 007 10**

RESOL EM



Sensor and relay Extension module with 5 outputs and 6 inputs (see page 33)

Price bracket A | Article no.: **145 440 80**

RESOL DL3 Datalogger



For visualisation via VBus.net, incl. SD card, mains adapter, network and VBus® cable (see page 68)

Price bracket A | Article no.: **180 009 90**

RESOL SD3 Smart Display



Display module for the living area with 3 displays for collector and store temperature as well as for heat quantity (see page 70)

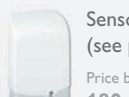
Price bracket A | Article no.: **180 004 90**

VFD/RPD Grundfos Direct Sensor™



Digital sensors in different versions (see page 90)

RESOL SP10

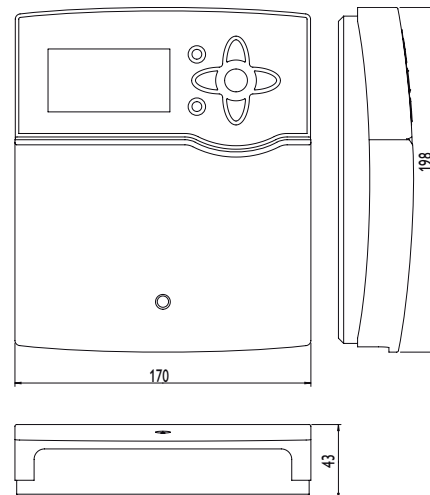


Sensor overvoltage protection (see page 92)

Price bracket A | Article no.: **180 110 70**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 8 (9) inputs for Pt1000, Pt500 or KTY temperature sensors, 1 V40 impulse input, inputs for 2 digital Grundfos Direct Sensors™*, 1 input for a CS10 irradiation sensor

Outputs: 4 semiconductor relays, 1 potential-free relay, 2 PWM outputs

PWM frequency: 512 Hz

PWM voltage: 11.0 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

4 (1) A 24 V~ / 240 V~ (potential-free relay)

Total switching capacity: 4 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.76 W

Temperature controls class: I

Energy efficiency contribution: 1 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, SD card slot

VBus® current supply: 60 mA

Functions: ΔT control, pump speed control, heat quantity measurement, operating hours counter for the solar pump, tube collector function, thermostat function, store loading in layers, priority logic, drainback option, booster function, heat dump function, thermal disinfection function, PWM pump control, function control according to VDI 2169

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication / Display: full graphic display, operating control LED (directional pad) and background illumination

Operation: 7 push buttons

Ingress protection: IP 20 / EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 198 x 170 x 43 mm

*For the digital inputs, the following sensor combinations are possible:

- 1 x RPD, 1 x VFD

- 2 x VFD, but with different measuring ranges only

A table with the current consumption values of all VBus® accessories can be found on page 72!



rosenthal design 

DeltaSol[®] MX

The DeltaSol[®] MX is the most versatile system controller for complex solar and heating systems in our product range. It is ideal to control a combination of solar and non-solar parts of the system.

Easy combination and parameterisation of pre-programmed functions for several millions of hydraulic variants.

Customised and OEM versions are available on request. Please contact our sales team.



Certified for the North American market!*



The all-rounder

- 14 relay outputs and 12 inputs for Pt1000, Pt500 or KTY temperature sensors
- Up to 5 extension modules via RESOL VBus[®] (45 sensors and 39 relays in total)
- Inputs for analogue and digital Grundfos Direct Sensors[™]
- Integrated control of up to 4 high-efficiency pumps via PWM outputs
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via SD card
- Cooling over the heating circuit with condensation detection by means of a dew point switch
- Simplified timer, 0-10V boiler control and DHW preheating
- Remote access to the heating circuits with room control unit(s) or the VBus[®]Touch HC App
- Extended optional functions, e.g. solid fuel boiler function with mixer and target temperature control

RESOL DeltaSol[®] MX

Price bracket A | Article no.: **115 992 03**

RESOL DeltaSol[®] MX – Full kit

Incl. 6 Pt1000 sensors (2 x FKP6, 4 x FRP6)

Price bracket A | Article no.: **115 992 13**

An SD card is included with the controller. See page 90 for Grundfos Direct Sensors[™]!

Menu languages:

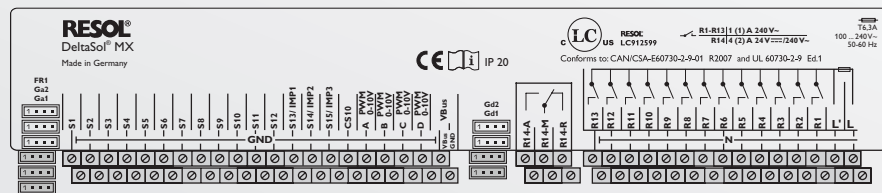


Visit www.resol.de/videos for a product video about this controller

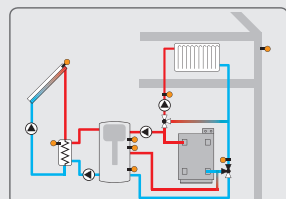
* The cLCus certification confirms that the controller is certified to UL 60730-2-9 and CSA - E60730-2-9-01.

** On request

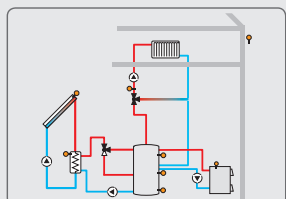
ELECTRICAL CONNECTION



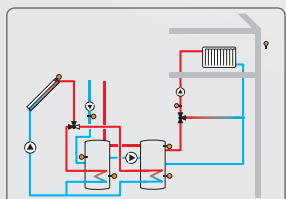
EXAMPLES



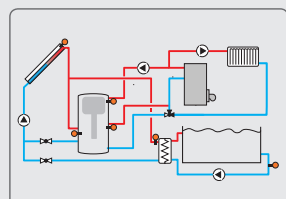
Solar system with combined store, external heat exchanger, weather-compensated heating circuit, return preheating and backup heating



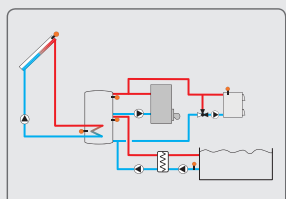
Solar system with external heat exchanger, store loading in layers and backup heating by solid fuel boiler



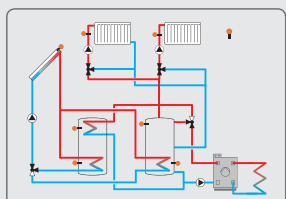
Solar system with 2 stores, circulation pump control, heat exchange control and weather-compensated heating circuit



Solar system with combined store and swimming pool, backup heating, heating circuit loading and return preheating



Solar system with store, swimming pool and backup heating over gas- and solid fuel boiler



Solar system with 2 stores and 2 weather-compensated heating circuits for heating or cooling application of a heat pump

ACCESSORIES

RESOL DL3 Datalogger

For visualisation via VBus.net, incl. SD card, mains adapter, network and VBus® cable (see page 68)

Price bracket A | Article no.: **180 009 90**

RESOL EM

Sensor and relay Extension module with 5 outputs and 6 inputs (see page 33)

Price bracket A | Article no.: **145 440 80**

VFS/RPS,VFD/RPD Grundfos Direct Sensor™

Analogue sensors / digital sensors in different versions (see page 90)

RESOL RCPI12

Room control unit (see page 91)

Price bracket A | Article no.: **136 000 50**

RESOL TS10

Dew point switch (see page 90)

Price bracket B | Article no.: **155 009 00**

RESOL RTA12 Remote control

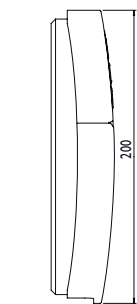
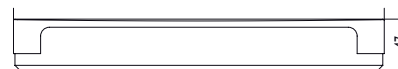
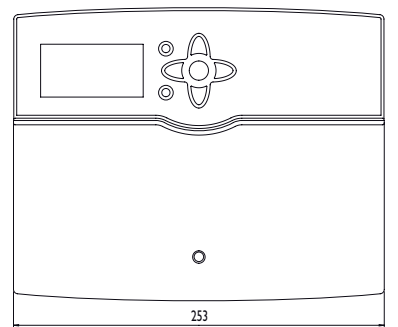
The heating curve can be comfortably adjusted from the living area (see page 91)

Price bracket A | Article no.: **136 000 40**

For a survey of accessories see page 48!

A table with the current consumption values of all VBus® accessories can be found on page 72!

TECHNICAL DATA



Inputs: 12 Pt1000, Pt500 or KTY temperature sensor inputs (can optionally be used for remote controls, operating mode switches or potential-free switches), 3 impulse inputs for V40 flowmeters, 1 input for a FlowRotor, 1 CS10 solar cell, 4 Grundfos Direct Sensors™ (2 x analogue, 2 x digital)

Outputs: 14 relays, 13 of them semiconductor relays for pump speed control, 1 potential-free relay and 4 PWM outputs (convertible to 0-10V signal outputs)

PWM frequency: 512 Hz

PWM voltage: 10.5 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

4 (2) A 24 V~/240 V~ (potential-free relay)

Total switching capacity: 6.3 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.83 W

Temperature controls class: VIII

Energy efficiency contribution: 5 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, SD card slot

VBus® current supply: 35 mA

Functions: 7 integrated calorimeters and control of weather-compensated heating circuits. Adjustable system parameters and add-on options (menu-driven), balance and diagnostics functions, function control according to VDI 12169

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication / Display: full graphic display

Operation: 7 push buttons

Ingress protection: IP 20 / EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

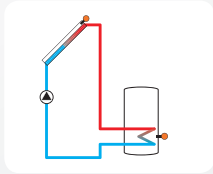
Dimensions: 253 x 200 x 47 mm

*For the digital inputs, the following sensor combinations are possible:

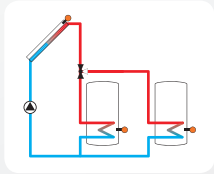
- 1 x RPD, 1 x VFD

- 2 x VFD, but with different measuring ranges only

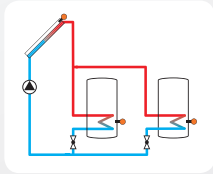
DeltaSol® MX EXAMPLES FOR BASIC SOLAR SYSTEMS



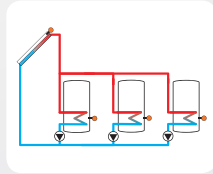
Solar system with 1 store



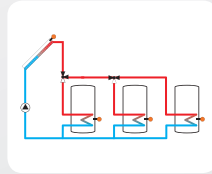
Solar system with 2 stores, 3-port-valve logic



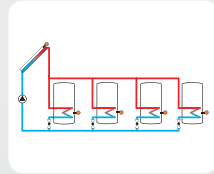
Solar system with 2 stores, valve logic



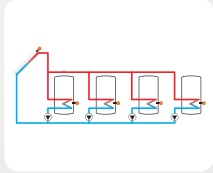
Solar system with 3 stores, pump logic



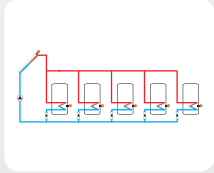
Solar system with 3 stores, 3-port-valve logic



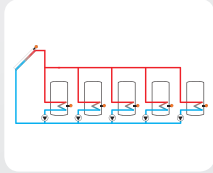
Solar system with 4 stores, valve logic



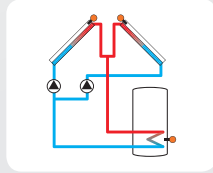
Solar system with 4 stores, pump logic



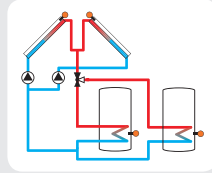
Solar system with 5 stores, valve logic



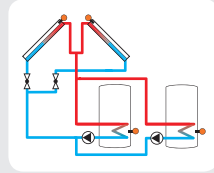
Solar system with 5 stores, pump logic



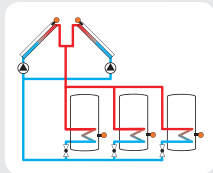
Solar system with east/west collectors and 1 store, pump logic



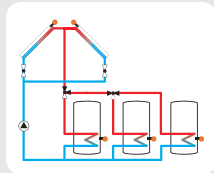
Solar system with east/west collectors and 2 stores, 3-port-valve logic



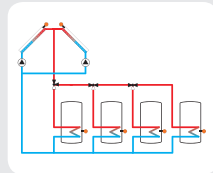
Solar system with east/west collectors and 2 stores, valve/pump logic



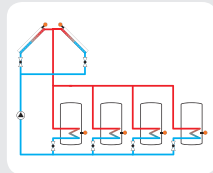
Solar system with east/west collectors and 3 stores, pump/valve logic



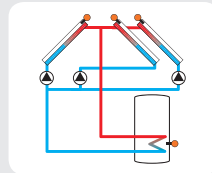
Solar system with east/west collectors and 3 stores, valve logic and 3-port valves



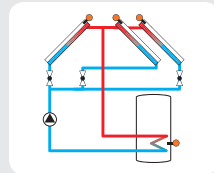
Solar system with east/west collectors and 4 stores, 3-port-valve logic



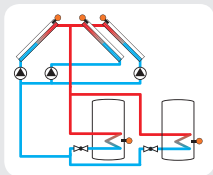
Solar system with east/west collectors and 4 stores, valve logic



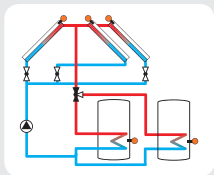
Solar system with 3 collector fields and 1 store, pump logic



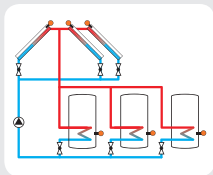
Solar system with 3 collector fields and 1 store, valve logic



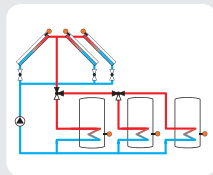
Solar system with 3 collector fields and 2 stores, pump/valve logic



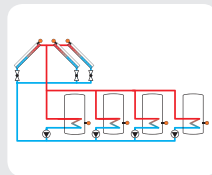
Solar system with 3 collector fields and 2 stores, valve logic and 3-port valves



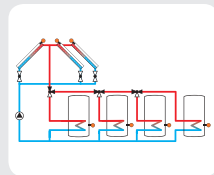
Solar system with 3 collector fields and 3 stores, valve logic



Solar system with 3 collector fields and 3 stores, valve logic and 3-port valves

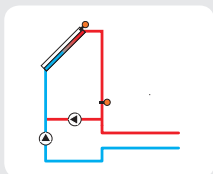


Solar system with 3 collector fields and 4 stores, valve/pump logic

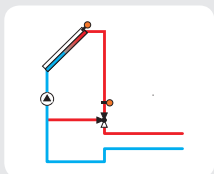


Solar system with 3 collector fields and 4 stores, valve logic and 3-port valves

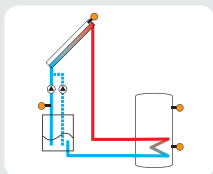
Extendable by a range of pre-programmed optional functions, such as:



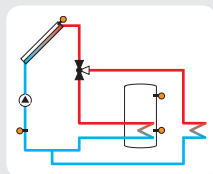
Pump logic bypass



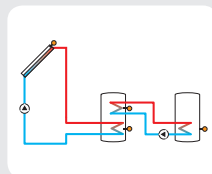
Valve logic bypass



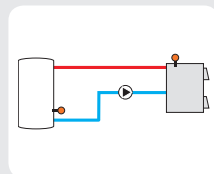
Drainback system with booster pump



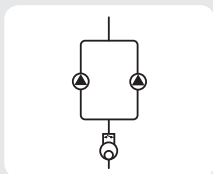
Heat dump



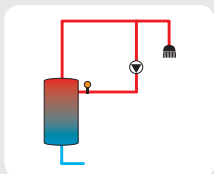
Heat exchange



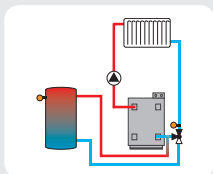
Solid fuel boiler



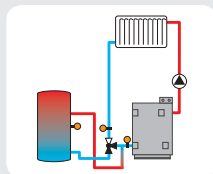
Twin pump



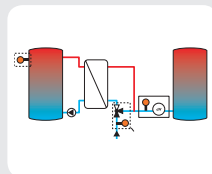
Circulation



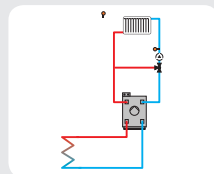
Return preheating



Return mixing function



DHW preheating



Cooling over the heating circuit (e.g. with a heat pump)

EM Extension module



The EM Extension module provides 5 additional relays and 6 additional sensor inputs for the *DeltaSol*[®] MX controller. Up to 5 extension modules can be connected to the MX via the VBus[®], so that a total of up to 39 outputs and 45 inputs can be made available for the control logic.

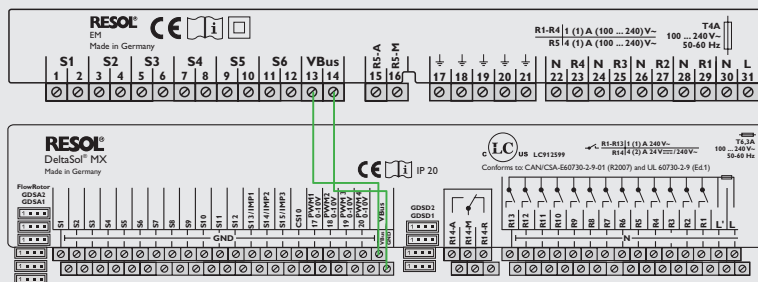
The Extension modules themselves do not require any adjustments, they are simply connected and assigned to the controller. The inputs and outputs of the registered modules will then be available for all functions of the controller. With 5 extension modules and its 2 internal heating circuits, for example, the *DeltaSol*[®] MX can manage no less than 7 heating circuits complete with individual room thermostats.

DeltaSol[®] MX



The devices are connected over the RESOL VBus[®] to enable data communication.

ELECTRICAL CONNECTION



RESOL EM Extension module

Sensor and relay Extension module with 5 outputs and 6 inputs

Price bracket A | Article no.: **145 440 80**



RESOL RTA12

Remote control for connection to the *DeltaSol*[®] MX, BX Plus, *DeltaTherm*[®] HC, HC mini or EM Extension module

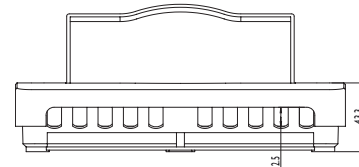
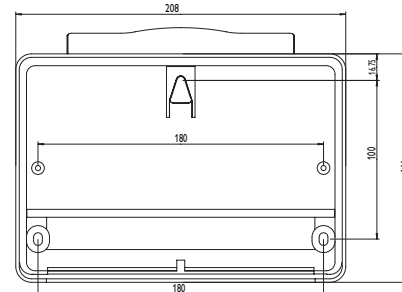
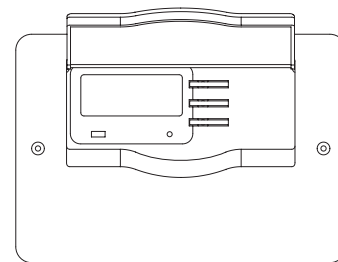
Price bracket A | Article no.: **136 000 40**



RESOL FAP13

Outdoor temperature sensor

Price bracket A | Article no.: **155 008 10**



- 7-segment LC display
- Function control
- Slide switch 0 Auto I
- Usable for all optional functions of the *DeltaSol*[®] MX, BX Plus and *DeltaTherm*[®] HC
- Easy to install, configurable over the controller menu

TECHNICAL DATA

Inputs: 6 Pt1000, Pt500 or KTY temperature sensors

Outputs:

4 semiconductor relays and 1 potential-free relay

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

4 (1) A 24 V~/240 V~ (potential-free relay)

Total switching capacity: 4 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.30 W

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus[®]

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting

Indication/Display: LC display, 7-segment display

Operation: 3 push buttons and 1 slide switch

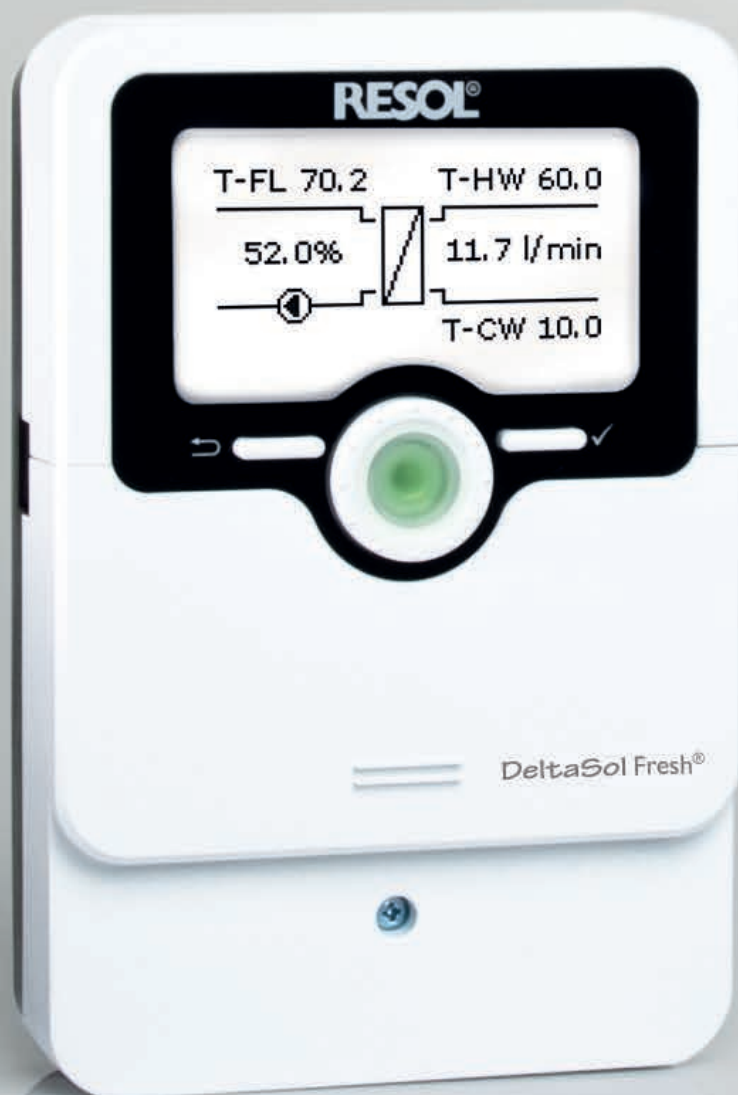
Ingress protection: IP 20 / EN 60529

Protection class: II

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

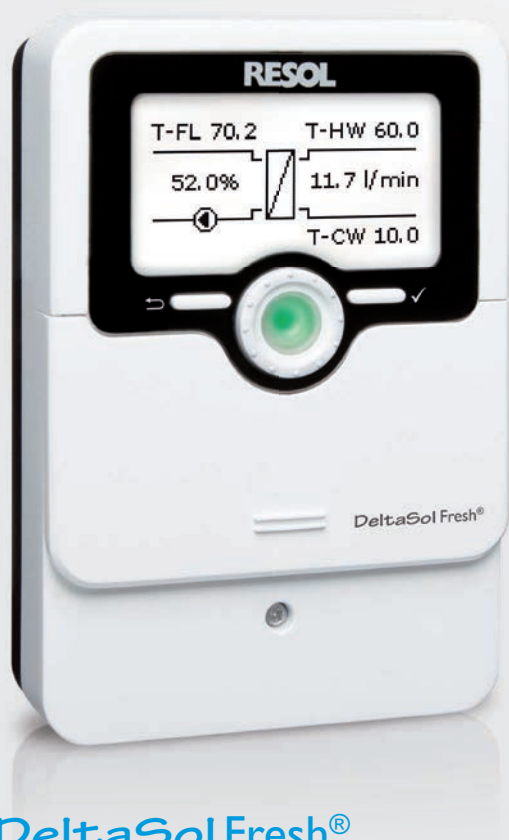
Dimensions: 144 × 208 × 43 mm



DHW exchange controllers

Page 35

- Precise and energy-saving control of the draw-off temperature of your OEM DHW exchange module
- Additional functions adapted to individual usage profiles
- Versatile application in differently dimensioned modules
- Cascades of up to 4 DHW exchange controllers or stations
- Remote access over a local network or over the Internet possible via RESOL VBus®
- Tested to suit top quality standards



DeltaSol Fresh®

DHW exchange controller platform

RESOL offers a range of solutions for the control of DHW exchange modules. The new controller platform is equipped with an enhanced and faster control algorithm and enables the precise and energy-efficient control of the draw-off temperature. In order to achieve the best possible control quality, our laboratories run a number of dimensioning tests and check measurements. Classification of control quality is conducted on the basis of research results of the Rapperswil Institute for Solar Technology and the Institute for Solar Energy Research in Hamelin (ISFH).

- Constantly high control quality by adaptation to the end user system by means of self-learning neural networks
- Customised control for systems with or without circulation
- Flexible circulation function for different user profiles, also available with thermal disinfection
- Reliable DHW heating even in the case of a fault condition
- Control of PWM and LIN bus pumps
- Adaptable to many commonly used flow rate sensors
- Cascades of up to 4 DHW exchange controllers or stations

RESOL develops and produces the right controller to suit your DHW exchange module, [PLEASE CONTACT US!](#)

TECHNICAL DATA (EXAMPLE)

Inputs: 7 inputs for Pt1000 temperature sensors, 1 flow rate sensor: VBus®3 (e.g. digital Grundfos Direct Sensor™) or 0-5 V interface or 0-500 Hz interface or impulse input

Outputs: 3 semiconductor relays and 3 PWM outputs (with LIN bus 1 PWM output), 1 potential-free extra-low voltage relay

Switching capacity:

1 (1) A 240V~ (semiconductor relay)

1 (1) A 30V== (potential-free relay)

Total switching capacity: 4 A 240V~

Power supply: 100 ... 240V~ (50 ... 60 Hz)

Supply connection: Y

Mode of operation: type 1.B.C.Y

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, cascade bus, LIN bus interface, MicroSD card slot

VBus® current supply: 60 mA

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication / Display: full graphic display, operating control LED (Lightwheel®)

Operation: 4 buttons, 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20 / DIN EN 60529

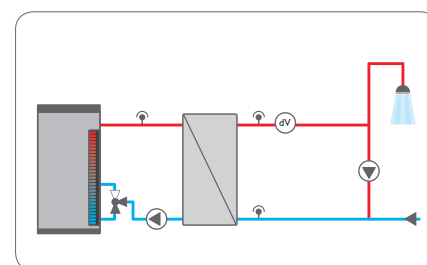
Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 110 x 166 x 47 mm

EXAMPLE





Page 37-50

Heating controllers

- Solutions for different DHW and space heating systems
- Suitable for small systems in private households up to large, multivalent heating installations
- Fulfil top efficiency standards such as ErP temperature controls class VIII
- Room thermostats from all manufacturers can be connected
- User-friendliness and efficiency at an attractive price
- Visualisation and remote parameterisation via Internet and apps possible

Survey of heating controllers

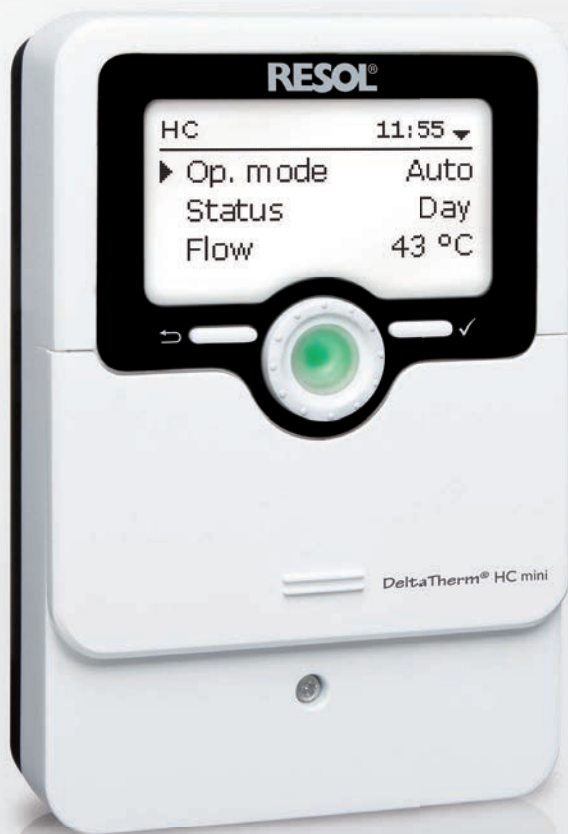


	DeltaTherm® FK	DeltaTherm® HC mini	DeltaTherm® HC	DeltaTherm® HC MAX
Temperature sensor inputs	4	5	8 (9 ²)	12 (15 ²)
Sensor type	Pt1000	Pt1000	Pt1000, Pt500, KTY	Pt1000, Pt500, KTY
Semiconductor relays	2	3	4	13
Potential-free relay	-	1	1	1
PWM/0-10V outputs	2	2	2	4

Software

Pre-configured systems	8	4	30	36
Mixed heating circuits	-	1	6 ¹	7 ¹
Mixer control weather-compensated	-	✓	✓	✓
Mixer control with target temperature	✓	✓	✓	✓
Operating modes	-	5	6	6
0-10V boiler control	-	✓ ³	✓	✓
Room control	-	✓ ³	✓	✓
Remote access with VBus®Touch HC	-	✓	✓	✓
Remote display via VBus®Touch FK	✓	-	✓	✓
Remote access with RCP12	-	✓ ³	✓	✓
Heating circuit antifreeze function	-	✓	✓	✓
Heating circuit chimney sweeper function	-	✓	✓	✓
Screed drying function	-	✓	✓	✓
Room thermostats	-	3	5 (30 ¹)	20 (35 ¹)
Thermal disinfection	-	-	✓ ¹	✓
DHW heating	✓	-	✓	✓
Circulation	-	-	✓ ¹	✓
Solid fuel boiler	✓	-	✓	✓
Heating circuit return preheating	✓	-	✓ ¹	✓
Return mixing function	✓	-	-	✓
Weather-compensated backup heating	-	✓	✓	✓
Night correction	-	✓	✓	✓
Boiler protection	✓	✓	✓	✓
Start-up/Overrun	-	-	✓	✓
Backup heating suppression	-	-	✓	✓
Heat exchange	✓	-	✓ ¹	✓
Mixer	✓	-	✓ ¹	✓
Parallel relay	-	-	✓ ¹	✓
Error relay	-	-	✓ ¹	✓
Function block	-	-	✓ ¹	✓
HQM	-	-	✓	✓

¹ via EM Extension module(s) ² via convertible impulse inputs ³ from version 1.01




DeltaTherm® HC mini

The DeltaTherm® HC mini offers a compact and user-friendly solution for simple heating systems. It can control a weather-compensated heating circuit and its backup heating demand. Additionally, there's a choice of 5 different operating modes, a boiler protection option and a night correction.

Due to the commissioning menu and the 4 pre-configured basic systems, configuration is quick and easy.

The chimney sweeper function and the holiday mode can be activated by pressing a single button.



rosenthal design 



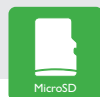
HE pump control



VBus.net



RPT



MicroSD

Heating control, simple and efficient

- 4 pre-configured basic systems
- 12 pre-programmed schemes for the temperature controls classes II, III, V, VI, VII and VIII
- 4 relay outputs (incl. 1 potential-free extra-low voltage relay)
- 5 inputs for Pt1000 temperature sensors
- 5 operating modes, boiler protection, room thermostat and night correction
- Holiday mode, chimney sweeper function and screed drying function via microbuttons
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via SD card
- Modulating heating control with 0-10V boiler control
- Weather-compensated control with room influence or demand-based room control with up to 3 room temperature sensors
- Remote access with a room control unit or the VBus®Touch HC App

RESOL DeltaTherm® HC mini

Price bracket A | Article no.: **115 005 23**

RESOL DeltaTherm® HC mini – Full kit

Incl. 3 Pt1000 sensors (1 x FAP13, 1 x FKP23, 1 x FRP6)

Price bracket A | Article no.: **115 005 13**

Menu languages:

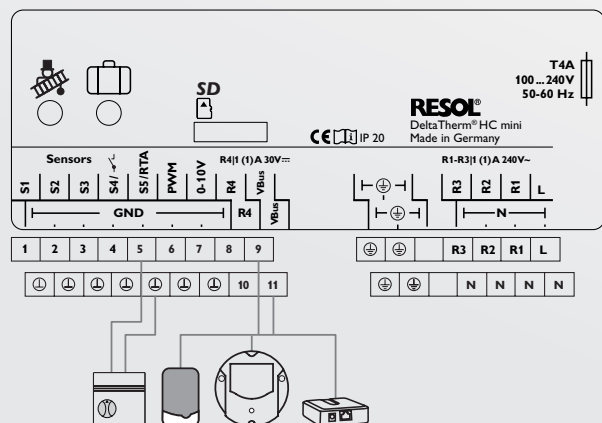


Customised and OEM versions are available on request.
Please contact our sales team.

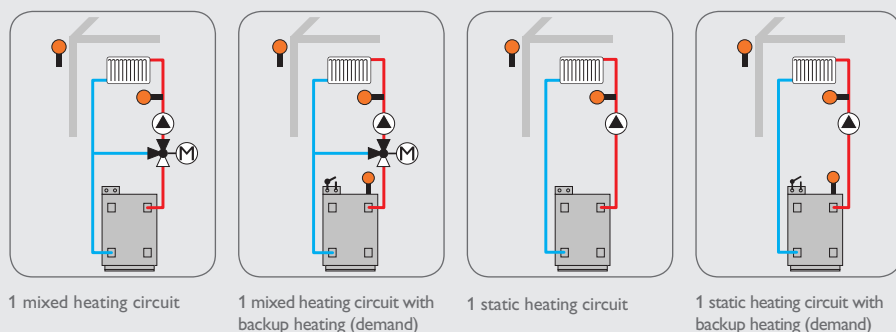


Temperature controls class VIII

ELECTRICAL CONNECTION



EXAMPLES



1 mixed heating circuit

1 mixed heating circuit with backup heating (demand)

1 static heating circuit

1 static heating circuit with backup heating (demand)

ACCESSORIES

RESOL RTA12 Remote control



The heating curve can be comfortably adjusted from the living area (see page 91)

Price bracket A | Article no.: **136 000 40**

RESOL FRP12 Indoor temperature sensor



Used for measuring the indoor temperature with a Pt1000 measuring element (see page 91)

Price bracket A | Article no.: **155 008 90**

RESOL RCP12



Room control unit (see page 91)

Price bracket A | Article no.: **136 000 50**

RESOL KM2 Communication module



Incl. RESOL service CD, network cable and mains adapter, VBus® cable pre-connected (see page 66)

Price bracket A | Article no.: **180 012 10**

RESOL AM1



Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

RESOL SV6

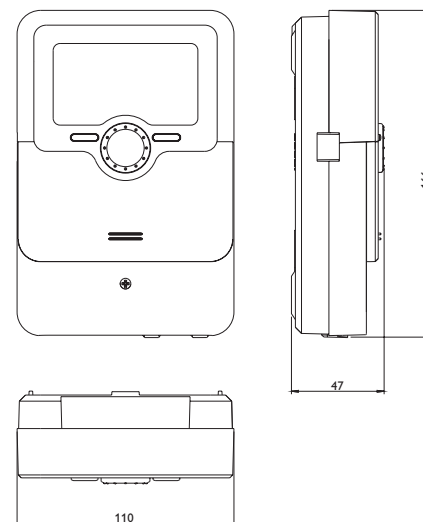


SV6 Sensor distribution box (see page 92)

Price bracket A | Article no.: **145 441 30**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 5 inputs for Pt1000 temperature sensors (1 of them can be converted to Switch and one of them to RTA remote control or BAS operating mode switch)

Outputs: 3 semiconductor relays, 1 potential-free extra-low voltage relay, 1 PWM output, 1 0-10 V output

PWM frequency: 512 Hz

PWM voltage: 10.8 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

1 (1) A 30 V= (potential-free relay)

Total switching capacity: 3 A 240 V~

Power supply: 100... 240 V~ (50... 60 Hz)

Supply connection: type Y attachment

Standby: 0.63 W

Temperature controls class: VIII

Energy efficiency contribution: 5 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, MicroSD card slot

VBus® current supply: 60 mA

Functions: weather-compensated heating circuit control, backup heating, room thermostat, chimney sweeper function, screed drying function

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: full graphic display, control lamp (Lightwheel®)

Operation: 4 push buttons and 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0... 40 °C

Pollution degree: 2

Dimensions: 110×166×47 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!



rosenthal design 



Heat upon request!

- 9 pre-configured basic systems and numerous pre-programmed optional functions
- 30 pre-programmed schemes for the temperature controls classes II, III, V, VI, VII and VIII
- Up to 5 EM extension modules can be connected via the RESOL VBus® (39 sensors and 30 relays in total), up to 6 mixed heating circuits
- 2 inputs for digital Grundfos Direct Sensors™
- Screed drying function
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via SD card
- Modulating heating control with 0-10V boiler control
- Weather-compensated control with room influence or demand-based room control with up to 5 room temperature sensors
- Remote access with a room control unit or the VBus®Touch HC App

DeltaTherm® HC

The *DeltaTherm®* HC can control a weather-compensated heating circuit, the DHW loading and the backup heating demand for both.

With up to five extension modules, further heating circuits, additional DHW functions such as circulation or thermal disinfection, and the efficient implementation of further heat sources can be controlled.

Due to the flexible application and extension possibilities, the heating controller is also ideal for larger objects such as apartment houses, residential homes and industrial buildings.

Customised and OEM versions are available on request. Please contact our sales team.



Temperature controls class VIII

RESOL *DeltaTherm®* HC

Price bracket A | Article no.: **115 002 53**

RESOL *DeltaTherm®* HC – Full kit

Incl. 5 Pt1000 sensors (1 x FAP13, 1 x FKP23, 3 x FRP6)

Price bracket A | Article no.: **115 002 63**

RESOL *DeltaTherm®* HC – ErP 6 kit

Incl. 1 x FAP13, 1 x RCP12, 1 x FKP23, 1 x FRP6

Price bracket A | Article no.: **115 005 73**

RESOL *DeltaTherm®* HC – ErP 8 kit

Incl. 1 x FKP23, 1 x FRP6, 1 x RCP12, 2 x FRP12

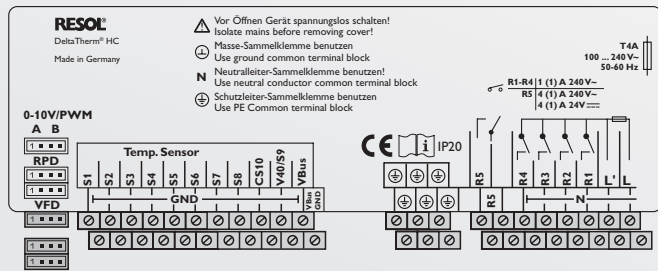
Price bracket A | Article no.: **115 005 83**

A 0-10V adapter cable and an SD card are included with the controller. See page 90 for Grundfos Direct Sensors™!

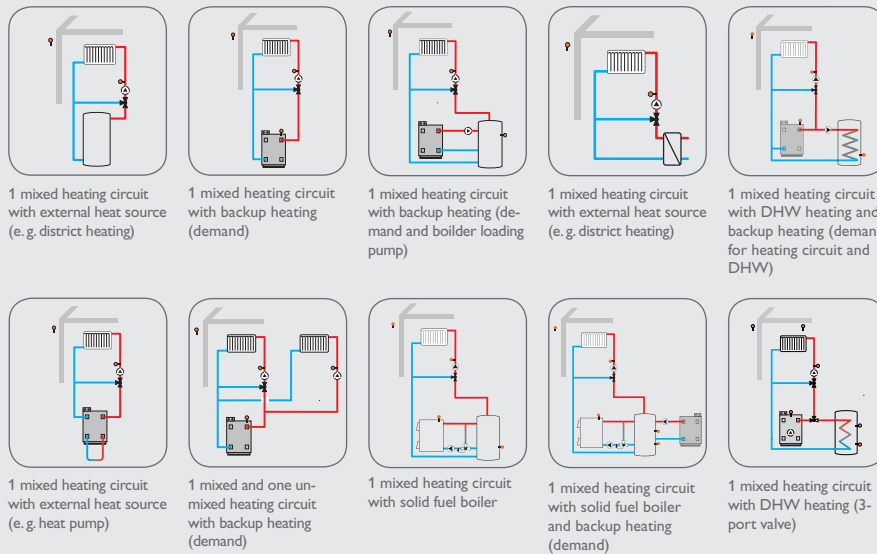
Menu languages:



ELECTRICAL CONNECTION



EXAMPLES



ACCESSORIES

RESOL KM2 Communication module



Incl. RESOL service CD, network cable and mains adapter; VBus® cable pre-connected (see page 66)

Price bracket A | Article no.: **180 012 10**

RESOL EM



Sensor and relay Extension module with 5 outputs and 6 inputs (see page 33)

Price bracket A | Article no.: **145 440 80**

RESOL FRP12 Indoor temperature sensor



Used for measuring the indoor temperature with a Pt1000 measuring element (see page 91)

Price bracket A | Article no.: **155 008 90**

RESOL RCP12



Room control unit (see page 91)

Price bracket A | Article no.: **136 000 50**

VFD/RPD Grundfos Direct Sensor™



Digital sensors in different versions (see page 90)

RESOL SV6

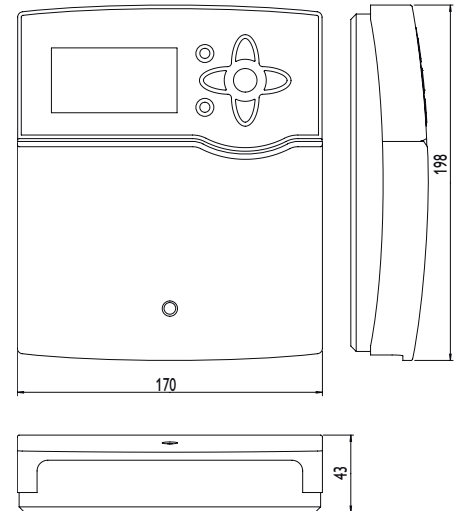


SV6 Sensor distribution box (see page 92)

Price bracket A | Article no.: **145 441 30**

For a survey of accessories see page 48!

TECHNICAL DATA



Inputs: 8 (9) inputs for Pt500, Pt1000 or KTY temperature sensors, 1 V40 impulse input, inputs for 2 digital Grundfos Direct Sensors™*, 1 input for a CS10 irradiation sensor

Outputs: 4 semiconductor relays, 1 potential-free relay, 2 PWM outputs

PWM frequency: 512 Hz

PWM voltage: 10.5 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

4 (1) A 24 V~ / 240 V~ (potential-free relay)

Total switching capacity: 4 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.94 W

Temperature controls class: VIII

Energy efficiency contribution: 5 %

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, SD card slot

VBus® current supply: 60 mA

Functions: screed drying, weather-compensated heating circuit control, backup heating, DHW heating with priority logic, circulation, thermal disinfection, heat quantity measurement, optional functions such as solid fuel boiler, return preheating, etc.

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: full graphic display, operating control lamp LED (directional pad) and background illumination

Operation: 7 push buttons

Ingress protection: IP 20 / EN 60529

Protection class: I

Ambient temperature: 0 ... 50 °C

Pollution degree: 2

Dimensions: 198 x 170 x 43 mm


*For the digital inputs, the following sensor combinations are possible:

- 1 x RPD, 1 x VFD

- 2 x VFD, but with different measuring ranges only

A table with the current consumption values of all VBus® accessories can be found on page 72!



rosenthal design 

DeltaTherm® HC MAX

The DeltaTherm® HC MAX can control up to 4 weather-compensated heating circuits, the DHW loading and the backup heating demand for both.

Additional DHW functions such as circulation or thermal disinfection, and the efficient implementation of further heat sources are possible. With extension modules, further heating circuits can be controlled.

Due to the flexible application and extension possibilities, the heating controller is also ideal for larger objects such as apartment houses, residential homes and industrial buildings.

Customised and OEM versions are available on request. Please contact our sales team.



Ideal for larger objects

- Up to 5 EM extension modules can be connected via the RESOL VBus® (45 sensors and 39 relays in total), up to 7 weather-compensated heating circuits
- 2 inputs for digital Grundfos Direct Sensors™
- 2 inputs for analogue Grundfos Direct Sensors™
- Screed drying function
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via SD card
- Cooling over the heating circuit with condensation detection by means of a dew point switch
- Modulating heating control with 0-10V boiler control
- Weather-compensated control with room influence or demand-based room control with up to 5 room temperature sensors per heating circuit
- Remote access with a room control unit or the VBus®Touch HC App

DeltaTherm® HC MAX

Price bracket A | Article no.: **115 00 673**

DeltaTherm® HC MAX – Full kit

Incl. 5 sensors Pt1000 (1 x FAP13, 1 x FKP23, 3 x FRP6)

Price bracket A | Article no.: **115 006 83**

DeltaTherm® HC MAX – ErP 6 kit

Incl. 1 x FAP13, 1 x RCP12, 1 x FKP23, 1 x FRP6

Price bracket A | Article no.: **115 006 93**

DeltaTherm® HC MAX – ErP 8 kit

Incl. 1 x FKP23, 1 x FRP6, 1 x RCP12, 2 x FRP12


Price bracket A | Article no.: **115 00 703**

An SD card is included with the controller.

Menu languages:





rosenthal design 

DeltaTherm® FK

The *DeltaTherm® FK* Solid fuel boiler controller has been especially developed for systems with solid fuel boilers, water heating stoves or pellet stove heating systems. With the integrated PWM outputs, the FK can manage the speed control of 2 high-efficiency pumps.

With its easily configurable optional functions, the versatile software allows e. g. for the control of an electronic mixer for the return mixing function, a thermostatic backup heating, a target temperature control function and many more.

Customised and OEM versions are available on request. Please contact our sales team.



HE pump control



VBus.net



VBus® Apps

The biomass specialist!

- 2 relay outputs, 4 temperature sensor inputs
- 2 PWM outputs for the speed control of high-efficiency pumps
- Control of an electronic mixer for the return mixing function
- Heating backup
- Heat exchange function
- Thermostatic backup heating

RESOL *DeltaTherm® FK*

Price bracket A | Article no.: **115 002 83**

RESOL *DeltaTherm® FK – Full kit*

Incl. 3 Pt1000 sensors (1 x FKP6, 2 x FRP6)

Price bracket A | Article no.: **115 002 93**

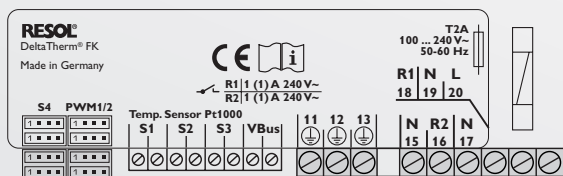
A PWM adapter cable is included with the controller. In order to connect sensor 4 to the controller, a sensor adapter cable is required, see page 45.

High-temperature sensors can be found on page 87.

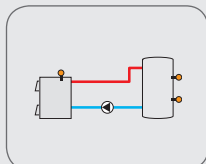
Manuals available:



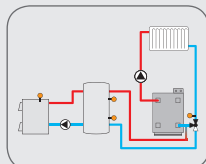
ELECTRICAL CONNECTION



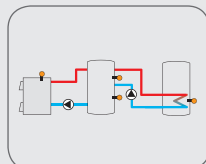
EXAMPLES



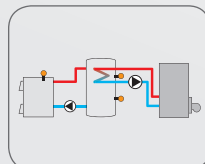
Solid fuel boiler



Solid fuel boiler with heating circuit return preheating



Solid fuel boiler with heat exchange control



Solid fuel boiler with heat exchange control

VBus®Touch FK

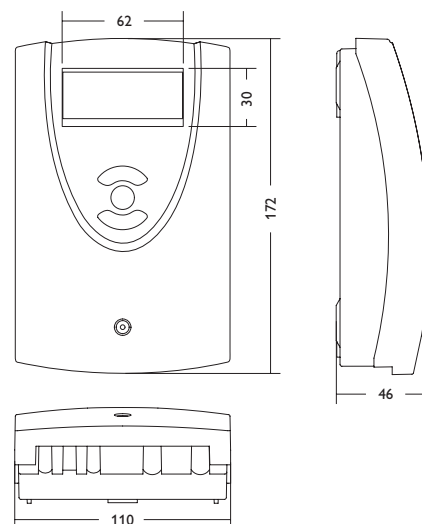
With VBus®Touch FK (see page 63), you can turn your mobile devices into a remote data display for your RESOL controller with a solid fuel boiler function.



Visit www.resol.de/videos for a product video



TECHNICAL DATA



Inputs: 4 Pt1000 temperature sensors

Outputs: 2 semiconductor relays, 2 PWM outputs

PWM frequency: 1000 Hz

PWM voltage: 10.5 V

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

Total switching capacity: 2 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.46 W

Mode of operation: type 1.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

VBus® current supply: 35 mA

Functions: minimum and maximum temperature limitation, mixer control for the return mixing function, target temperature control, speed control, heating circuit backup, thermostatic backup heating, heat exchange, PWM pump control, operating hours counter

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Indication/Display: full graphic display

Operation: 3 push buttons

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 172 x 110 x 46 mm

A table with the current consumption values of all VBus® accessories can be found on page 72!

ACCESSORIES

RESOL DL2 Datalogger



For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected (see page 67)

Price bracket A | Article no.: **180 007 10**

RESOL SDFK Smart Display



Display module with 3 displays for biomass boiler temperature and store temperature as well as for the pump status (see page 70)

Price bracket A | Article no.: **180 010 80**

RESOL sensor adapter cable



JST adapter cable for systems in which the 4th sensor is required

Price bracket C | Article no.: **112 041 33**

RESOL AM1



Alarm module for signalling system failures (see page 71)

Price bracket B | Article no.: **180 008 70**

RESOL VBus®/LAN interface adapter



Network connection set for RESOL controllers with VBus® incl. Service CD (see page 69)

Price bracket B | Article no.: **180 008 80**

RESOL VBus®/USB interface adapter



PC connection kit for RESOL controllers with VBus® incl. Service CD (see page 69)

Price bracket B | Article no.: **180 008 50**

For a survey of accessories see page 48!



DeltaTherm® HT

The DeltaTherm® HT is a compact and user-friendly solution for simple heating systems and offers weather-compensated control with room influence or demand-based room control with 1 room temperature sensor. If a central outdoor sensor unit is used, several controllers can use the outdoor temperature value – this requires the installation of only 1 outdoor temperature sensor. Additionally, there's a choice of 5 different operating modes and a night correction.

Heating circuit controller for heat interface units

- Pre-programmed basic system
- 4 relay outputs (incl. 1 potential-free extra-low voltage relay)
- 4 inputs for Pt1000 temperature sensors
- 5 operating modes, room thermostat and night correction
- Chimney sweeper function, screed drying function and holiday mode via microbuttons
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via MicroSD card
- Weather-compensated control with room influence or demand-based room control with 1 room temperature sensor
- Remote access with a room control unit
- Function for using a central outdoor sensor unit

RESOL DeltaTherm® HT

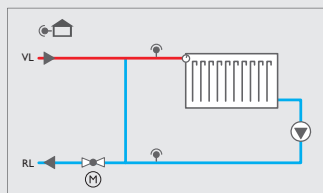
Price bracket A | Article no.: **115 006 03**

RESOL DeltaTherm® HT – Full kit

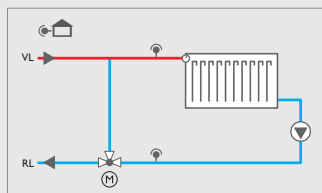
Incl. 3 Pt1000 sensors (2 x FKP23, 1 x FAP13)

Price bracket A | Article no.: **115 006 13**

EXAMPLES



Basic system



Basic system with mixer

ACCESSORIES

RESOL RTA12 Remote control


The heating curve can be comfortably adjusted from the living area (see page 91)

Price bracket A | Article no.: **136 000 40**

RESOL FRP12 Indoor temperature sensor


Used for measuring the indoor temperature with a Pt1000 measuring element (see page 91)

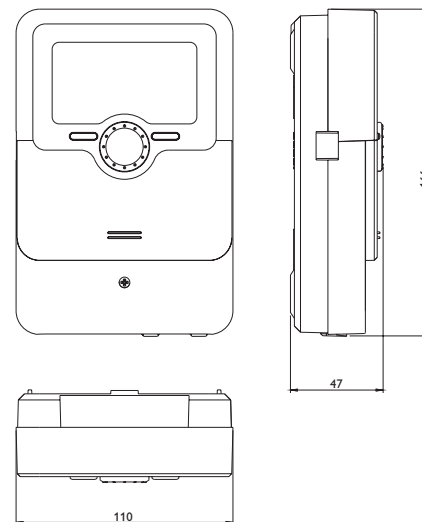
Price bracket A | Article no.: **155 008 90**

RESOL RCP12


Room control unit (see page 91)

Price bracket A | Article no.: **136 000 50**

TECHNICAL DATA



Inputs: 4 inputs for Pt1000 temperature sensors (1 of them can be converted to room thermostat (switch)), 1 input for remote control (RTA) or operating mode switch (BAS)

Outputs: 3 semiconductor relays, 1 potential-free extra-low voltage relay, 1 x PWM output, 1 x 0-10V output

PWM frequency: 512 Hz

PWM voltage: 10.8V

Switching capacity:

1 (1) A 240V~ (semiconductor relay)

1 (1) A 30V = (potential-free relay)

Total switching capacity: 3 A 240V~

Power supply:

100 ... 240V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.63W

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®, MicroSD card slot

Functions: weather-compensated heating circuit control, room thermostat, chimney sweeper function, screed drying function, holiday mode

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, also suitable for mounting into patch panels

Indication / Display: full graphic display, operating control LED (Lightwheel®)

Operation: 4 buttons and 1 Lightwheel®

Protection type: IP 20 / EN 60529

Protection class: I













Ambient temperature: 0 ... 40 °C

Degree of pollution: 2

Dimensions: 110 x 166 x 47 mm

Find the right accessories for your controller!



Controller Model	AM1 (page 71)	CS10 (page 92)	DL2 (page 67)	DL3 (page 68)	KM2 (page 66)	EM1 (page 33)/EM1-HP (page 71)
 DeltaSol® AL E HE	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaSol® BS series	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaSol® BX/BX L	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaSol® BX Plus	✓	✓	✓	✓	✓	✓
 DeltaSol® CS series	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaSol® MX	✓	✓	✓	✓	✓	✓
 DeltaSol® SL/SLT/SLL	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaTherm® HC mini	✓	-	✓	✓	✓	-
 DeltaTherm® HC	✓	✓	✓	✓	✓	✓
 DeltaTherm® HC MAX	✓	✓	✓	✓	✓	✓
 DeltaTherm® FK	✓	-	✓	✓	✓	✓ (EM-HP)
 DeltaTherm® HT	-	-	-	-	-	-



VBUS®/USB (page 69)



VBUS®/LAN (page 69)



GA3 (page 70)



RTA12/RCP12 (page 91)



SD3/SDFK (page 70)



SP10 (page 92)



Moisture-proof housing (page 19)

✓	✓	✓	-	✓ (SD3)	✓	-
✓	✓	✓	-	✓ (SD3)	✓	✓
✓	✓	✓	-	✓ (SD3)	✓	-
✓	✓	✓	✓ (RTA12)	✓ (SD3)	✓	-
✓	✓	✓	-	✓ (SD3)	✓	✓
✓	✓	✓	✓*	✓ (SD3)	✓	-
✓	✓	✓	-	✓ (SD3)	✓	✓
✓	✓	-	✓*	-	-	✓
✓	✓	-	✓*	-	-	-
✓	✓	✓	✓	✓ (SD3)	✓	-
✓	✓	-	-	✓ (SDFK)	-	✓
-	-	-	✓	-	✓	✓

Customisation of RESOL controllers

Ask our sales team for the price of your personal customisation!

Controllers with inlay (e. g. DeltaSol® BS, MX)

	Logo	Type designation	Company headquarters	Company address
Inlay	✓	✓		
Type label	✓	✓	✓	
Manual	✓	✓		✓

Controllers with printed housing (e. g. DeltaSol® CS, AL E HE)

	Logo	Type designation	Company headquarters	Company address
Housing cover	✓	✓		
Type label	✓	✓	✓	
Manual	✓	✓		✓

Controllers with display cover pane (e. g. DeltaSol® SL, SLT)

	Logo	Type designation	Company headquarters	Company address
Display cover pane	✓			
Type label	✓	✓	✓	
Manual	✓	✓		✓

Alternatively, the Slider of the DeltaSol® SL series can be printed by pad printing.



Spare fuses

Spare glass fuses 4 A

Bag with fuses, 10 x T4 A

Price bracket C | Article no.: **290 018 30**

Spare glass fuses 6.3 A

Bag with fuses, 10 x T6.3 A

Price bracket C | Article no.: **290 029 90**

Spare can fuses 4 A

Bag with fuses, 10 x T4 A

Price bracket C | Article no.: **280 001 20**

Spare can fuses 6.3 A

Bag with fuses, 10 x T6.3 A

Price bracket C | Article no.: **290 004 70**

Spare glass fuses 0.2 A

Bag with fuses, 10 x T0.2 A

Price bracket C | Article no.: **290 030 60**

Spare glass fuses 1.0 A

Bag with fuses, 10 x T1.0 A

Price bracket C | Article no.: **290 030 50**

Spare glass fuses 0.8 A

Bag with fuses, 10 x T0.8 A

Price bracket C | Article no.: **290 030 20**

Spare glass fuses 2.0 A

Bag with fuses, 10 x T2.0 A

Price bracket C | Article no.: **290 030 00**



Auxiliary relays

Auxiliary relays for separation of different electric circuits. In the case of wall mounting, please use one of the housings HRG2 (appropriate for up to 2 HR230 auxiliary relays) or HRG3 (appropriate for 1 HR230/3 auxiliary relay).

TECHNICAL DATA

Contacts: 1 NO, 1 NC, single-phase (HR230), 4 NO, three-phase (HR230/3)

Rated current: 20 A (HR230), 40 A (HR230/3)

Rated voltage/Max. switching voltage: 250/400 V~ (HR230), 250/440 V~ (HR230/3)

HR230 Auxiliary relay

Single-phase, suitable for all RESOL controllers

Price bracket A | Article no.: **280 002 60**

HRG2 Housing

For up to 2 HR230 Auxiliary relays

Price bracket A | Article no.: **280 003 10**

HR230/3 Auxiliary relay

Three-phase, suitable for all RESOL controllers

Price bracket A | Article no.: **280 033 50**

HRG3 Housing

For 1 HR230/3 Auxiliary relay

Price bracket A | Article no.: **280 033 60**





DHW heat exchange modules available on request!



Pump stations & accessories

Page 52-58

- Pump station and controller are developed in sync – for an optimum outcome
- Available with different pumps and controllers
- All units necessary for the operation of a solar system combined in one pre-assembled station
- Award-winning functionality and design
- Broad range of accessories – perfectly matched with station and controller

Survey of pump stations



	FlowSol® S	FlowSol® S HE	FlowSol® B	FlowSol® B HE	FlowSol® XL
Wilo ST 15/6 ECO	✓		✓		
Wilo ST 15/7 ECO	✓		✓		
Wilo Yonos PARA ST 15/7.0-PWM2		✓		✓	
Wilo Stratos PARA 15/1-9					✓
Air separator			✓	✓	✓
Flowmeter	1 ... 13 l/min	1 ... 13 l/min	1 ... 13 l/min	1 ... 13 l/min	5 ... 35 l/min
DeltaSol® BS/2, BS/4, BS Plus	✓		✓		
DeltaSol® BX, BX L, BX Plus			✓	✓	✓ (BX Plus)
DeltaSol® CS/2, CS/4, CS Plus	✓	✓	✓	✓	
DeltaSol® SL, SLL, SLT			✓	✓	
Metric thread / 230 V~ pump	✓	✓	✓	✓	✓
NPT thread / 115 V~ pump	✓	✓	✓	✓	

Further combinations of pumps and threads are available on request!

Customisation of our pump stations

The customised version of our pump stations includes the following:

	Logo	Type designation	Company headquarters	Company address
Type label	✓	✓	✓	
Manual	✓	✓		✓
Embossed label	✓			

Embossed label with your company logo:

On request the pump stations can be manufactured with a customised embossed label on the front half of the insulation.

For this purpose we will need the following:

- Your company logo as vector eps file

Alternatively, our standard embossed label with the inscription FlowSol® can be used.

Ask our sales team for the price of your personal customisation! For further information on customising our controllers see page 50.



FlowSol® S / S HE pump station



EEI < 0,23



rosenthal design

The FlowSol® S pump station is a single-line pump station and is used in the solar return. The station is available with a choice of controllers from the popular DeltaSol® BS series or DeltaSol® CS series.

The pump station is pre-assembled and contains all the vital hydraulic components for operating a solar thermal system and is particularly easy to install.

- Safety assembly with connection for the diaphragm-type expansion vessel, safety valve and pressure gauge
- Insulated design casing
- Fill and drain valves
- Integrated standard or high-efficiency pump
- Wall mounting bracket with fastening material

ErP data overview

Solar controller:	CS/2	CS/4	CS Plus
Standby [W]	0.57	0.59	0.59
Auxiliary electricity consumption [kWh/a]			
Wilo Yonos PARA ST 15/7.0-PWM2	50.0	50.2	50.2

Station	Controller	Pt1000 sensors	Article no.
FlowSol® S	DeltaSol® BS/2	(1 x FKP6, 2 x FRP6)	290 018 73
FlowSol® S	DeltaSol® BS/4	(1 x FKP6, 2 x FRP6)	290 018 83
FlowSol® S	DeltaSol® BS Plus	(2 x FKP6, 2 x FRP6)	290 018 93

EEI < 0,23

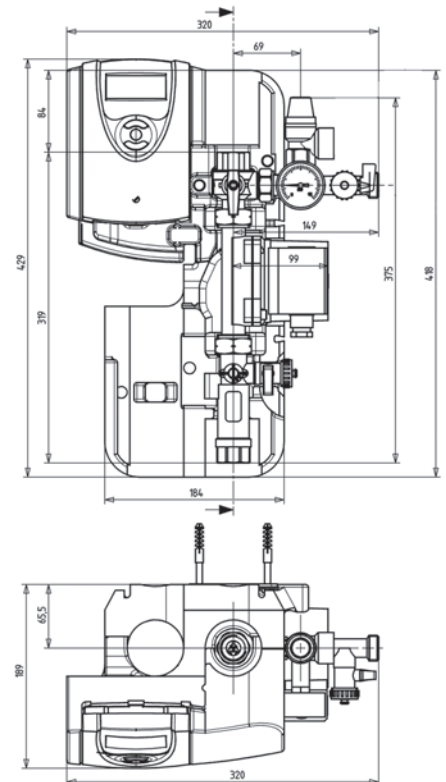


Variants with high-efficiency pump

FlowSol® S HE	DeltaSol® CS/2	(1 x FKP6, 2 x FRP6)	290 028 43
FlowSol® S HE	DeltaSol® CS/4	(1 x FKP6, 2 x FRP6)	290 028 53
FlowSol® S HE	DeltaSol® CS Plus	(2 x FKP6, 2 x FRP6)	290 028 63

On request, all stations are available without controller!

TECHNICAL DATA



Circulating pump:

FlowSol® S: Wilo ST 15/6 ECO or ST 15/7 ECO (surcharge)

FlowSol® S HE:

Wilo Yonos PARA ST15/7.0-PWM2 (Maximum power consumption: 45 W)

Safety valve: 6 bar

Pressure gauge: 0 ... 10 bar

Flowmeter: 1 ... 13 l/min

Non-return valves:

opening pressure 40 mbar, openable

Connection to diaphragm-type expansion vessel: ¾" ET, flat sealing

Outlet safety valve: ¾" IT

Connections to the solar pipes: ¾" IT

Maximum temperature: 95 °C

Maximum pressure: 6 bar

Medium: water with max. 50 % glycol

Dimensions:

approx. 430 × 223 × 193 mm (with insulation)

distance centres: 100 mm

distance centre/wall: 67 mm

Material:

fittings: brass

seals: EPDM/AFM 34

insulation: EPP foam

Optionally available with a Grundfos pump!

FlowSol® B/B HE pump station

Innovative hinged controller panel for easy access!



rosenthal design

The FlowSol® B is a pre-assembled twin-line pump station and contains all the vital hydraulic components for operating a solar thermal system and is particularly easy to install.

- Integrated controller
- Integrated standard or high-efficiency pump
- Fill and drain valves
- Safety assembly with connection for the diaphragm-type expansion vessel, safety valve and pressure gauge
- Air separator with manual air vent for the solar thermal system

ErP data overview

Solar controller:	CS/2	CS/4	CS Plus	BX	BX Plus	SL	SLL	SLT (LAN)
Standby [W]	0.57	0.59	0.59	0.58	0.76	0.69	0.66	0.68 (1.43)
Auxiliary electricity consumption [kWh/a]								
Wilo Yonos PARA	50.0	50.2	50.2	50.1	52.6	51.0	50.8	52.0 (57.5)
ST 15/7.0-PVM2								

Station	Controller	Pt1000 sensors	Article no.
FlowSol® B	DeltaSol® BS series	(1 x FKP6, 2 x FRP6)	290 019 43 (BS/2) 290 019 53 (BS/4)
FlowSol® B	DeltaSol® BS Plus	(2 x FKP6, 2 x FRP6)	290 019 63
FlowSol® B	DeltaSol® BX	(2 x FKP6, 3 x FRP6)	290 020 33
FlowSol® B	DeltaSol® BX L	(2 x FKP6, 3 x FRP6)	290 020 43
FlowSol® B	DeltaSol® BX Plus	(2 x FKP6, 3 x FRP6)	290 020 53
FlowSol® B	DeltaSol® SL	(2 x FKP6, 2 x FRP6)	290 028 03
FlowSol® B	DeltaSol® SLL	(1 x FKP6, 2 x FRP6)	290 029 13
FlowSol® B	DeltaSol® SLT	(2 x FKP6, 2 x FRP6)	290 029 53 290 029 33 (LAN)

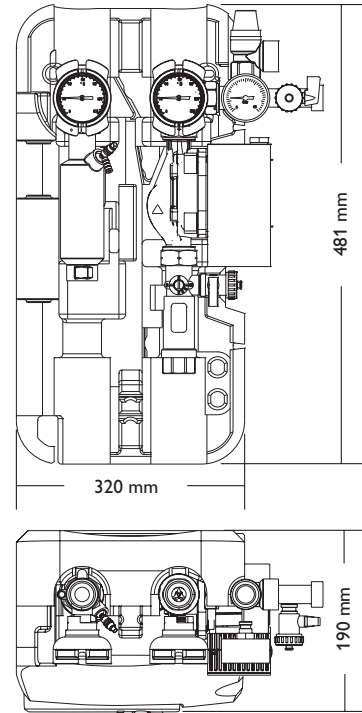


Variants with high-efficiency pump

FlowSol® B HE	DeltaSol® CS series	(1 x FKP6, 2 x FRP6)	290 028 13 (CS/2) 290 028 23 (CS/4)
FlowSol® B HE	DeltaSol® CS Plus	(2 x FKP6, 2 x FRP6)	290 028 33
FlowSol® B HE	DeltaSol® BX	(2 x FKP6, 3 x FRP6)	290 022 63
FlowSol® B HE	DeltaSol® BX Plus	(2 x FKP6, 3 x FRP6)	290 022 83
FlowSol® B HE	DeltaSol® SL	(2 x FKP6, 2 x FRP6)	290 029 03
FlowSol® B HE	DeltaSol® SLL	(1 x FKP6, 2 x FRP6)	290 029 23
FlowSol® B HE	DeltaSol® SLT	(2 x FKP6, 2 x FRP6)	290 029 63 290 029 43 (LAN)

On request, all stations are available without controller!

TECHNICAL DATA



Circulating pump:

FlowSol® B: Wilo ST 15/6 ECO or ST 15/7 ECO (surcharge)

FlowSol® B HE:

Wilo Yonos PARA ST15/7.0-PWM2 (Maximum power consumption: 45 W)

Safety valve: 6 bar

Pressure gauge: 0 ... 10 bar

Flowmeter: 1 ... 13 l/min

Non-return valves:

opening pressure 20 mbar, openable

Connection to diaphragm-type expansion vessel: 3/4" ET, flat sealing

Outlet safety valve: 3/4" IT

Connections to the solar pipes: 3/4" IT

Maximum temperature flow/return: 120 °C/95 °C

Maximum pressure: 6 bar

Medium: water with max. 50% glycol

Dimensions:

approx. 481 x 320 x 190 mm (with insulation)

distance centres: 100 mm

distance centre/wall: 67 mm

Material: fittings: brass

seals: AFM 34

insulation: EPP foam

Optionally available with a Grundfos pump!

FlowSol® XL pump station



For collector fields of up to 100 m²

The FlowSol® XL is a pre-assembled twin-line pump station especially developed for systems with high flow rates. Equipment and nominal width are designed to meet the demands of large collector fields.

- Integrated DeltaSol® BX Plus controller
- Integrated energy-saving high-efficiency pump
- Safety assembly with connection for the diaphragm-type expansion vessel, safety valve and pressure gauge
- Ball valves in flow and return with non-return valves and thermometer handles
- Flowmeter
- Air separator with manual air vent for the solar thermal system
- Fill and drain valves

ErP data overview

Solar controller::	BX Plus
Standby [W]	0.73
Auxiliary electricity consumption [kWh/a]	
Wilo Yonos PARA ST 15/1-p-RKA-130-6H	94.4

RESOL FlowSol® XL – DeltaSol® BX Plus

Twin-line pump station, incl. DeltaSol® BX Plus controller and 5 Pt1000 sensors (2 x FKP6, 3 x FRP6)

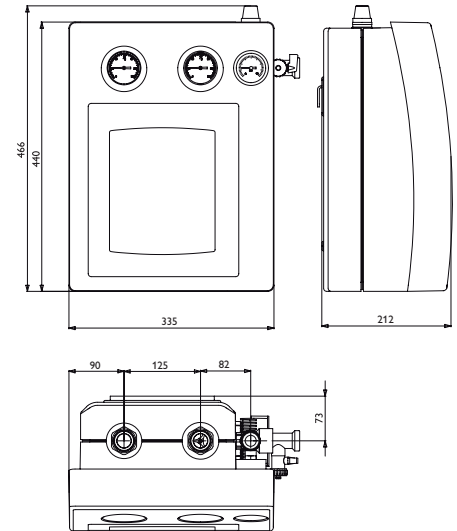
Price bracket A | Article no.: **290 023 93**

RESOL FlowSol® XL – without controller

Twin-line pump station

Price bracket A | Article no.: **290 026 83**

TECHNICAL DATA



Circulating pump: Wilo Stratos PARA 15/1-9
(Maximum power consumption: 88 W)

Safety valve: 6 bar

Pressure gauge: 0 ... 10 bar

Flowmeter: 5 ... 35 l/min

For low-flow systems (0.2 l/min/m²) with collector fields of up to 100 m²

For high-flow systems (0.5 l/min/m²) with collector fields of up to 50 m²

Ball valves in flow and return with non-return valves and thermometer handles:
non-return valves:

opening pressure 20 mbar; openable thermometer: 0 ... 160 °C

Connection to diaphragm-type expansion vessel: 1" ET, flat sealing

Outlet safety valve: 1" IT

Connections to the solar pipes: 1" IT

Maximum temperature flow / return:
120 °C / 95 °C

Maximum pressure: 6 bar

Medium: water with max. 50 % glycol

Dimensions:

approx. 470 x 380 x 220 mm (with insulation)

distance centres: 125 mm

distance centre / wall: 73 mm

Material:

fittings: brass

seals: AFM 34

o-ring: FKM

insulation: EPP foam

Controller ErP data (standby):

DeltaSol® BX Plus: 0.76 W

* 50 % of the rated power consumption



Accessories for pump stations of the FlowSol® series

(except for FlowSol® XL)



Wall mounting for diaphragm-type expansion vessel with screws and wall plugs, high grade steel corrugated tube and connection thread $\frac{3}{4}$ ". Including quick release valve coupling enabling removal of expansion without draining down of the system.

Wall mounting for diaphragm-type expansion vessel

Price bracket B | Article no.: **280 004 60**



Filling and injection pump with non-return valve for pressure increase and refilling of heat transfer fluids. $\frac{1}{2}$ " ET self-sealing with O-ring, 15 mm tube connection, pump output 2 l/min, 4.5 bar max.

RESOL Filling and injection pump

Price bracket B | Article no.: **280 005 40**



Self-sealing double nipples $\frac{3}{4}$ " ET

Price bracket B | Article no.: **280 008 90**



Max. operating temperature: 120 °C

Filling and flushing unit

Price bracket B | Article no.: **290 013 40**



A dirt trap with fine sieve, 1" IT, temperature-resistant up to 110 °C, mounting length 75 mm.

Dirt trap DN25

Price bracket B | Article no.: **280 016 60**



Fittings

Cutting ring fitting $\frac{3}{4}$ " to 15 mm

Article no.: **280 014 50**

Cutting ring fitting $\frac{3}{4}$ " to 18 mm

Article no.: **280 014 80**

Cutting ring fitting $\frac{3}{4}$ " to 22 mm

Article no.: **280 014 60**

Accessories for pump stations of the FlowSol® series

(except for FlowSol® XL)

ALS15 discharge hose



At the safety valve outlet of a solar thermal or heating system, it can get pretty hot at times. The RESOL ALS15 sees to it that no-one gets hurt and nothing gets soiled when that happens.

The robust, heat resistant EPDM hose fits all common 3/4" safety valve outlets, can be individually shortened and is easy and effortless to install.

TECHNICAL DATA

Material: EPDM

Length: 150 cm

Weight: ~ 0.49 kg

Opening: Ø 3 cm

Colour: black

Max. temperature: 120 °C

ALS15 discharge hose

Price bracket B | Article no.: 280 004 92

VM1020 flowmeter



A correct flow rate is vital for the function of a solar thermal system. The RESOL VM1020 flowmeter indicates flow rates from 1 ... 13 litres per minute, with the integrated flow rate limiter, the value can be throttled.

With the also integrated fill/drain valve, flushing and draining processes can be carried out; an opening for the immersion sensor enables an easy return temperature measurement.

Nominal size: DN 15

Max. pressure: 6 bar

Max. operation temperature: 140 °C

Fittings:

upper connection thread: 1" union nut, flat sealing

lower connection thread: 3/4" IT, metal seated

Indication range: 1 ... 13 l/min

VM1020 flowmeter

Price bracket B | Article no.: 280 004 90

LT20 air separator



A solar thermal system has to be vented regularly in order to function efficiently. The RESOL LT20 air separator, installed in the solar flow line, permanently separates the air from the heat transfer fluid.

With the air vent valve and the hose included, the collected air can be discharged manually.

Nominal size: DN 15

Max. pressure: 6 bar

Max. operation temperature: 140 °C

Fittings:

upper connection thread: 1" union nut, flat sealing

lower connection thread: 3/4" IT, metal seated

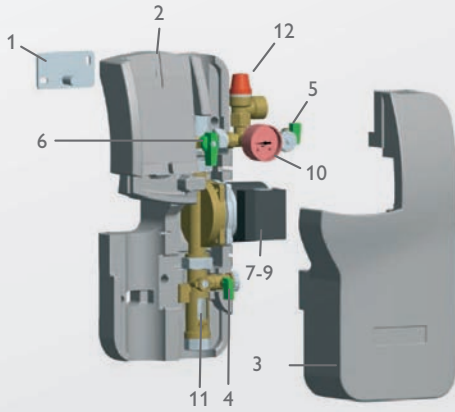
LT20 air separator

Price bracket B | Article no.: 280 004 91



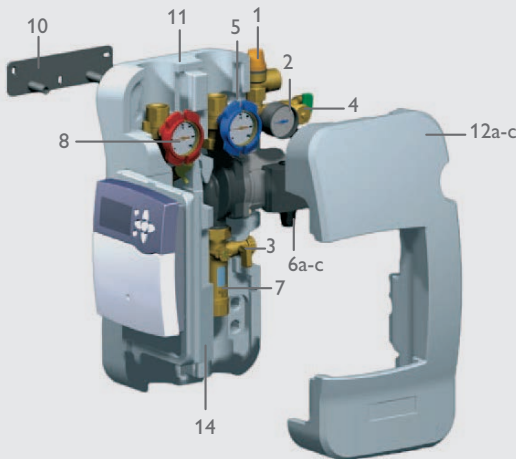
Spare parts for pump stations of the FlowSol® series

FlowSol® S/S HE



Pos.	Art. no.:	Article
1	112 000 52	Wall mounting bracket
2	700 015 12	Back half of the insulation
3	700 015 11	Front half of the insulation
4/5	112 000 58	Fill / drain valve
6	112 000 60	Ball valve with integrated nonreturn valve
7	280 006 10	Pump Wilo ST 15/6
8	280 006 20	Pump Wilo ST 15/7
9	112 041 95	Pump Wilo Yonos Para ST 15/7 (HE pump)
10	112 000 39	Pressure gauge
11	280 004 90	Flowmeter
12	112 000 54	Safety valve 6 bar
13	700 015 14	Controller housing blank (not shown)

FlowSol® B/B HE



Pos.	Art. no.:	Article
1	112 000 54	Safety valve 6 bar
2	112 000 39	Pressure gauge
3/4	112 000 58	Fill / drain valve
5	112 000 69	Ball valve (return) with thermometer and integrated non-return valve
6a	280 006 10	Pump Wilo ST 15/6
6b	280 006 20	Pump Wilo ST 15/7
6e	112 041 95	Pump Wilo Yonos Para ST 15/7 (HE pump)
7	280 004 90	Flowmeter
8	112 000 62	Ball valve (flow) with thermometer and integrated non-return valve
9	280 004 91	Air separator (not shown)
10	112 000 71	Wall mounting bracket
11	700 016 11	Back half of the insulation
12a	700 016 14	Front half of insulation DeltaSol® BX series
12b	700 016 13	Front half of the insulation DeltaSol® BS/CS series (not shown)
12c	700 015 16	Front half of the insulation DeltaSol® SL series (not shown)
13	700 015 14	Controller housing blank (not shown)
14	700 016 12	Hinged controller panel



PV heating

The products from our "PV heating" category enable you to use and store your home-generated power by converting excess current into thermal energy.

Page 60

They form the missing link between the photovoltaic system and the heat generator – for more independence, decreased heating costs and less CO₂ emissions.

FlowSol® E electrothermal station



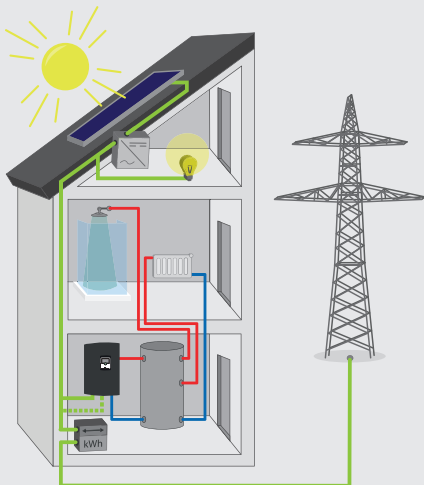
For converting excess current into thermal energy

The RESOL FlowSol® E has been especially designed for using excess power produced by PV systems.

The measuring device reliably detects excess current and the integrated controller redirects it to a steplessly variable electric heater for heating a water store. Thus, excess power can be stored as regenerative heat, internal consumption can be increased while decreasing conventional heating costs.

- Integrated high-efficiency pump and DeltaTherm® E controller
- Integrated electric heater of up to 3 kW, steplessly variable and grid compliant
- Retrofittable in all heating systems
- Reliable household power priority

EXAMPLE

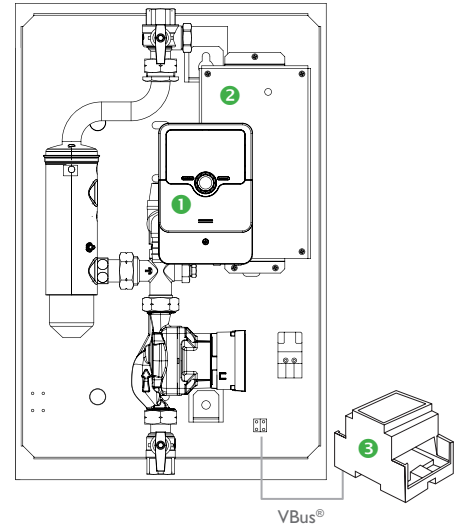


- Converts excess PV current into heat and stores it for later use
- Helps using more regenerative power for yourself and decrease heating costs
- Only converts current which is actually available as excess power into heat
- Contains power fluctuations, observes household power priority
- Intelligent control technology for optimum store stratification, e.g. loading of the upper store zone for optimum energy use

RESOL FlowSol® E – DeltaTherm® E
Electrothermal station, incl. DeltaTherm® E controller, power unit and measuring unit

Article no. (heating water): **112 199 33**

TECHNICAL DATA



- ❶ DeltaTherm® E controller
- ❷ Power unit
- ❸ DeltaTherm® E sensor measuring unit and current sensors

Circulating pump:

Wilo Yonos PARA 15/7.0-PWM2 (heating water)
(power consumption of the pump: 3 ... 45 W)

Power supply: 220 ... 240 V~ (50 ... 60 Hz)

Cable cross section required: 2.5 mm²

Heater: 0.8 kW/0.8 kW/1.4 kW

Nominal power/current: 0 ... 3 kW (13 A)

Safety valve:

3 bar (heating water)

Connections: Rp 3/4" IT

Maximum temperature: 95 °C

Maximum pressure:

3 bar (heating water)

Medium: heating water

Dimensions:

approx. 605 x 400 x 240 mm (with insulation)
distance centre/wall: 76 mm

Weight: 14 kg

Material: fittings: brass

seals: EPDM

insulation: EPP foam

TECHNICAL DATA CONTROLLER

Inputs: 4 Pt1000 temperature sensors

Outputs: 2 semiconductor relays, 1 PWM output

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

Total switching capacity: 2 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: < 1 W

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: VBus®, MicroSD card slot

VBus® current supply: 60 mA

Housing: plastic, PC-ABS and PMMA

Indication/Display: full graphic display, operating control LED (Lightwheel®) and background illumination

Operation: 2 push buttons and 1 adjustment dial (Lightwheel®)

Ingress protection: IP 20/EN 60529

Protection class: I

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

DeltaTherm® PV



Generate current → Manage energy → Store heat

BE INDEPENDENT!

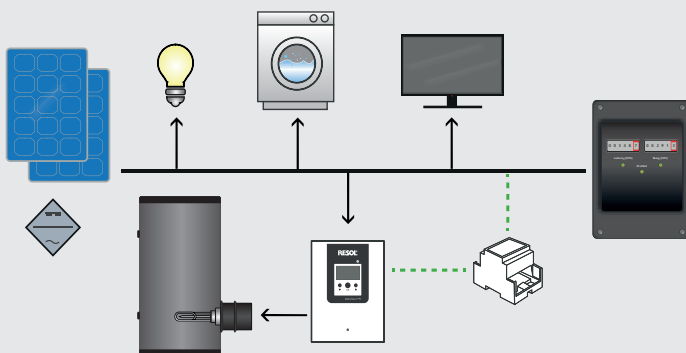
POWER TO HEAT



Made in Germany

- ✓ Increase in self-consumption
- ✓ Reduction of heating costs
- ✓ Direct control of an electric immersion heater
- ✓ Variable and grid-compliant
- ✓ Household current priority
- ✓ Can be used with all PV systems

EXAMPLE



The DeltaTherm® E sensor measures the current flow directly in front of the energy meter in the house. If a current excess is detected, the DeltaTherm® PV controls an electric immersion heater in the store. In this way, the excess current produced by the PV system can be used for heating and DHW heating – also for several days.

RESOL DeltaTherm® PV – Full kit

Incl. measuring unit, 3 current sensors and 1 Pt1000 sensor (FRP6)

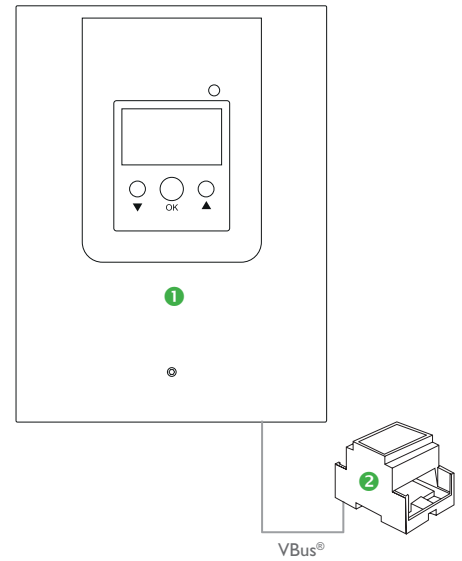
Price bracket B | Article no.: 115 006 53

Electric immersion heater 3 kW 230V~

1½", incl. connection cable 3 m

Price bracket B | Article no.: 180 112 00

TECHNICAL DATA



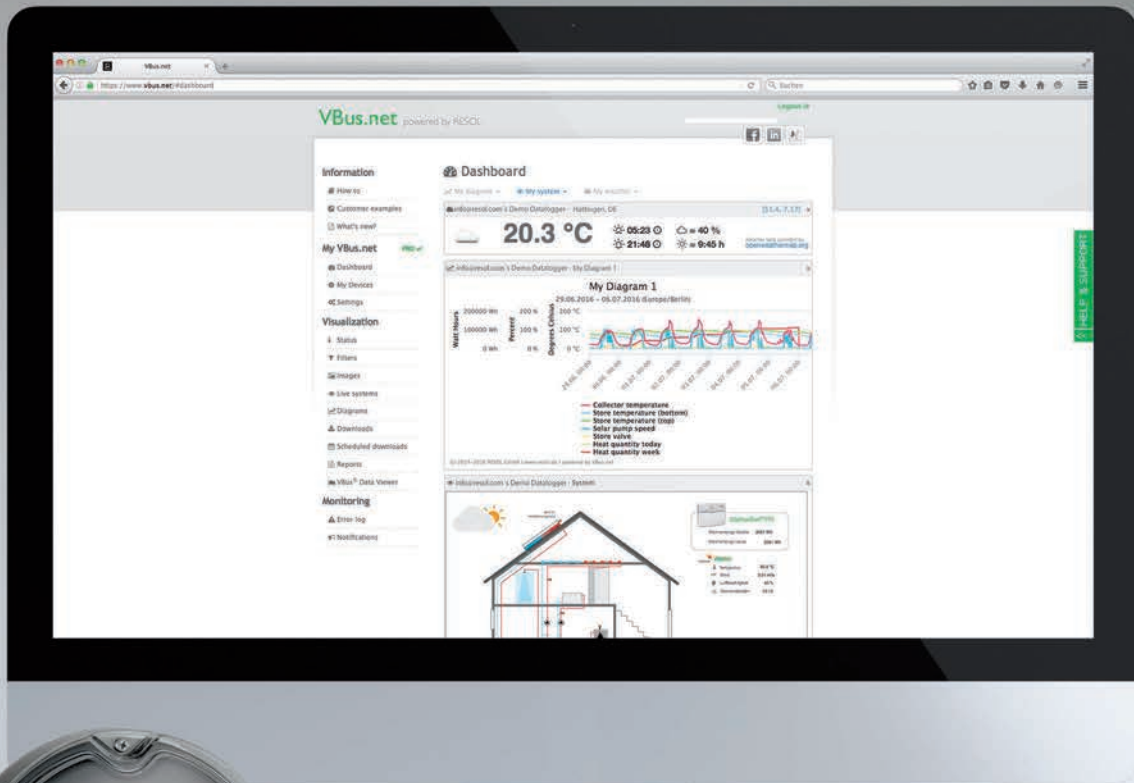
- ① DeltaTherm® PV controller with power unit
- ② DeltaTherm® E sensor measuring unit with current sensors

Technical data DeltaTherm® PV

Inputs: 3 Pt1000 temperature sensors, 2 digital switching inputs, 0-10 V control input
Outputs: 2 digital switching outputs, variable power control up to 3 kW (electric immersion heater)
Power supply: 100 ... 240 V~ (50 ... 60 Hz)
Supply connection: type Y attachment
Standby: 1.41 W
Rated impulse voltage: 2.5 kV
Data interface: VBus®
VBus® current supply: 35 mA
Functions: controller and power controller
Housing: sheet metal, powder-coated
Mounting: wall mounting
Indication / Display: full graphic display
Operation: 3 buttons
Ingress protection: IP 20 / EN 60529
Protection class: I
Ambient temperature: 0 ... 40 °C
Degree of pollution: 2
Dimensions: approx. 226 x 302 x 84 mm

Technical data DeltaTherm® E sensor

Inputs: 3 current inputs and 3 voltage inputs for SW16 current sensors
Power supply: 100 ... 240 V~ (50 ... 60 Hz)
Supply connection: type Y attachment
Standby: < 1 W
Rated impulse voltage: 1.0 kV
Data interface: VBus®
Functions: energy measuring unit
Housing: plastic, PC (UL 94 V-0)
Mounting: DIN rail in the domestic distribution board
Indication / Display: 2 operating control LEDs
Ingress protection: IP 20 / EN 60529
Protection class: II
Ambient temperature: 0 ... 40 °C
Degree of pollution: 2
Dimensions: 71 x 90 x 58 mm



Visualisation products

Page 63-65

- Controllers, Dataloggers and visualisation solutions from one and the same developer team
- Software solutions for remote parameterisation, data evaluation and visualisation
- Apps for different purposes
- The best solution for each computer and all mobile devices
- OEM versions of all solutions possible with your design



Dataloggers & VBus® accessories

Page 66-72

- The RESOL VBus® is the connection between RESOL devices
- Extend your system by additional sensors, relays and switching capacities
- Interface for remote data displays, visualisation and remote parameterisation
- Signal amplification for complex systems with many devices and great cable lengths

Visualisation and parameterisation overview



VBus®Touch Trainer



VBus®Touch



VBus®Touch FK



VBus®Touch HC

DESCRIPTION

RESOL controller operation training and simulation

Simulate controller software
Use operating elements like on the real controller
Freely adjust sensor values
Relay outputs will be displayed with the corresponding status and/or the pump speed
Adjustments can be sent via e-mail in order to be transferred to an actual controller via SD/MicroSD card

Mobile remote display and monitoring of simple solar systems

Display live data in a pre-defined system graphic
Display system status and/or yield balances
Display temperature progress in detail

Mobile remote display and monitoring of solid fuel boiler / biomass systems

Display live data in an animated system graphic

Remote parameterisation, mobile remote display and monitoring of heating systems

Display live data
Display heating circuit status and outdoor temperature
Use the app as remote control and operating mode switch
Adjust time frames for the correction timer
Rename heating circuits

REQUIREMENTS

All solar controllers equipped with a VBus®

DL2/DL3 Datalogger
Network connection (VBus.net or port forwarding)

Availability

App Store

App Store

All controllers with solid fuel boiler function

DL2/DL3 Datalogger or KM1/KM2
Communication module
VBus.net

App Store, Google Play™

DeltaTherm® HC/ HC mini, DeltaSol® MX

DL2/DL3 Datalogger or KM1/KM2
Communication module
VBus.net

App Store, Google Play™

iPad

iPad, iPhone, iPod touch

iPad, iPhone, iPod touch, Android smartphones and tablets

iPad, iPhone, iPod touch, Apple Watch, Android smartphones and tablets

COSTS

Basic version with HC mini free of charge

Free of charge

EUR 4,99

Basic version with HC mini free of charge

More controllers available via in-app purchases

More controllers available via in-app purchases



VBus.net



RPT Parameterisation tool



RSC ServiceCenter software



VBus®Viewer

DESCRIPTION

System data visualisation, mobile remote display and system monitoring of any number of however complex solar thermal, heating or combined systems

Remote parameterisation of RESOL controllers

Remote parameterisation and system data visualisation of older RESOL controller models

System data visualisation for RESOL controllers without network connection

Display live data and error messages

Create customised data filters and diagrams

Download data packets

Automatic e-mail reports (PRO)

Save and restore visualisation settings (PRO)*

Remotely parameterise RESOL controllers

Display live data in a system graphic

Read out and store system data

Remotely parameterise older RESOL controller models

Manage protocol data from an SD/MicroSD card

Create and edit diagrams, export them as images

REQUIREMENTS

All controllers equipped with a VBus®

All controllers supported

All controllers supported

All controllers with an SD/MicroSD card slot

DL2/DL3 Datalogger or KM1/KM2 Communication module

DL2/DL3 Datalogger or KM1/KM2 Communication module or VBus®/LAN, VBus®/USB interface adapter

DL2/DL3 Datalogger or KM1/KM2 Communication module or VBus®/LAN, VBus®/USB interface adapter

SD/MicroSD card

Availability

www.VBus.net (web-based application)

RESOL website (software application)

RESOL website (software application)

RESOL website (software application)

All devices with a browser and an Internet connection (platform-independent)

PC with MS Windows 7 or higher

PC with MS Windows 7 or higher

PC with MS Windows 7 or higher

COSTS

Basic access free of charge

Free of charge

Free of charge

Free of charge

PRO access with an extended range of functions: EUR 39/year

* Please see page 65 for further information


VBus.net

Visualise your system data

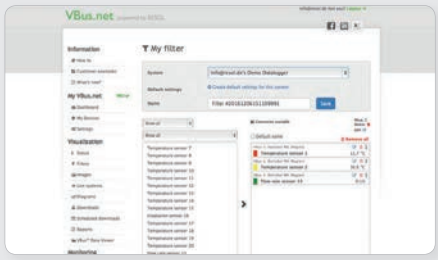
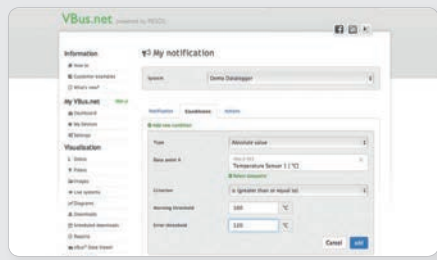

 Simplified **filter** creation – define data points via Drag&Drop and configure them for further use.

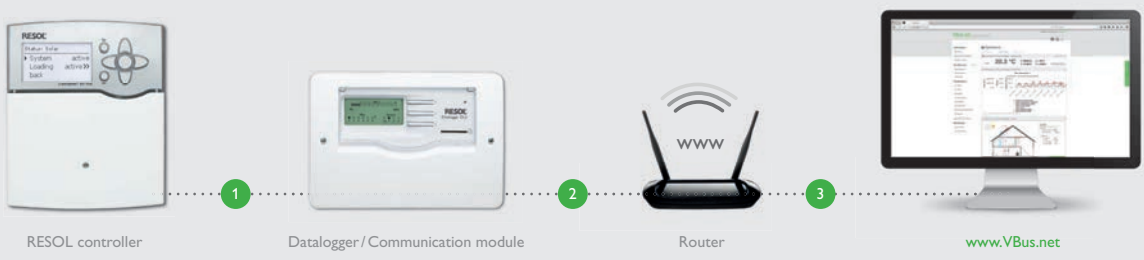
Diagram function with freely positionable legend.

 Advanced **live system editor** with extended format and layout functions.

 Freely configurable **e-mail notifications** to recipients of your choice, e.g. in the case of error messages, temperature deviations, etc.

The safe and easy way to yield monitoring your RESOL controller with the VBus.net visualisation portal.

- For every PC and mobile device
- No software installation required
- Without any tedious router configuration

Functions	Basic	Pro
Price	0 €	39 €/ year
Data refresh	5 minutes	1 minute
Data storage	90 days	1 year
Custom system images	3	10
Weather data	-	✓
Advanced system editor	-	✓
Error protocol	-	✓
E-mail notifications	-	✓
Share device	-	✓
Reports	-	✓
Default filter settings	-	✓
Visualisation data backup	-	✓

How to:


- 1 Establish VBus® connection
- 2 Establish LAN connection
- 3 Visit website www.VBus.net

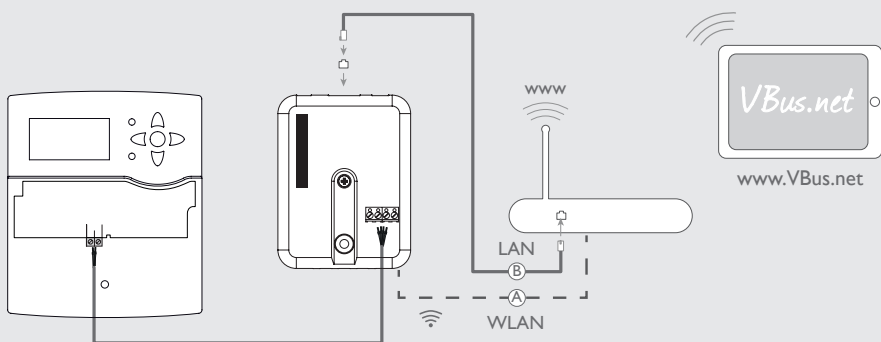


KM2 Communication module

Economical solution for remote controller access

The KM2 Communication module is the ideal interface between a solar or heating controller and the Internet. In only a few steps, the RESOL controller can be connected to the VBus.net visualisation portal. The communication module is suitable for all controllers with VBus® and enables the easy and secure access to system data via VBus.net. Remote access to your RESOL controller is also possible, of course, via the RESOL Parameterisation Tool RPT.

- Internet access to the system data via VBus.net
- Suitable for all RESOL controllers with VBus®
- Comfortable system parameterisation via the RESOL RPT Parameterisation Tool possible
- WLAN functionality

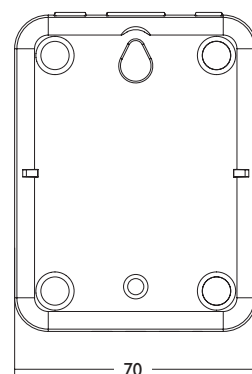
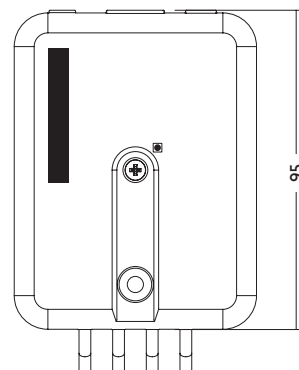


RESOL KM2 Communication module

Communication module incl. RESOL service CD, network cable and mains adapter, VBus® cable pre-connected

Price bracket A | Article no.: **180 012 10**

TECHNICAL DATA



Housing: plastic

Protection type: IP 20/EN 60529

Protection class: III

Ambient temperature: 0 ... 40 °C

Dimensions: 95 × 70 × 25 mm

Mounting: wall mounting (optional)

Display: operating control LED

Interfaces: RESOL VBus® for the connection to the RESOL controller, 10/100 Base TX Ethernet, Auto MDIX, WLAN 2.4–2.4835 GHz

WLAN encryption: WEP, WPA/PSK, WPA2/PSK

Power consumption: < 1.75W

Power supply:

input voltage of mains adapter:

100 ... 240 V~ (50 ... 60 Hz)

rated current: 146 mA

input voltage of Communication module:

12V DC ± 5 %

The Communication module can be branded with your own logo. Please contact our sales team.

For use in Europe only!



rosenthal design



DL2 Datalogger

Remote access to the controller and integrated data logging

The DL2 Datalogger is the interface between a RESOL controller and the Internet and additionally permits logging of system data. The DL2 enables the access to the system data via www.VBus.net.

- Remote access to the system via the VBus.net visualisation portal
- Comfortable system parameterisation via the RESOL RPT Parameterisation Tool
- Internal memory for datalogging
- Data transfer via SD card
- Firmware updates via Internet or SD card
- Suitable for all RESOL controllers with VBus®



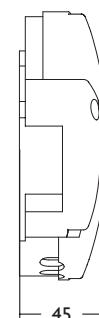
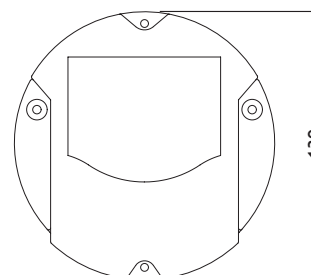
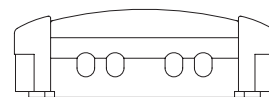
The Datalogger can be branded with your own logo. Please contact our sales team.



VBus.net

The www.VBus.net visualisation portal – your system data displayed as live data, diagrams and tables

TECHNICAL DATA



Housing: plastic PC-ABS and PMMA

Ingress protection: IP 20/EN 60529

Protection class: III

Ambient temperature: 0 ... 40 °C

Dimensions: Ø 130 mm, depth 45 mm

Mounting: wall mounting

Display: bar LED for monitoring the memory capacity, 1 illuminated push button for indication of the SD card status

Interfaces: RESOLVBus® for the connection to the controller; LAN

Power supply:

input voltage of mains adapter:

100 ... 240 V~, 50-60 Hz

rated current: 350 mA

input voltage of Datalogger: 5V_{DC} ± 5%

Memory: 160 MB internal memory, with a logging interval of 5 min sufficient for:

- 18 months for a systems with one DeltaSol® MX, 3 EM, 3 heating circuits and 1 HQM
- 24 months for a system with one DeltaSol® MX, 1 EM and 1 heating circuit
- 30 months for a system with one DeltaSol® MX

RESOL DL2 Datalogger

For visualisation via VBus.net, incl. SD card and network cable, mains adapter and VBus® cable pre-connected

Price bracket A | Article no.: **180 007 10**

MicroSD card, 4 GB memory capacity, incl. adapter

Price bracket C | Article no.: **180 007 41**



rosenthal design



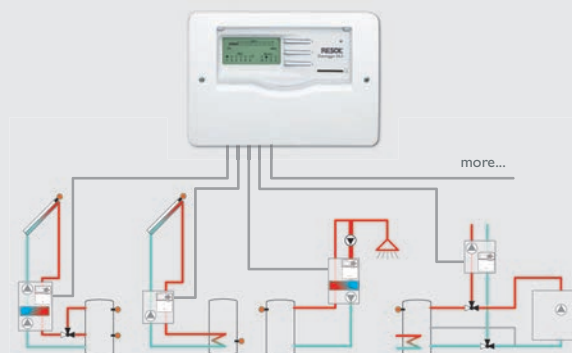
DL3 Datalogger

Data logging with an extended range of functions

The DL3 Datalogger is used for logging data of up to 6 RESOL controllers and permits the visualisation via www.VBus.net and the parameterisation via RPT. Get a comprehensive overview of all controllers connected with the large full graphic display, all important settings are directly adjustable on the DL3. The integrated sensor and impulse inputs can measure and log temperatures – even without a controller.

The DL3 is furthermore equipped with a BACnet functionality for BACnet conform transmission of data and can thus be used in a building management system.

- Data logging and parameterisation of up to 6 VBus® master devices
- Temperature measurement and logging – even without a controller
- BACnet functionality
- Integrated heat quantity measurement
- Remote access to the system via the VBus.net visualisation portal
- Comfortable system parameterisation via the RESOL RPT Parameterisation Tool possible
- Firmware updates via Internet or SD card
- Suitable for all RESOL controllers with VBus®

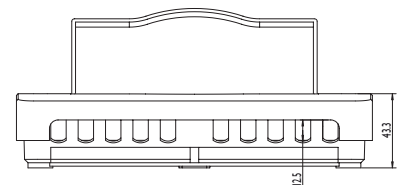
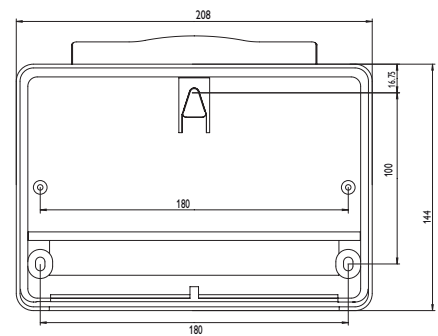
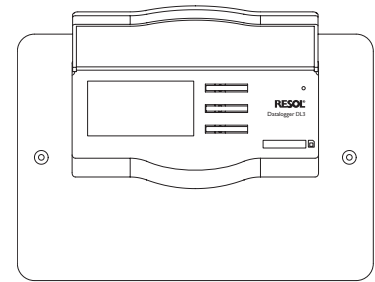


RESOL DL3 Datalogger

For visualisation via VBus.net, incl. SD card, mains adapter, network and VBus® cable

Price bracket A | Article no.: 180 009 90

TECHNICAL DATA



Housing: plastic, PC-ABS and PMMA

Ingress protection: IP 20/EN 60529

Protection class: III

Ambient temperature: 0 ... 40 °C

Dimensions: 144 x 208 x 43 mm

Mounting: wall mounting, mounting into patch panels possible

Display: full graphic display for status visualisation and operating control LED

Inputs: for 3 Pt500, Pt1000, KTY or impulse sensors, 1 current loop interface 0(4)-20 mA

Operation: 3 push buttons and 1 slide switch

Interfaces: 6 x RESOLVBus® for the connection to the controller (slave), 1 x SD card slot, 1 x LAN (10/100), 1 x USB master

Power supply:

input voltage of mains adapter: 100 ... 240 V~

rated current: 1 A

input voltage of Datalogger: 12 V= (DC)

Memory: 160 MB internal memory, with a logging interval of 5 min. sufficient for:

- 18 months for a system with one DeltaSol® MX, 3 EM, 3 heating circuits and 1 HQM
- 24 months for a system with one DeltaSol® MX, 1 EM and 1 heating circuit
- 30 months for a system with one DeltaSol® MX

The Datalogger can be branded with your own logo. Please contact our sales team.



VBus.net

The www.VBus.net visualisation portal – your system data displayed as live data, diagrams and tables

VBus®/USB interface adapter

With the RESOL VBus®/USB interface adapter, the controller can be connected to the USB port of a PC via the VBus®.



- USB 2.0 full speed compatible
- With mini USB-B port
- Remote parametrisation of the controller via VBus®
- RESOL Service CD included
- Including standard USB/mini USB adapter cable

VBus®/LAN interface adapter

The VBus®/LAN interface adapter is designed for the direct connection of the controller to a PC or router. It enables easy access to the controller via the local network of the owner. VBus.net access is not possible with this product. For VBus.net access, you will need a KM2 Communication module or a DL2/DL3 Datalogger.



- The network connection for your solar system
- Access to the system via the complete network
- Remote parametrisation of the controller via VBus®
- RESOL Service CD included

VBus®-Repeater

The VBus®-Repeater amplifies the VBus® signal of a controller and supplies a current of 200 mA in total to modules connected.



- Connect multiple modules to one controller
- Maximum current supply of 200 mA
- VBus® cable extension of up to 150 m in total possible

TECHNICAL DATA

Housing: plastic

Protection class: IP 20/EN 60529

Dimensions: 95 x 70 x 25 mm

VBus®/USB

Interfaces: RESOL VBus® for the connection to the controller, mini USB-B

Power supply: via RESOL VBus®

RESOL VBus®/USB interface adapter

PC connection kit for RESOL controllers with VBus® incl. RESOL Service CD

Price bracket B | Article no.: **180 008 50**

VBus®/LAN

Interfaces: RESOL VBus® for the connection to the controller; LAN connection RJ45 with 2 status LEDs

Power supply: mains adapter input voltage: 100 ... 240 V~ (50 ... 60 Hz)
adapter input voltage: 12 V==

RESOL VBus®/LAN interface adapter

Network connection set for RESOL controllers with VBus® incl. RESOL Service CD

Price bracket B | Article no.: **180 008 80**

VBus®-Repeater

Input: 1 RESOL VBus® master (controller)

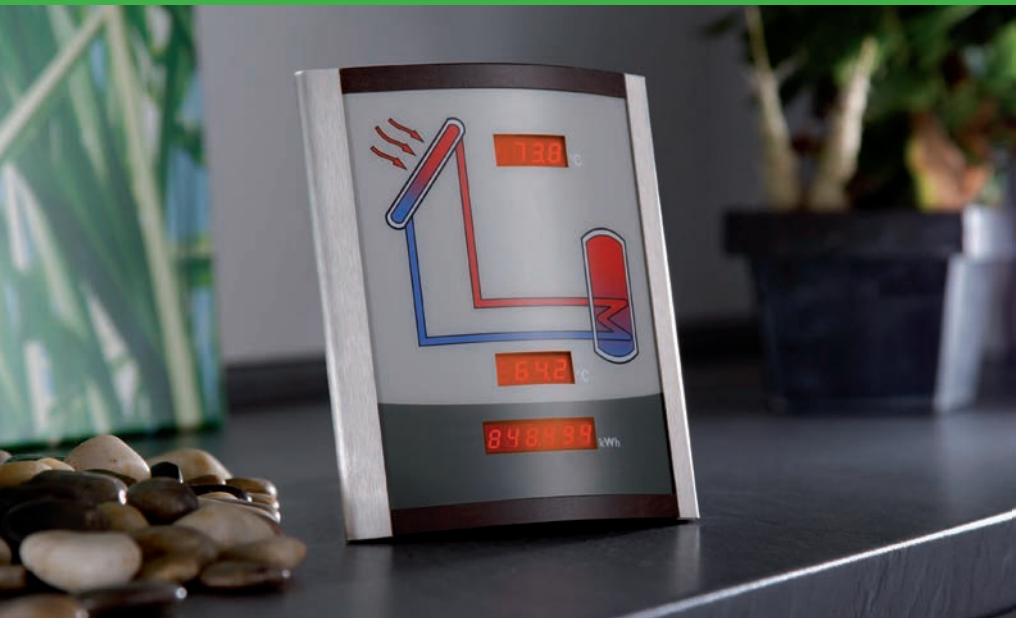
Outputs: 3 VBus® devices (modules, e.g. AM1, SD3, 200 mA in total)

Power supply: input voltage of mains adapter: 100 ... 240 V~ (50 ... 60 Hz)
input voltage of repeater: 12 V==/0.5 A 5.5 x 2.5 mm

RESOL VBus®-Repeater

VBus® signal amplifier

Price bracket B | Article no.: **180 010 40**



TECHNICAL DATA

Housing: high-grade steel frame with wood elements

Dimensions: 150 x 165 x 24 mm

Ingress protection: IP 20 (suitable for dry rooms)

Protection class: III

Display: numerical 7-segment LED display, bicoloured LED red/green (SDFK)

Segment size: 7.5 x 10 mm, 10° digit inclination

Ambient temperature: 0 ... 40 °C

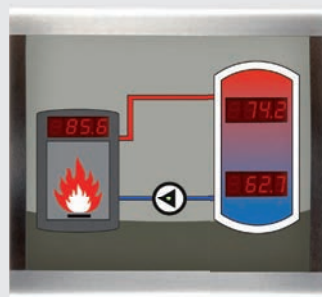
Power supply: via RESOLVBus®

Data interface: RESOLVBus®

SD3 / SDFK Smart Display



SD3



SDFK

The RESOL SD3 and SDFK Smart Displays are used for visualising data issued by the controller.

The SD3 Smart Display indicates the collector temperature, the store temperature and the energy yield of the solar thermal system.

- Visualisation of collector and store temperature as well as heat quantity
- One 6-digit and two 4-digit 7-segment LED displays

In the heating area, the SDFK Smart Display indicates the solid fuel boiler temperature and the bottom/top store temperatures as well as the pump status.

- Visualisation of solid fuel boiler temperature and bottom/top store temperature as well as pump status
- Three 4-digit 7-segment LED displays as well as one bicoloured LED red/green

- Simple connection and power supply via RESOL VBus®
- °F version as well as customised sensor and relay allocation possible on request

RESOL SD3 Smart Display

Display module with 3 displays for collector and store temperature as well as for heat quantity (suitable for all *DeltaSol*® controllers equipped with a VBus®)

Price bracket A | Article no.: **180 004 90**

RESOL SDFK Smart Display

Display module with 3 displays for biomass boiler and store temperature as well as for the pump status (suitable for *DeltaTherm*® FK)

Price bracket A | Article no.: **180 010 80**

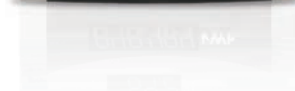
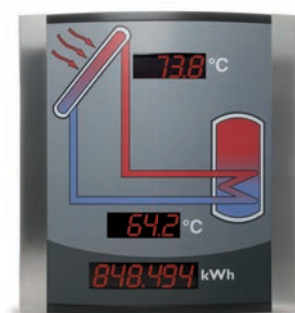
GA3 Large Display

- Easy connection via RESOLVBus®
- Power supply via mains adapter
- Further versions and customised layout of the front plate on request
- Dimensions: 530 x 630 x 100 mm

RESOL GA3

Large Display module with 3 displays for collector and store temperatures as well as for heat quantity, incl. power supply

Price bracket C | Article no.: **180 006 53**



AM1 Alarm module



The AM1 Alarm module is designed to signal system failures. It is to be connected to the VBus® of the controller and issues an optical signal via the red LED if a failure has occurred.

The AM1 also has a potential-free relay output, which can e. g. be connected to a building management system (BMS), so that a collective error message can be issued in the case of a system failure. Thus, the reliability and the stable yield of the system are ensured.

DeltaSol® CS



DeltaSol® MX



EM Extension module



Data communication between the devices takes place via the RESOL VBus®.

EM-HP Extension module



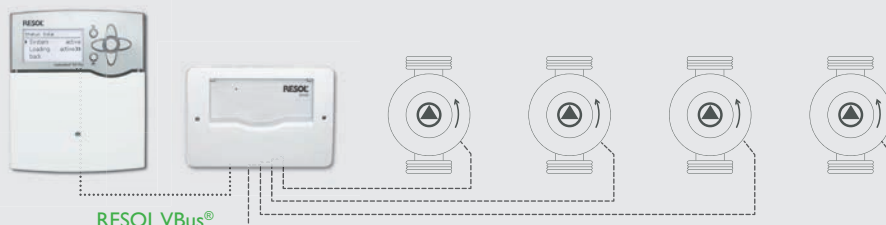
- Connection and speed control of loads with a high current consumption
- Simple connection to the controller via VBus®
- Easy configuration with selection and DIP switches
- 4 electromechanical relays



The EM-HP Extension module enables the control of up to 4 loads with a high current consumption. The power supply of these loads is established over electromechanical relays with a switching capacity of 4 A each.

For the speed control of high-efficiency pumps, the Extension module is equipped with 4 PWM outputs that can be converted to 0-10V outputs.

RESOL controller



TECHNICAL DATA

- Reliable failure signal by LED
- Connection to a building management system (BMS) possible
- Supply and control via RESOL VBus®

Housing: plastic (PC 2207 UV); base part: Karilen E 42 D - H201

Ingress protection: IP 54

Ambient temperature: -25 ... +70 °C

Dimension: 111 x 68 x 40 mm

Mounting: wall mounting

Display: 1 LED

Power supply: RESOL VBus®

Output: 1 potential-free relay

Interface: RESOL VBus®

Switching capacity: max. 30 V~, 1A; 125 V~, 0.5 A

RESOL AM1

Alarm module for signalling system failures

Price bracket B | Article no.: **180 008 70**

Outputs:

4 electromechanical relays, 4 PWM/0-10V outputs

PWM frequency: 512 Hz

PWM voltage: 10.5 ... 11V

Switching capacity:

4 (2) A 240V~ (electromechanical relay)

Total switching capacity: 8 A 240V~

Power supply: 100 ... 240V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.52 W

Mode of operation: type 1.B action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus®

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting

Indication/Display: operating control LED

Operation: 4 DIP switches, 1 slide switch

Ingress protection: IP 20/EN 60529

Protection class: II

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 144 x 208 x 43 mm

RESOL EM-HP

Extension module

Price bracket A | Article no.: **145 441 20**

EM Extension module



The EM Extension module provides 5 additional relays and 6 additional sensor inputs for the *DeltaSol*[®] MX, BX Plus and *DeltaTherm*[®] HC controllers.

- 7-segment LC display
- Function control
- Slide switch 0 Auto I
- Communication via RESOL VBus[®]
- Usable for all optional functions
- Easy to install, configurable over the controller menu

RESOL EM Extension module

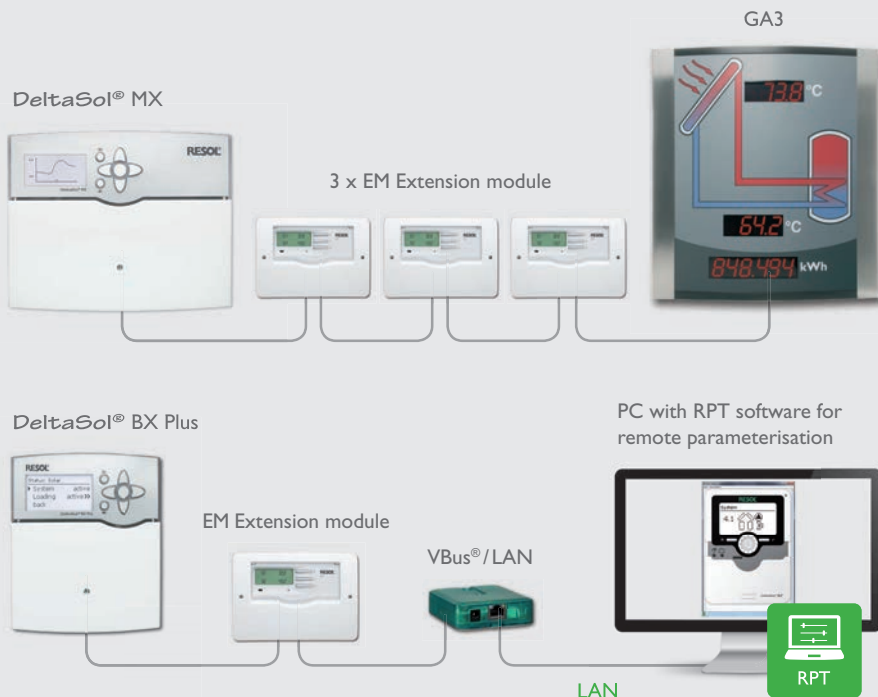
Sensor and relay Extension module with 5 outputs and 6 inputs

Price bracket A | Article no.: **145 440 80**

Application examples of the VBus[®]

The VBus[®] is a two-wire bus, which allows RESOL controllers and additional modules to interchange data. In addition to that, it is possible to power VBus[®] modules without external power supply – the number of VBus[®] accessories that can be connected to one controller depends on the sum of their current consumption and on the current supply of the controller VBus[®]. All RESOL controllers are equipped with a VBus[®] interface (except the *DeltaSol*[®] A/AX/AX HE).

Example illustrations, further configurations are possible. Data communication between the devices takes place via the RESOL VBus[®].



TECHNICAL DATA

Inputs: 6 Pt1000, Pt500 or KTY temperature sensors

Outputs:

4 semiconductor relays and 1 potential-free relay

Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

4 (1) A 24 V~/240 V~ (potential-free relay)

Total switching capacity: 4 A 240 V~

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.30 W

Mode of operation: type 1.B.C.Y action

Rated impulse voltage: 2.5 kV

Data interface: RESOL VBus[®]

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting

Indication/Display: LC display, 7-segment display

Operation: 3 push buttons and 1 slide switch

Ingress protection: IP 20/EN 60529

Protection class: II

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

Dimensions: 144 × 208 × 43 mm

Current consumption of the VBus[®] devices

The number of VBus[®] accessories that can be connected to one controller depends on the sum of their current consumption and on the current supply of the controller VBus[®].

Device	Maximum current consumption
VBus [®] /USB interface adapter	6.5 mA
VBus [®] /LAN interface adapter	6.5 mA
DL2 Datalogger	1.5 mA
DL3 Datalogger	VBus [®] 1-5: 10 mA, VBus [®] 6: 0.5 mA
KM2 Communication module	5.6 mA
SD3 Smart Display	17.5 mA
SDFK Smart Display	25 mA
GA3 Large Display	1 mA
AM1 Alarm module	16.5 mA
EM/EM-HP Extension module	1 mA
WMZ	35 mA
WMZ-G1	35 mA

The **VBus[®] Repeater** amplifies the VBus[®] signal such that modules with a combined current consumption of up to 200 mA can be connected (see page 69).



Tools and HE accessories

- Indispensable helpers for craftsmen, service technicians and lab workers
- Facilitate maintenance of solar thermal and heating systems
- Increase efficiency, maintain reliability and yield stability
- Compatible with all makes and models of pumps and controllers

Page 74-78

SBS 2000 filling and flushing station



DESIGN PLUS
powered by: ISH



- Easy handling and cleaning
- Pictorial instructions on the station
- For heat transfer fluids and cleaning fluids
- Powerful pump
- Dirt filter at the pump inlet
- Additional handles for easy transport
- Integrated hose reel
- Filling level control
- Also available as a 115 V~ version

TECHNICAL DATA

Dimensions: 1000 × 400 × 530 mm

Weight: 21 kg

Tank: 30 litres, PE, with dirt filter and fill level control

Delivery flow: 5 ... 47 l/min

Delivery height: 42 m

Pressure: 4.2 bar

Drain valve: ½"

Medium: water, glycol mixtures

Medium temperature: max. 65 °C



Visit www.resol.de/videos for a product video

For solar thermal professionals, filling and flushing solar thermal systems is a day-to-day business.

The SBS 2000 is the ideal companion for that – lots of thoughtful details help to make this quicker, easier and cleaner.

Version	DE	UK 230V~	UK 115V~	US	AUS
Article no.	280 010 90	280 010 93	280 011 93	280 010 97	280 012 93
Pump	230V~/50 Hz	230V~/50 Hz	115V~/60 Hz	115V~/60 Hz	230V~/50 Hz
Pump power	550 W	550 W	1000 W	1000 W	550 W
Connection	CEE 7/4 socket	UK plug	UK plug	UK plug	AUS plug
Pump pressure	4.2 bar	4.2 bar	4.2 (3") bar	4.2 bar	4.2 bar

*when operating at 50 Hz frequency

ACCESSORIES



Set of 2 ball valves with butterfly handles for pressure and flushing hose

Price bracket C | Article no.: **280 050 60**



Extension cable, 5 m (black)

Price bracket C | Article no.: **280 050 70**

With safety connection, suitable for 280 010 90 only

Customised versions possible!



The customised version of the SBS 2000 includes the following:

	Logo	Type designation	Company headquarters	Company address	RAL number
Base part colour					✓
Lateral label	✓				
Type label	✓	✓	✓		
Manual	✓	✓			✓

For this purpose we will need the following:

- Your company logo as a .tif or an .eps vector file
- The desired type designation of the product
- Your company address
- For the personalised base part colour: the desired RAL number

Ask our sales team for the price of your personal customisation!

Heat transfer fluids



Example mixing ratio Tyfocor® L:
1 tank Tyfocor® L + 15,6 l of water =
26 l of readymix with 40 Vol % (-23,7 °C)

Propylene-glycol-water mixtures are commonly used as the heat transfer fluid. An antifreeze concentration of about 40 % of glycol in the mixture prevents the system from damage.

Even at temperatures of -21 °C, the system remains in an operable state. Temperatures below this protection point will cause the formation of ice pulp, which however is not able to destroy tubes and piping.

However, today's high-end flat collectors and direct-flow vacuum tube collectors may cause the premature degrading of conventional heat transfer fluid at high stagnation temperatures. In order to prevent this process, the operating pressure of the system can be limited to 4 bar or a high-temperature-resistant heat transfer fluid can be used.

Data sheets can be downloaded from our website.

Important notice about the use of heat transfer fluids:

- Only use heat transfer fluid which is suitable for the system it is used in
- All parts of the system that come into contact with fluids must be glycol-resistant
- Concentrations of more than 50 % of glycol are to be avoided in order to achieve optimum efficiency
- At a pH value of 7.5 or less, the heat transfer fluid should be replaced
- Do not dilute readymix fluids!

Physical and chemical characteristics

Density at 20 °C (100 Vol-% concentration): approx. 1.055 g/cm³

	Tyfocor® L	Tyfocor® LS
	Canister of 11 kg concentrate	Canister of 10 l readymix
Article no.	290 000 10	290 000 20
Form	liquid	liquid
Colour	colourless	red fluorescent
Odour	nearly odourless	product-specific
Antifreeze temp.	< -50 °C (40 Vol-%: -23,7 °C)	-28 °C
Boiling point	> 150 °C	> 100 °C
Flashing point	> 100 °C	none
Density at 20 °C	1.054 ... 1.058 g/cm ³	1.032 ... 1.035 g/cm ³

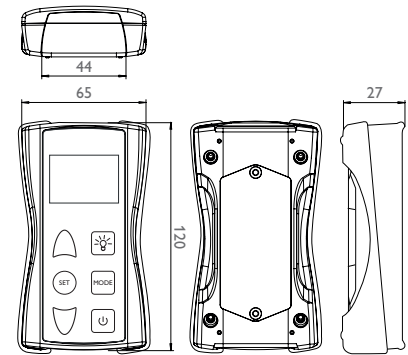
HE-Check

Testing device for PWM and 0-10V signals



Generates and measures PWM and 0-10V signals

TECHNICAL DATA



Inputs: PWM/0-10V

Outputs: PWM/0-10V

PWM frequency: 40 ... 2000 Hz

Measuring range: 0 ... 15 V

Power supply: 3 type AAA batteries (included), typical battery life: 2 years

Functions: measuring and generating a PWM or 0-10V signal

Housing: plastic, ABS and TPE

Indication/Display: full graphic display

Operation: 6 push buttons

Ingress protection: IP 54/DIN EN 60529

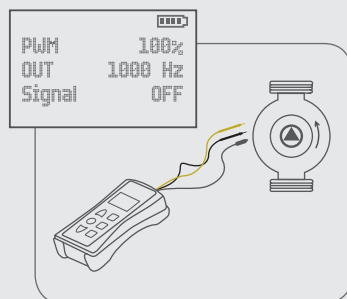
Safety: 18V class I/EN 61010

Ambient temperature: 0 ... 40 °C

Pollution degree: 2

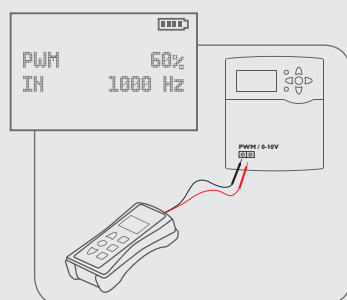
Dimensions: 120 × 65 × 27 mm

With the HE-Check, the function of the pump and the signals of the controller can be checked quickly and easily.



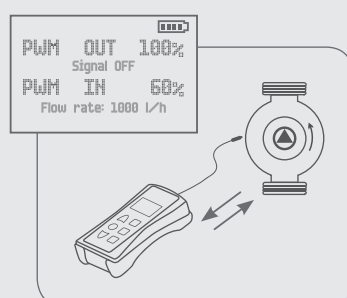
Simulating PWM/0-10V signals

- Suitable for all devices with PWM/0-10V inputs
- Generating speed control signals from 0-100 %
- Adjustable frequency and voltage
- Checking pump function



Testing PWM/0-10V signals

- Suitable for all devices with PWM/0-10V outputs
- Precise measuring of:
 - PWM voltage
 - PWM frequency
- Easy fault diagnostics



Bidirectional pumps

- Simultaneous generating and measuring of PWM signals
- Flow rate indication
- Pump status display:
 - No PWM signal
 - Standby
 - Normal operation
 - Error

- Measures and generates PWM signals in a frequency range from 40 to 2000 Hz
- Intuitive operating concept
- Ergonomic design
- Easy fault diagnostics
- Including a set of measuring and signal cables for different pumps and controllers
- Including a practical storage bag

HE-Check

Testing device for PWM and 0-10V signals

Price bracket B | Article no.: 280 016 50

The PSW Pump signal converter series



PSW Basic

PSW Premium

PSW Universal

The PSW Pump signal converter series translates the speed control signal of the controller into an input signal suitable for a HE pump.

Older controller models HE pump



- The existing controller can still be used
- Controller adjustments do not have to be changed
- All PSW models can be used with any pump and controller brand
- This will save you time and money

	PSW Basic	PSW Premium	PSW Universal
PWM or 0-10V output signal	✓	✓	✓
Inversion of the output signal possible	✓	✓	✓
Pump status display		✓	✓
Outputs: 0-20 mA, 4-20 mA			✓
Article no.	180 010 50	180 010 90	180 010 60

PSW in a set including a WILO Yonos Para HE pump

- Set at an attractive price
- Cables included with the device (Basic) or already pre-connected (Premium)
- Extra-quick mounting

Pre-connected



PSW Basic Set



PSW Premium Set

Wilo Yonos PARA ST 15/7. (130 mm)	180 011 80	180 011 13
Wilo Yonos PARA ST 25/7 (130 mm)	180 011 90	180 011 23
Wilo Yonos PARA ST 25/7 (180 mm)	180 012 00	180 011 53

TECHNICAL DATA

PSW BASIC

Inputs: On / Off, bursts / wave packets, phase cutting
Outputs: PWM/0-10V
PWM frequency: 625 Hz \pm 15 %
PWM voltage: 11V
Power supply: 220 ... 240V~ (50 ... 60 Hz)
Supply connection: type Y attachment
Power consumption: max. 1.5 VA
Mode of operation: 1.Y
Rated impulse voltage: 2,5 kV
Housing: plastic
Ingress protection: IP 65 / EN 60529
Protection class: II
Ambient temperature: 0 ... 50 °C
Dimensions: 80 x 80 x 53 mm

PSW PREMIUM

Inputs: On / Off, bursts / wave packets, phase cutting
Outputs: 1 semiconductor relay, 1 PWM, 1 0-10V
PWM frequency: 625 Hz \pm 2,5 %
PWM voltage: 11V
Power supply: 220 ... 240V~ (50 ... 60 Hz)
Supply connection: type Y attachment
Power consumption: max. 1.7 VA
Mode of operation: 1.Y
Rated impulse voltage: 2,5 kV
Housing: plastic
Indication / Display: operating control LED
Ingress protection: IP 20 / EN 60529
Protection class: II
Ambient temperature: 0 ... 40 °C
Dimensions: Ø 139 mm, depth 45 mm

PSW UNIVERSAL

Inputs: On / Off, PWM, 0-10V, 0-20 mA, 4-20 mA, bursts / wave packet, leading-edge phase control, trailing-edge phase control
Outputs: 1 semiconductor relay, 1 PWM, 0-10V, 0-20 mA, 4-20 mA
PWM frequency: 625 Hz \pm 1 %
PWM voltage: 11V
Switching capacity:
 1 (1) A 240V~ (semiconductor relay)
Total switching capacity: 1 A 240V~
Power supply: 100 ... 240V~ (50 ... 60 Hz)
Supply connection: type Y attachment
Power consumption: < 1 W
Mode of operation: 1.Y
Rated impulse voltage: 2,5 kV
Housing: plastic
Indication / Display: operating control LED
Operation: 1 DIP switch, 1 selector switch
Ingress protection: IP 20 / EN 60529
Protection class: II
Ambient temperature: 0 ... 40 °C
Dimensions: 144 x 208 x 43 mm

Test box



Solar systems reach an increasingly high degree of efficiency but in many cases they can still further increase their efficiency through regular and professional maintenance.

The test box is a professional service box for checking solar thermal systems quickly and easily. Problems affecting system operation can be detected reliably with the help of these measuring and testing devices.



Refractometer



Test set with precise refractometer for exact determination of the antifreeze concentration in the heat transfer fluid.

Refractometer set

Price bracket B | Article no.: 280 009 60

Test set with precise refractometer for exact determination of the cloud point of the heat transfer fluid.

Refractometer set for exact determination of the cloud point

Price bracket B | Article no.: 280 006 00

Contents of the test box

- Test and indication badges
- Compass
- pH test strips
- Screwdriver with voltage control
- Mini screwdriver
- Manometer
- Hand-held refractometer
- Digital multimeter

Test box

Price bracket B | Article no.: 290 009 20

Test and indication badges (25 pieces)

Price bracket C | Article no.: 290 000 60

pH test strips (84 pieces)

Price bracket C | Article no.: 290 001 10

Contents of the refractometer set

- Padded plastic box
- Pipet for sampling
- Mini screwdriver

Dimensions: 27 x 40 x 155 mm

Weight: 180 g



Page 80-85

Thermostats, measuring instruments & calorimeters

Thermostats, measuring instruments and calorimeters are important devices for the installer as well as for the end user. A thermostat is an electronic controller which compares the temperature detected by the sensor to the preset value and controls it using actuators, such as pumps and valves, to achieve that value.

Furthermore, the RESOL product range includes components such as measuring instruments and calorimeters which can be used separately.

TT2 Thermostat controller



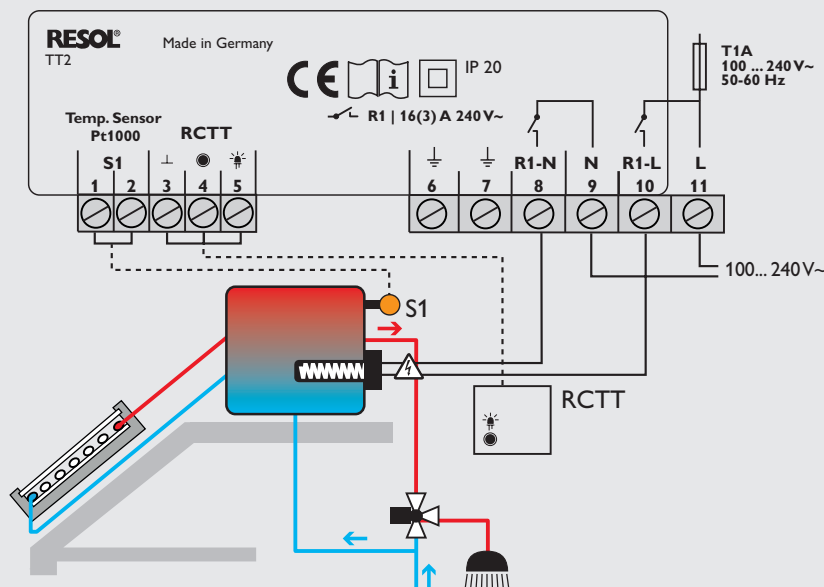
For electric immersion heaters!

The TT2 Thermostat controller is equipped with two high-current relays to which an electric immersion heater of up to 3.6 kW (230 V~)/1.8 kW (115 V~) can be connected.

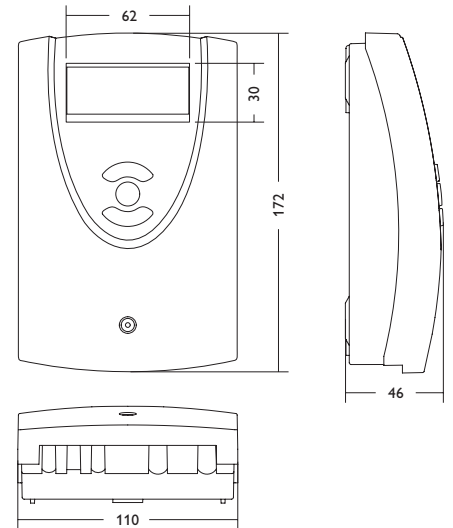
Thus, the TT2 manages the time and temperature control of the electric backup heating for a DHW store. The rapid heat-up function makes for extra comfort. A wireline remote control with an integrated LED enables a comfortable operation of the rapid heat-up function.

- Direct connection of an electric immersion heater up to 3.6 kW (230 V~)/1.8 kW (115 V~)
- Time and temperature control of the electric backup heating
- Rapid heat-up function with optional remote control activation
- Intuitive operating concept
- Energy-efficient switch-mode power supply
- For thermosiphon systems

EXAMPLE



TECHNICAL DATA



The device can be branded with your own logo. Please contact our sales team.

Inputs: 1 Pt1000 temperature sensor; 1 input for RCTT Remote control

Output: 2 high-current relays for electric immersion heater

Switching capacity: 16 (3) A 240 V~ (high-current relay)

Power supply: 100 ... 240 V~ (50 ... 60 Hz)

Supply connection: type Y attachment

Standby: 0.44 W

Mode of operation: type 1.C action

Rated impulse voltage: 2.5 kV

Functions: time-controlled thermostat function, DHW heating with rapid heat-up function

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, also suitable for mounting into patch panels

Display: LC display, multi-functional combined display with pictograms, two 2-digit text fields and two 4-digit 7-segment displays

Operation: 3 push buttons

Ingress protection: IP 20 / DIN EN 60529

Protection class: II

Ambient temperature: 0 ... 50 °C

Degree of pollution: 2

Dimensions: 172 x 110 x 46 mm

RESOL TT2

Thermostat controller

Price bracket A | Article no.: 125 111 03

RESOL TT2 – Full kit

Thermostat controller incl. 1 Pt1000 sensor (FKP6)

Price bracket A | Article no.: 125 111 13

RESOL TT2 – Full kit

Thermostat controller incl. RCTT Remote control and 1 Pt1000 sensor (FKP6)

Price bracket A | Article no.: 125 111 23

RCTT Remote control

With status LED



The RCTT Remote control is designed for activating the rapid heat-up function without accessing the controller menu.

RESOL RCTT

Remote control for connection to the TT2 or the DeltaSol® AL E HE

Price bracket A | Article no.: **136 000 60**

RTM1 Mini digital thermometer



Battery-operated mini digital thermometer with connected sensor for universal application.

TIP:

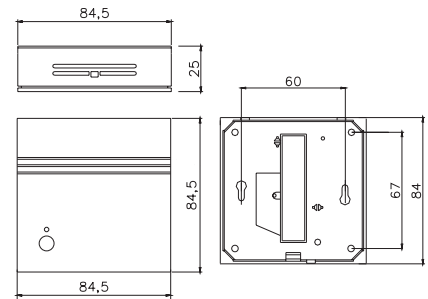
Put several digital thermometers in the store insulation so that you can always read out different temperatures of the store.

RESOL RTM1

Mini digital thermometer

Price bracket B | Article no.: **236 000 20**

TECHNICAL DATA



Housing: wall mounting, material ASA, colour: pure white, similar to RAL 9010

Ingress protection: IP 10

Ambient temperature: 0 ... 40 °C

Dimensions: 84.5 × 84.5 × 25 mm

Colour: black

Dimensions: 48 × 28.6 × 14 mm

Display: 3-digit LC display, continuous indication

Measuring range: -50 ... +95 °C

Resolution: 0.1 °C

Precision: +/- 1 °C

Measuring rate: 10 seconds

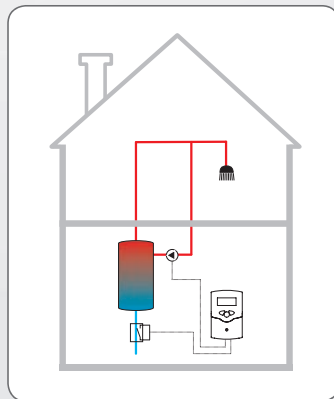
Sensor:

with 2.0 m connection cable (non-extendable)

Incl. battery: G10X1PC



EC1 Variable controller for circulation systems



The purpose of a circulation system is to provide the consumer with hot water as quick as possible when opening the tap. The pipe line system for the supply of domestic water is simultaneously used as a circulation system so that by means of the circulating pump, water is passed through the water pipes even without having to open the tap.

Via a flow switch in the cold water pipe, the controller monitors the water draw-off. After opening the tap for a short moment, the circulating pump is switched on and will be switched off again after the adjusted runtime. The tap operates like a "remote control". This circulating pump control function is an eco-friendly and energy-saving solution in line with demand.

RESOL EC1 - Full kit

Variable controller for circulation systems with FS08 flow switch

Price bracket A | Article no.: **136 112 63**

FS07/FS08 Flow switch

The FS07/FS08 Flow switch is used for flow detection and incorporates a reed-contact, which will be closed as soon as the flow rate is larger than 1 litre/min.

NOTE

Suitable for vertical installation only.
Please pay attention to the flow direction indicated on the housing!



RESOL FS07

Flow switch (230 V~ version; not suitable for EC1)

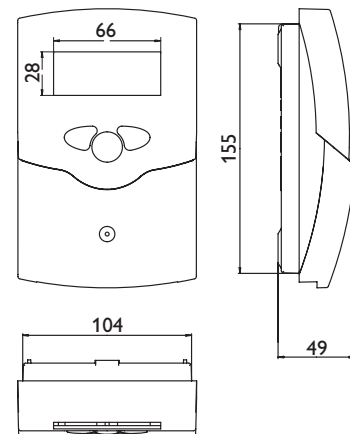
Price bracket A | Article no.: **256 011 10**

RESOL FS08

Flow switch (suitable for EC1)

Price bracket A | Article no.: **256 011 00**

TECHNICAL DATA



Input: 1 sensor input for flow switch

Output: 1 electromechanical relay

Power supply: 220 ... 240 V~ (50 ... 60 Hz)

Power consumption: approx. 2 VA

Controller adjustment: menu-driven

Housing: plastic, PC-ABS and PMMA

Mounting: wall mounting, mounting into patch panels is possible

Operation: 3 push buttons

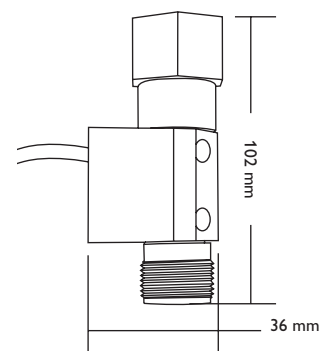
Display:

LC display, multi-functional combined display

Ingress protection: IP 20/EN 60529

Ambient temperature: 0 ... 40 °C

Dimensions: 172 x 110 x 49 mm



Housing: brass

Temperature range: -30 °C ... +100 °C

Maximum pressure: 10 bar

Switching capacity: 250 V~/3 A (FS07)
300 V~/1 A (FS08)

Switching point: 1 litre/min

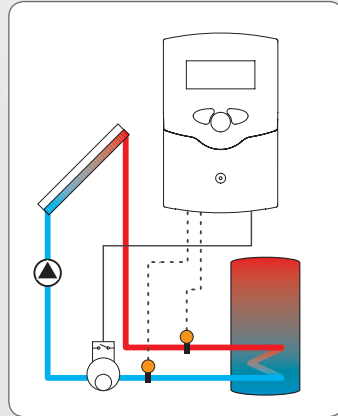
Fittings:

Upper connection thread: ET 22 mm, flat sealing

Lower connection thread: IT 3/4"

Dimensions: 102 mm x 36 mm

WMZ Calorimeter



Universal calorimeter module for solar and heating systems. Graphic display for indication of flow and return temperature, heat quantity, flow rate and sensor faults (balance values are also stored in the case of a power failure). Suited for solar systems with water or water-glycol mixtures (water, propylene glycol, ethylene glycol and Tyfocor® LS adjustable).

- Energy, temperature and flow rate displays with imperial units
- Commissioning menu for easy configuration
- Available for different voltages

RESOL WMZ - Full kit

Calorimeter module incl. 2 Pt1000 temp. sensors (2 x FRP30) and 1 **V40-06 flowmeter**

Article no.: **135 304 13**

as above, but with V40-15 flowmeter

Article no.: **135 304 23**

as above, but with V40-25 flowmeter

Article no.: **135 304 33**

as above, but with V40-35 flowmeter

Article no.: **135 305 03**

as above, but with V40-60 flowmeter

Article no.: **135 305 13**

as above, but with V40-100 flowmeter

Article no.: **135 305 23**

as above, but with V40-150 flowmeter

Article no.: **135 305 33**

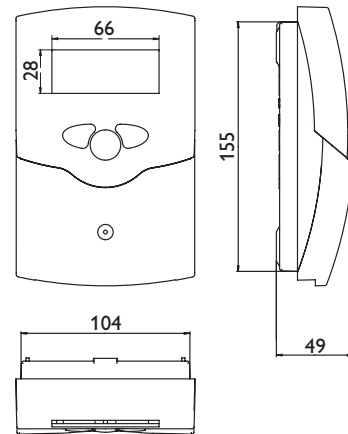
RESOL WMZ

Also available as 12V~ and 115V~ versions!

Calorimeter module

Price bracket B | Article no.: **135 303 53**

TECHNICAL DATA



Power supply: 220 ... 240 V~ (50 ... 60 Hz)

Power consumption: approx. 2 VA

Settings:

- **Volumetric content of glycol:** 0 ... 70% (1% - steps)
- **Impulse rate of flow rate:** 0 ... 99 l/Imp (1 l/Imp - steps) for RESOL V40 flowmeter

Sensors: RESOL Pt1000 sensors only

Measuring precision: ± 0.3 K

Measuring range: -30 ... +150 °C

Interface: RESOL VBus®

Display: graphic display as well as bi-coloured LED

Operation: 3 push buttons

Ingress protection: IP 20/EN 60529

Ambient temperature: 0 ... 40 °C

Dimensions: 172 x 110 x 49 mm

T-piece sensor

(Please see page 90 for further information)



RESOL T22

T-piece sensor 22 mm with FKP 5.5 temperature sensor and TH30 immersion sleeve

Price bracket A | Article no.: **155 005 80**

RESOL T28

T-piece sensor 28 mm with FKP 5.5 temperature sensor and TH30 immersion sleeve

Price bracket A | Article no.: **155 005 90**

V40 Flowmeter

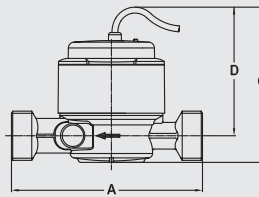
The RESOLV40 is a measuring instrument with a contactor for measuring the flow of water or water-glycol-mixtures and can be connected directly to the controller or calorimeter for heat quantity measurement. After a specific volume has passed, the V40 reed switch sends an impulse to the calorimeter.

The heat quantity used is calculated by these impulses, the temperature difference and pre-defined parameters (glycol type, concentration, heat capacity etc.). Fitting included.

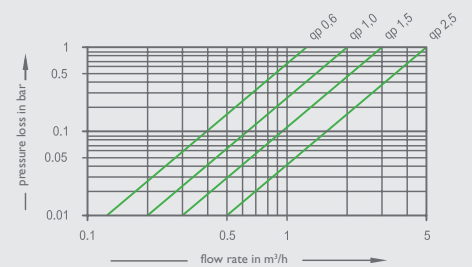


VERSION 1

Irradiation impeller DN20	0.6; 1.5 m ³ /h	2.5 m ³ /h
A mounting length without fitting	110 mm	130 mm
mounting with fitting	208 mm	228 mm
C height with pulser	108 mm	
D height at centre of pipe	90 mm	
counter width	72 mm	
weight without fitting	0.7 kg	

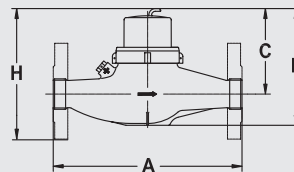


Vertical and horizontal mounting is possible

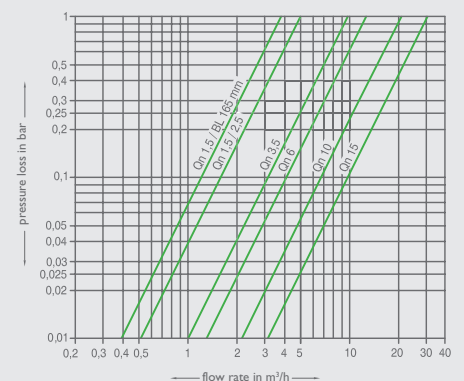


VERSION 2

Irradiation impeller DN25/DN40/DN50	3.5 m ³ /h	6.0 m ³ /h	10 m ³ /h	15 m ³ /h
A mounting length without fitting	260 mm	300 mm		
B total height	143 mm	169 mm	183 mm	
C height at centre of pipe	100 mm	123 mm	126 mm	
H height with flange	152 mm	192 mm	204 mm	
weight with fitting	3.2 kg	6.4 kg	7.4 kg	
weight without fitting	2.7 kg	5.3 kg	5.8 kg	



Horizontal mounting is possible



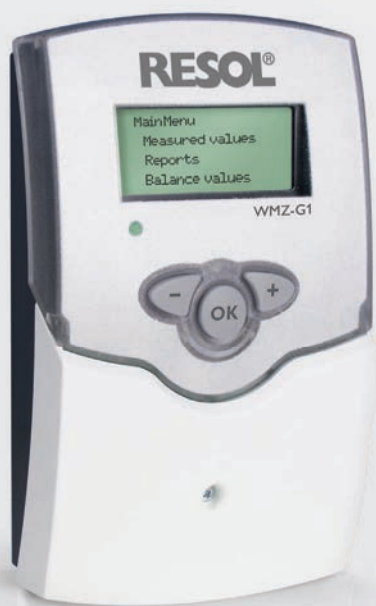
NOTE:

Version 1 is suitable for horizontal as well as for vertical mounting. Version 2 is for horizontal mounting only.

Type		V40-06	V40-15	V40-25	V40-35	V40-60	V40-100	V40-150
Version		1	1	1	2	2	2	2
Impulse rate	I/Imp	1	10	25	25	25	25	25
Nominal width	DN	20	20	20	25	25	40	50
Connection thread at the counter	G...B "	1	1	1	1 ¼	1 ¼	2	2 ¾
Connection thread of the fitting	R... "	¾	¾	¾	1	1	1 ½	2
Max. operat. pressure	P _{max} bar	16	16	16	16	16	16	16
Max. operat. temperature	T _{max} °C	120	120	120	130	130	130	130
Nominal flow	Q ⁿ m ³ /h	0.6	1.5	2.5	3.5	6	10	15
Maximum flow	Q _{max} m ³ /h	1.2	3	5	7	12	20	30
Insulation limit ± 3%	Q _c l/h	48	120	200	280	480	800	1200
Minimum flow horizontal	Q _{min} l/h	12	30	50	70	120	200	300
Minimum flow vertical	Q _{min} l/h	21	60	100	-	-	-	-
Art. no.		280 011 00	280 011 10	280 011 20	280 013 60	280 013 70	280 013 80	280 013 90



WMZ-G1 Calorimeter



Suitable for solar systems as well as for heat pumps!

The WMZ-G1 is a measurement and display unit for solar thermal systems and conventional heating systems. It is possible to connect up to two Grundfos Direct Sensors™, which measure the temperature as well as one additional value – depending on the type: flow rate, relative or differential pressure.

Heat quantity measurement is possible when two Grundfos Direct Sensors™ are connected and at least one of them is a VFS type sensor. The WMZ-G1 also monitors the operating status of the system and displays deviations.

- Recording of: flow temperature, return temperature, power, heat quantity, flow rate, pressure, differential pressure, system errors
- Easy connection
- Dot matrix display
- Function control
- Configurable control parameters

RESOL WMZ-G1

Calorimeter module for Grundfos Direct Sensors™

Price bracket B | Article no.: **135 307 03**

VFS 1-12 l Grundfos Direct Sensor™

Sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 000 20** (Solar / DHW)

Price bracket B | Article no.: **130 002 00** (Heating)

VFS 2-40 l Grundfos Direct Sensor™

Sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 000 30** (Solar / DHW)

Price bracket B | Article no.: **130 002 10** (Heating)

RPS 0-10 bar Grundfos Direct Sensor™

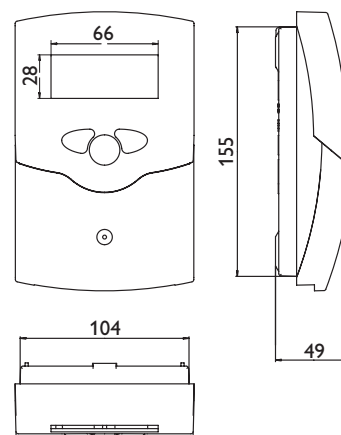
Sensor incl. fitting and connection cable

Price bracket B | Article no.: **130 000 40** (Solar / DHW)

Price bracket B | Article no.: **130 002 20** (Heating)

Please note: different versions for different application areas – Heating and Solar/DHW!

TECHNICAL DATA



Inputs:

2 VFS, RPS or DPS Grundfos Direct Sensors™

Power supply: 220 ... 240V~

Power consumption: approx. 2VA

Measuring range: -30 ... +150 °C

Interface: RESOL VBus®

Display: graphic display as well as bi-coloured LED

Operation: 3 push buttons

Housing: plastic, PC ABS and PMMA

Protection class: IP 20 / EN 60529

Ambient temperature: 0 ... 40 °C

Dimensions: 172 x 110 x 49 mm



Grundfos Direct Sensor™ VFS and RPS

Length: 110 mm (VFS)

Connection thread: ¼" ET (VFS), ½" ET (RPS)

Depth of thread engagement: 12 mm (RPS)

Max. operating temperature:

long-term: 100 °C

short-term: 120 °C

Material: stainless steel

A connection cable (3 m) for the WMZ-G1 is included with the calorimeter.



Sensors

Sensors are used to detect certain quantities such as temperature and irradiation. Platinum sensors, which change their electrical resistance proportionally to the temperature, are used for temperature measurements.

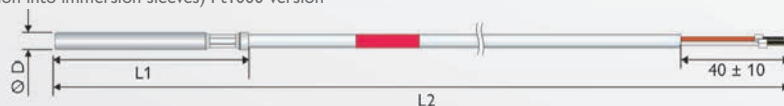
Page 87-92

The sensor type is indicated by the third letter "P", for example: FKP or FRP. FK designates the sensor of the heat source (e. g. collector sensor) and FR the reference sensor (e. g. store sensor). These sensor types have the same electrical features. They differ only in the connecting cable.



Temperature sensors

(for installation into immersion sleeves) Pt1000 version



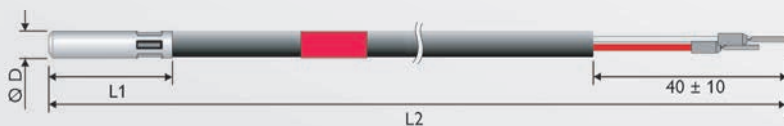
Sensor extension cable

PVC LiYY 2 x 0.5 mm²
(100 m cable coil)

Article no.: **280 051 00**
Price bracket C

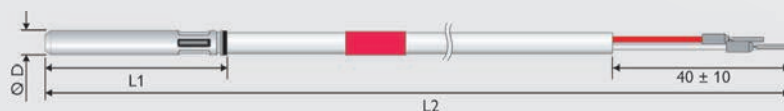
FKP4

D [mm]	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
4	40	1000	Silicone cable	Collector	-50 ... +180 °C	155 000 10



FKP5,5 FRP5,5

D [mm]	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
5,5	28	1500	Silicone cable	Collector	-50 ... +180 °C	155 003 10
5,5	28	2500	PVC cable	Store	-5 ... +80 °C	155 003 20



FRP6

FKP6

FKP6

FKP6

FKP6

FKP6

FKP6

D [mm]	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
6	45	2500	PVC cable	Store	-5 ... +80 °C	155 000 80
6	45	1500	Silicone cable	Collector	-50 ... +180 °C	155 000 20
6	45	2500	Silicone cable	Collector	-50 ... +180 °C	155 004 40
6	45	5000	Silicone cable	Collector	-50 ... +180 °C	155 004 50
6	45	10000	Silicone cable	Collector	-50 ... +180 °C	155 004 60
6	45	20000	Silicone cable	Collector	-50 ... +180 °C	155 006 10

Pt500

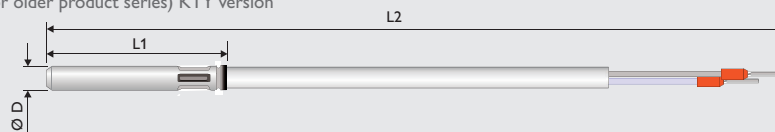
FKP6/500

FRP6/500

6	45	2500	Silicone cable	Collector	-50 ... +180 °C	155 009 20
6	45	2500	PVC cable	Store	-5 ... +80 °C	155 006 80

Semiconductor sensors

(spare part for older product series) KTY version



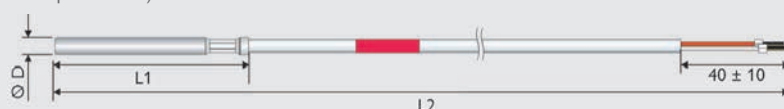
FRY6

FKY6

D [mm]	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
6	45	2500	PVC cable	Store	-5 ... +80 °C	151 000 80
6	45	1500	Silicone cable	Collector	-50 ... +180 °C	151 000 20

High-temperature sensors

(for temperatures up to 300 °C) Pt1000 version



FKP4/H

FKP6/H

D [mm]	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
4	40	1000	PTFE cable	Collector	-50 ... +250 °C	155 001 10
6	46	1500	Silicone cable	Collector	-50 ... +230 °C	155 001 20

All silicone cables are UV- and ozone-resistant.

The standard temperature sensors for collectors and stores are printed in bold.



Note: The temperature range refers to the insulation of the sensor cable!

Flatscrew sensors

(for installation on plane surfaces) Pt1000 version



Further lengths are available on request!

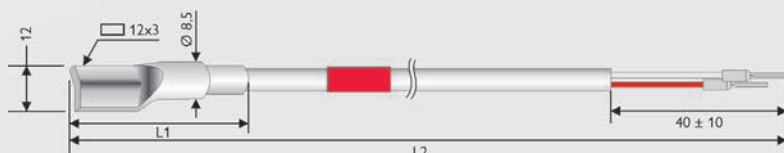


	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
FKP9	32	1500	Silicone cable	Collector	-50 ... +180 °C	155 003 60
FRP9	32	2500	PVC cable	Store	-5 ... +80 °C	155 003 70

All silicone cables are UV- and ozone-resistant.

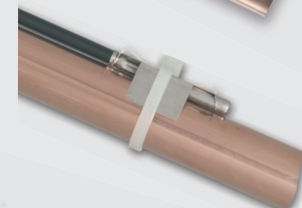
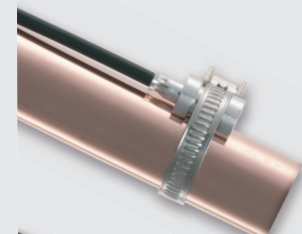
Cylindrical clip-on sensors

(for surface mounting on tubes) Pt1000 version



	L1 [mm]	L2 [mm]	Material	Application	Temperature range	Article no.
FKP23	30	2500	Silicone cable	Collector	-50 ... +180 °C	155 009 60
	incl. pipe clip					

FRP22	39	2500	PVC cable	Store	-5 ... +80 °C	155 008 80
	incl. 1 bracket, 1 cable tie (up to 105 °C), 1 tin of heat conductive paste					



Complete sensors

(Temperature sensors complete with immersion sleeve and strain relief)

	Sensor	Immersion depth [mm]	Material	Temperature range	Article no.
FKP30	FKP5,5	30	Brass	-50 ... +180 °C	155 001 90
FRP30	FRP5,5	30	Brass	-5 ... +80 °C	155 002 80
FKP45	FKP6	45	Brass	-50 ... +180 °C	155 002 00
FRP45	FRP6	45	Brass	-5 ... +80 °C	155 002 10
FKP60	FKP6	60	Copper	-50 ... +180 °C	155 002 20
FRP60	FRP6	60	Copper	-5 ... +80 °C	155 002 30
FKP100	FKP6	100	Copper	-50 ... +180 °C	155 002 40
FRP100	FRP6	100	Copper	-5 ... +80 °C	155 002 50
FKP150	FKP6	150	Copper	-50 ... +180 °C	155 002 60
FRP150	FRP6	150	Copper	-5 ... +80 °C	155 002 70
FKP30V	FKP6	30	Stainless steel	-50 ... +180 °C	155 006 60
FRP30V	FRP6	30	Stainless steel	-5 ... +80 °C	155 006 70
FKP60V	FKP6	60	Stainless steel	-50 ... +180 °C	155 003 80
FRP60V	FRP6	60	Stainless steel	-5 ... +80 °C	155 003 90
FKP100V	FKP6	100	Stainless steel	-50 ... +180 °C	155 004 00
FRP100V	FRP6	100	Stainless steel	-5 ... +80 °C	155 004 10
FKP150V	FKP6	150	Stainless steel	-50 ... +180 °C	155 004 20
FRP150V	FRP6	150	Stainless steel	-5 ... +80 °C	155 004 30



Sensor extension cable

PVC LiYY 2 x 0.5 mm²
(100 m cable coil)

Article no.: **280 051 00**
Price bracket C

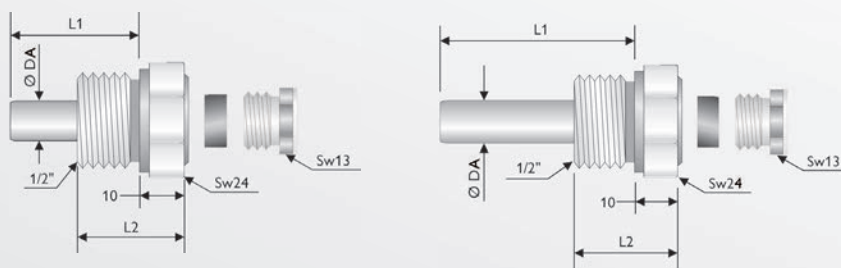
Note: The temperature range refers to the insulation of the sensor cable!

NPT versions available on request!



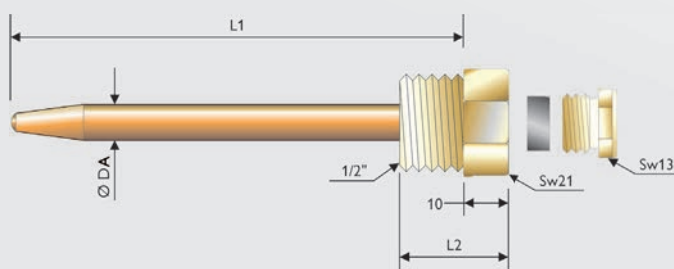
Because of the short component length, it is recommended to use the TH30 immersion sleeve with the FKP5,5 or FRP5,5 temperature sensor.

Immersion sleeves



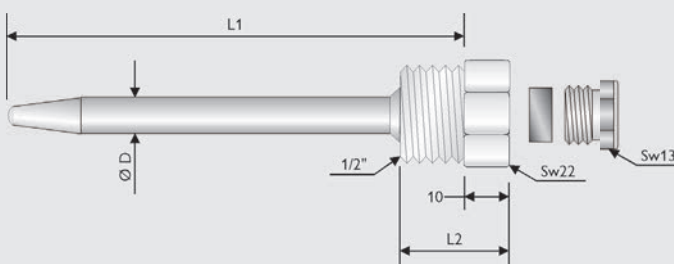
	DA [mm]	DI [mm]	L1 [mm]	L2 [mm]	Material	Article no.
TH30	9	6.2	30	23	Nickel-plated brass	280 005 60
TH45	10	6.2	45	23	Nickel-plated brass	280 000 30

PN10 at 90 °C



	DA [mm]	DI [mm]	L1 [mm]	L2 [mm]	Material	Article no.
TH60	8	6.2	60	23	Nickel-plated copper/brass	280 000 40
TH100	8	6.2	100	23	Nickel-plated copper/brass	280 000 50
TH150	8	6.2	150	23	Nickel-plated copper/brass	280 000 60
TH200	8	6.2	200	23	Nickel-plated copper/brass	280 000 70
TH300	8	6.2	300	23	Nickel-plated copper/brass	280 000 90

PN10 at 90 °C



	DA [mm]	DI [mm]	L1 [mm]	L2 [mm]	Material	Article no.
TH30V	8	6.2	30	23	Stainless steel	280 012 30
TH45V	8	6.2	45	23	Stainless steel	280 010 20
TH60V	8	6.2	60	23	Stainless steel	280 001 00
TH60V/4	5	4.2	60	23	Stainless steel	290 002 20
<small>(for FKP4/H high-temperature sensors)</small>						
TH100V	8	6.2	100	23	Stainless steel	280 002 10
TH100V/4	5	4.2	100	23	Stainless steel	290 002 30
<small>(for FKP4/H high-temperature sensors)</small>						
TH150V	8	6.2	150	23	Stainless steel	280 002 20
TH200V	8	6.2	200	23	Stainless steel	280 002 30
TH300V	8	6.2	300	23	Stainless steel	280 012 70
TH400V	8	6.2	400	23	Stainless steel	290 002 50
TH500V	8	6.2	500	23	Stainless steel	280 005 90

PN16 at 90 °C

Grundfos Direct Sensors™

VFS 1-12 l Grundfos Direct Sensor™

Analogue sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 000 20** (Solar / DHW)

Price bracket B | Article no.: **130 002 00** (Heating)

VFS 2-40 l Grundfos Direct Sensor™

Analogue sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 000 30** (Solar / DHW)

Price bracket B | Article no.: **130 002 10** (Heating)

RPS 0-10 bar Grundfos Direct Sensor™

Analogue sensor incl. fitting and connection cable

Price bracket B | Article no.: **130 000 40** (Solar / DHW)

Price bracket B | Article no.: **130 002 20** (Heating)

For the **DeltaSol® AL E HE, BX Plus, MX, CS** series and **DeltaTherm® HC** only:

VFD 1-12 l Grundfos Direct Sensor™

Digital sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 000 80** (Solar / DHW)

Price bracket B | Article no.: **130 002 30** (Heating)

VFD 2-40 l Grundfos Direct Sensor™

Digital sensor incl. fitting, insert and connection cable

Price bracket B | Article no.: **130 001 00** (Solar / DHW)

Price bracket B | Article no.: **130 002 40** (Heating)

RPD 0-10 bar Grundfos Direct Sensor™

Digital sensor incl. fitting and connection cable

Price bracket B | Article no.: **130 000 90** (Solar / DHW)

Price bracket B | Article no.: **130 002 50** (Heating)

Please note: if you wish to connect two digital sensors to a controller, only use Grundfos Direct Sensors™ with different measuring ranges.

Please note: different versions for different application areas – Heating and Solar/DHW!



Grundfos Direct Sensor™ VFS/VFD and RPS/RPD

Length: 110 mm (VFS/VFD)

Connection thread: ¾" ET (VFS/VFD), ½" ET (RPS/RPD)

Depth of thread engagement: 12 mm (RPS/RPD)

Max. operating temperature:

Long-term: 100 °C

Short-term: 120 °C

Material: stainless steel

A connection cable (3 m) with JST plug is included with each sensor.

Grundfos Direct Sensor™ connection cables in different lengths:

Connection cable 0.4 m

Price bracket B | Article no.: **280 040 40**

Connection cable 0.65 m

Price bracket B | Article no.: **280 040 66**

TS10 Dew point switch

The TS10 Dew point switch is designed for condensation detection in a heating circuit used for cooling purposes.

If the relative humidity falls below the adjusted set value, the TS10 will switch a potential-free contact.



RESOL TS10

Dew point switch for connection to the **DeltaSol® MX** (from version 2.0)

Price bracket B | Article no.: **155 009 00**

T-piece sensor

T-piece sensor for mounting into pipes.

The temperature sensor in the immersion sleeve measures the temperature of the circulating medium.



RESOL T22

T-piece sensor 22 mm with FKP 5,5 temperature sensor and TH30 immersion sleeve

Price bracket A | Article no.: **155 005 80**

RESOL T28

T-piece sensor 28 mm with FKP 5,5 temperature sensor and TH30 immersion sleeve

Price bracket A | Article no.: **155 005 90**

Heat conductive paste

For installing sensors as flatscrew or pipe sensors or into immersion sleeves, heat conductive paste should be used to ensure an optimum heat transfer.

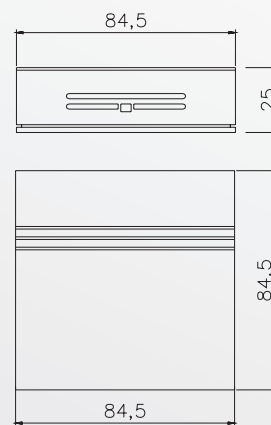


RESOL Heat conductive paste, tube (5 g)

Price bracket A | Article no.: **280 000 10**

FRP12 Indoor temperature sensor

The RESOL FRP12 is used for measuring the indoor temperature with a Pt1000 measuring element.



RESOL FRP12

Indoor temperature sensor

Price bracket A | Article no.: **155 008 90**

RTA12 Remote control

With the RTA12, the heating curve can be comfortably adjusted from the living area. Increasing the heating curve setting causes an increase in flow temperature, decreasing the setting causes a decrease.

The integrated Pt1000 sensor measures the ambient temperature.



RESOL RTA12

Remote control for connection to the *DeltaSol*® MX, BX Plus, *DeltaTherm*® HC/HC mini or EM Extension Module

Price bracket A | Article no.: **136 000 40**

RCP12 Room control unit

With the RCP12, the heating curve can be comfortably adjusted from the living area. The integrated Pt1000 sensor measures the room temperature.

The additional operating mode switch enables a quick change of modes, e. g. from Automatic to Night mode.



RESOL RCP12

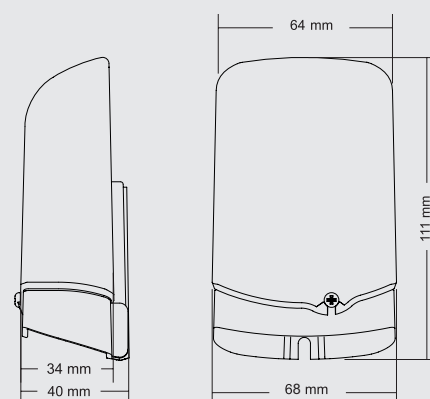
Room control unit for connection to the *DeltaSol*® MX (from version 2.0), *DeltaTherm*® HC mini (from version 1.01) or *DeltaTherm*® HC (from version 1.09)

Price bracket A | Article no.: **136 000 50**

FAP13 Outdoor temperature sensor

The RESOL FAP13 is used for measuring the outdoor temperature with a Pt1000 measuring element.

The FAP13 is placed in a weather-resistant housing and is designed for mounting outdoors. Cable glands for the sensor cables at the bottom of the housing allow easy installation.



RESOL FAP13

Outdoor temperature sensor

Price bracket A | Article no.: **155 008 10**

SV6 Sensor distribution box

With the SV6, the signal of a Pt1000 temperature sensor can be distributed to 6 outputs.

Thus, the signal of a single sensor can be made available to up to 6 controllers. In the case of a sensor fault, the LED will flash red.



- Distributes the signal of a Pt1000 temperature sensor
- Enables using a single sensor for multiple controllers
- Amplifies the signal for transmitting values over great cable lengths



RESOL SV6

Sensor distribution box

Price bracket A | Article no.: **145 441 30**

SP10 Overvoltage protection

Overvoltage protection device placed in housing, suitable for mounting outdoors.

We generally recommend installing the overvoltage protection in order to avoid overvoltage damage at collector sensors, e. g. caused by local lightning storms.



RESOL SP10

Sensor overvoltage protection

Price bracket A | Article no.: **180 110 70**

CS10 Solar cell

The solar cell is used for measuring the irradiation intensity. The short-circuit current rises with increasing irradiation intensity.

Depending on the controller, the sensor can also be used for additional plausibility control or direct control. The connecting cable can be extended to 100 m.



RESOL CS10

Solar cell

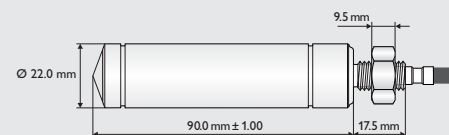
Price bracket A | Article no.: **151 003 20**

CS-I Global irradiation sensor

The CS-I global irradiation sensor is used for precise and reliable measurement of solar irradiation. It converts the irradiation measured proportionally into an interference-resistant 4 ... 20 mA signal.



TECHNICAL DATA



Ambient temperature: -40 ... +75 °C

Material: PVDF, 1.4301, 1.4305

Ingress protection: IP67 (DIN EN 60529)

Supply voltage: 12 V==

Power consumption: up to 10 mA

Output: 4-20 mA

Measuring range: 0 ... 1500 W/m²

Accuracy: +/- (5 % + 10 W/m²)

Connection cable: 5 m

RESOL CS-I Global irradiation sensor

4-20 mA output signal, incl. mains adapter, connection box (IP 44) and mounting material

Price bracket C | Article no.: **151 005 10**

Evaluation and display of measured values by means of the DL3.



Valves

Valves are used to control fluid flow. In hydraulic systems, different valves are used in order to run parts of the system separately or to switch on or off particular parts as required.

Page 94-98

2-port valves allow or stop flow rates. Changeover valves are used to distribute and redirect flow rates.

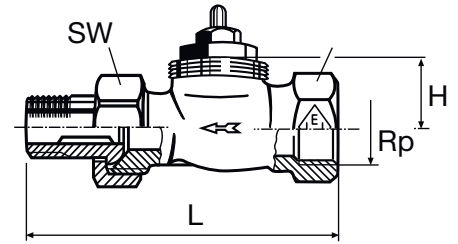
VA20 2-port valve

The 2-port valve RESOL VA20 is used for switching flow rates in solar, heating and air conditioning systems.

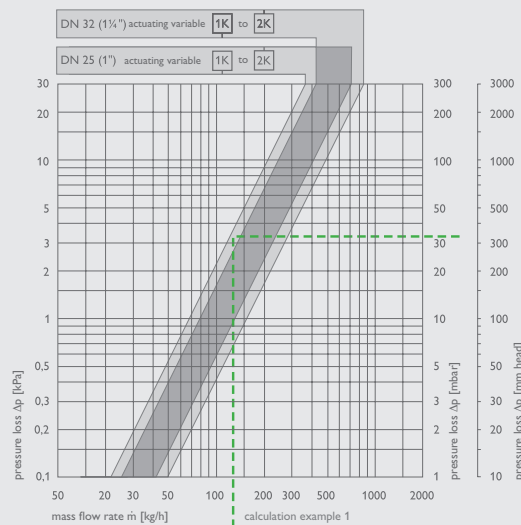
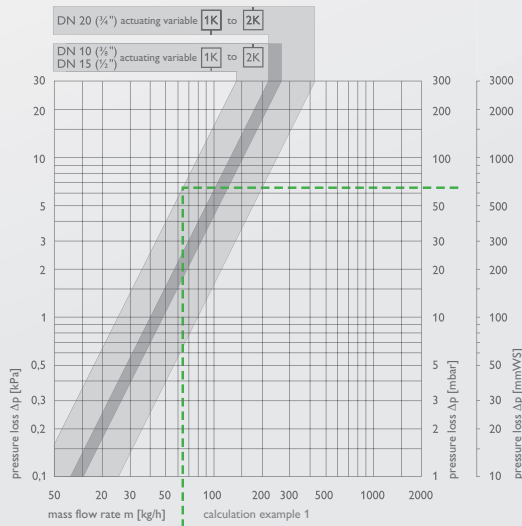
The VA20 is a 2-port-valve with an electro-thermal actuator. The actuating time of approx. 3 minutes enables a flow rate regulation without water hammers. The VA20 comes with brass connection fittings.



TECHNICAL DATA



DN	15	20	25	32
L	95	106	118	135
H	21.5	21.5	23	23
Rp	½	¾	1	1 ¼
SW	30	37	47	52



RESOL VA20-NO/DN 15

R½", with actuator normally open
Price bracket B | Article no.: **270 007 40**

RESOL VA20-NO/DN 20

R¾", with actuator normally open
Price bracket B | Article no.: **270 007 60**

RESOL VA20-NO/DN 25

R1", with actuator normally open
Price bracket B | Article no.: **270 007 80**

RESOL VA20-NO/DN 32

R1¼", with actuator normally open
Price bracket B | Article no.: **270 008 00**

RESOL VA20-NC/DN 15

R½", with actuator normally closed
Price bracket B | Article no.: **270 007 50**

RESOL VA20-NC/DN 20

R¾", with actuator normally closed
Price bracket B | Article no.: **270 007 70**

RESOL VA20-NC/DN 25

R1", with actuator normally closed
Price bracket B | Article no.: **270 007 90**

RESOL VA20-NC/DN 32

R1¼", with actuator normally closed
Price bracket B | Article no.: **270 008 10**

VALVE

Max. operating temperature:

Long-term: up to 120 °C
Short-term: 140 °C

Valve housing: corrosion resistant red brass

Internal parts: brass and stainless steel

Sealings: EPDM

Max. pressure: 10 bar

Connection thread: ½", ¾", 1" and 1¼"

ACTUATOR

Power supply: 230 V~, 50 ... 60 Hz

Power consumption: max. 2.5 W

Ambient temperature: max. 50 °C

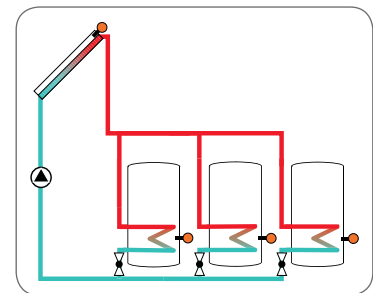
Ingress protection:

IP 44 (when mounted vertically to the top)

Spring force: 90 N

Stroke: 4 mm

EXAMPLE



SVA-NO Actuator for VA20/VA300 (normally open)

Price bracket B | Article no.: **270 007 20**



SVA-NC Actuator for VA20/VA300 (normally closed)

Price bracket B | Article no.: **270 007 30**

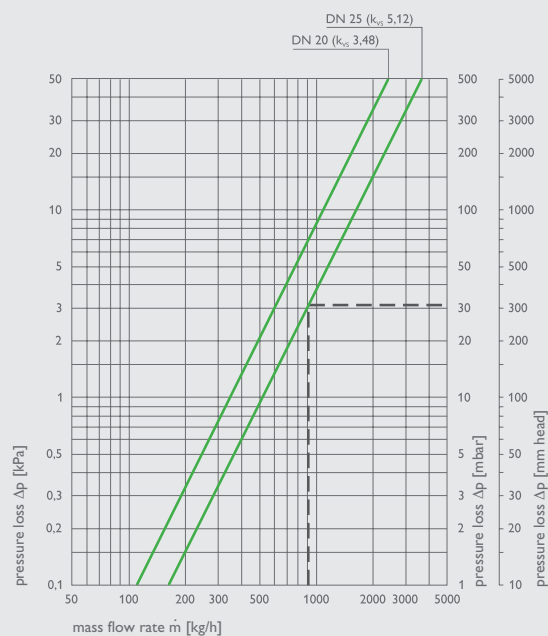
Larger quantity? Ask for an offer!

VA300 Changeover valve

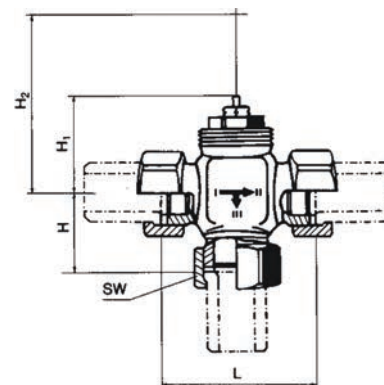


The VA300 is a 3-port-valve with an electrothermal actuator.

The actuating time of approx. 3 minutes enables a flow rate regulation without water hammers.



TECHNICAL DATA



DN	20	25	32	40
L	64	84	115	115
H	36	46	106	106
H ₁	44.5	50	64	64
H ₂	93	98.5	-	-
SW	37	47	66	66

VALVE

Max. operating temperature:

Long-term: up to 120 °C

Short-term: 140 °C

Valve housing: corrosion resistant red brass

Internal parts: brass and stainless steel

Sealings: EPDM

Max. pressure: 10 bar

Connection thread: ¾", 1", 1¼" or 1½"

ACTUATOR

Power supply: 230 V~, 50 ... 60 Hz

Power consumption: max. 2.5 W

Ambient temperature: max. 50 °C

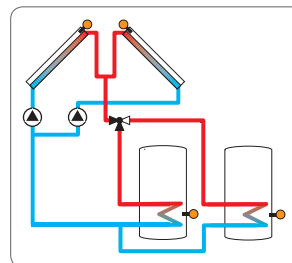
Ingress protection:

IP 44 (when mounted vertically to the top)

Spring force: 90 N

Stroke: 4 mm

EXAMPLE



SVA-NO Actuator for VA20/VA300 (normally open)

Price bracket B | Article no.: **270 007 20**

SVA-NC Actuator for VA20/VA300 (normally closed)

Price bracket B | Article no.: **270 007 30**



RESOL VA300-NO/DN 20 (normally open)

R¾", with actuator and fittings

Price bracket B | Article no.: **270 008 20**

RESOL VA300-NO/DN 25 (normally open)

R1", with actuator and fittings

Price bracket B | Article no.: **270 008 40**

RESOL VA300-NO/DN 32 (normally open)

R1¼", with actuator and fittings

Price bracket B | Article no.: **270 008 60**

RESOL VA300-NO/DN 40 (normally open)

R1½", with actuator and fittings

Price bracket B | Article no.: **270 008 80**

RESOL VA300-NC/DN 20 (normally closed)

R¾", with actuator and fittings

Price bracket B | Article no.: **270 008 30**

RESOL VA300-NC/DN 25 (normally closed)

R1", with actuator and fittings

Price bracket B | Article no.: **270 008 50**

RESOL VA300-NC/DN 32 (normally closed)

R1¼", with actuator and fittings

Price bracket B | Article no.: **270 008 70**

RESOL VA300-NC/DN 40 (normally closed)

R1½", with actuator and fittings

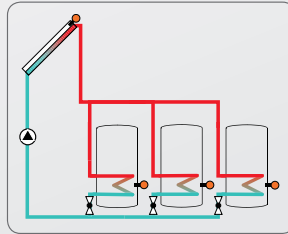
Price bracket B | Article no.: **270 008 90**

Larger quantity? Ask for an offer!

VA22 2-port motor-driven ball valve

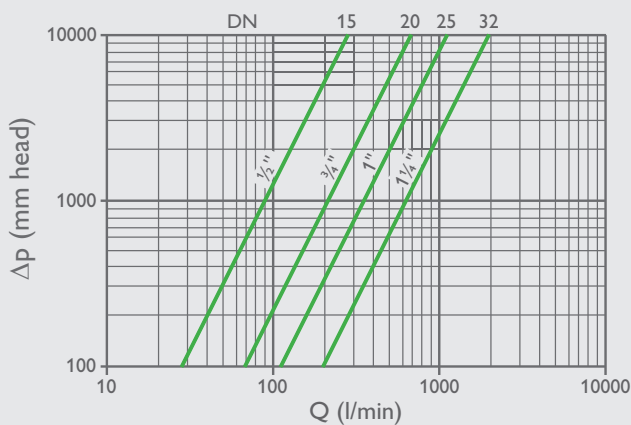


EXAMPLE



The VA22 is a 2-port-valve with a silent synchronous motor. The actuating time of approx. 30 seconds enables a quick flow rate regulation without water hammers.

The position of the ball valve can easily be read from the indicator on the housing. The limit switch signal output can additionally be used for control purposes.



RESOL VA22-DN15

R½", Motor-driven ball valve

Price bracket B | Article no.: **270 006 70**

RESOL VA22-DN20

R¾", Motor-driven ball valve

Price bracket B | Article no.: **270 001 70**

RESOL VA22-DN25

R1", Motor-driven ball valve

Price bracket B | Article no.: **270 001 80**

RESOL VA22-DN32

R1¼", Motor-driven ball valve

Price bracket B | Article no.: **270 003 90**

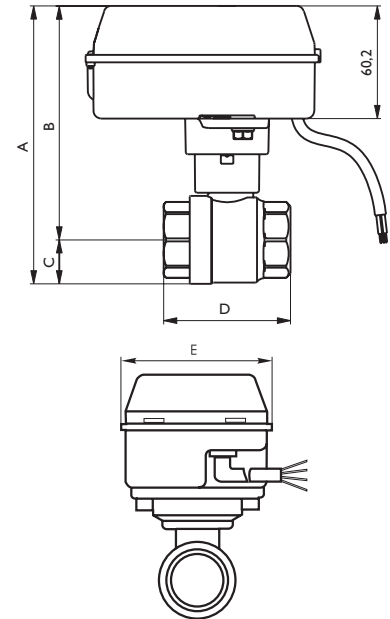


Actuator for VA22

Price bracket B | Article no.: **270 006 80**

Larger quantity? Ask for an offer!

TECHNICAL DATA



DN	15	20	25	32
A	135.5	140	148.5	162
B	117	120	125	130
C	18.5	20	23.5	32
D	64.5	58	70	81
E	78	78	78	78

ACTUATOR

Operating voltage: 220 ... 240 V~

Motor: synchronous motor

Load for limit switch: 5 (1) A 220 ... 240 V~

Power consumption: 7.5 VA max.

Insulation class: II insulated

Ingress protection: IP 44

Actuation time: 30 s / 90°

Operation mode: open - closed

Ambient temperature: 0 ... 50 °C

Torque: 6 Nm (max. 8 Nm)

Electrical connection: 4 x 0.5 mm²

VALVE

Max. operating temperature: 0 ... 120 °C

Nominal pressure: PN 15 (max. PN 16)

Valve connection: IT on both sides

Flow: full flow, according to nominal width NW.

Valve: pressed brass (CuZn40Pb2)

Valve connection: brass (CuZn40Pb2)

Valve spindle: brass (CuZn40Pb2)

Valve ball: brass, hard-chromium-plated

Ball sealing: PTFE-ring teflon sealing

Spindle sealing: 1 x O-ring EPDM, 1 x O-ring Viton and 1 x O-ring PTFE

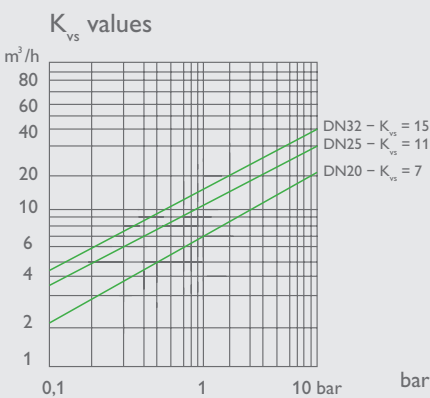
Sealing spindle to valve: 1 x O-ring EPDM, the axial stress between valve spindle and slot is compensated by another sealing.

VA32 3-port motor-driven valve

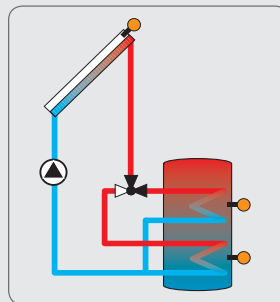


The VA32 is a 3-port-valve with a silent synchronous motor. The actuating time of approx. 18 seconds enables a quick flow rate regulation without water hammers.

The initial state of the adjusted flow direction can easily be switched. The limit switch signal output can additionally be used for control purposes.



EXAMPLE



RESOL VA32-DN20

R $\frac{3}{4}$ ", motor-driven changeover valve

Price bracket B | Article no.: 270 001 90

RESOL VA32-DN25

R1", motor-driven changeover valve

Price bracket B | Article no.: 270 002 00

RESOL VA32-DN32

R1 $\frac{1}{4}$ ", motor-driven changeover valve

Price bracket B | Article no.: 270 003 10

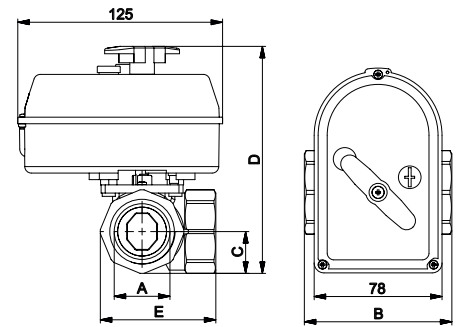


Actuator for VA32

Price bracket B | Article no.: 270 004 50

Larger quantity? Ask for an offer!

TECHNICAL DATA



DN	20	25	32
A	$\frac{3}{4}$ "	1"	1 $\frac{1}{4}$ "
B	72	82	94
C	17.5	20.8	25.5
D	130.5	133.8	138
E	54	66	70.5

ACTUATOR

Power consumption:

Relay on, motor running: 9 VA

Relay on, motor in standby: 5 VA

Relay off: 0 VA

Ingress protection: IP 44

Protection class: II

Output signal: phase L, 1 (1) A

Connection line: 4 x 0.5 mm², L = 1 m

Regulating angle: 90°

Actuation time: 18 s / 90°

Torque: 6 Nm (max. 8 Nm)

Ambient temperature: 0 ... 55 °C

Operation mode: open - closed

VALVE

Torque: 6 Nm (max. 8 Nm)

Max. operating temperature: 2 ... 110 °C

Max. operating pressure: 6 bar

Housing: forged brass

Rotor with the axle: brass

Axle sealing: 4 x O-rings, EPDM

Possibility of motor control: UV-3

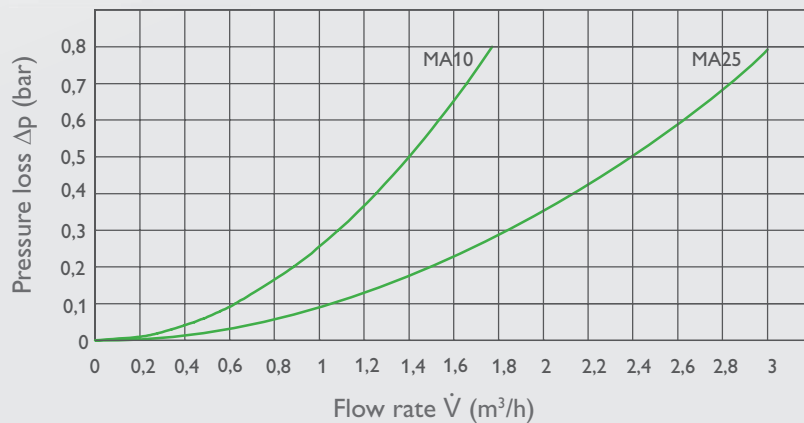
For reduction of axle friction: PA-plate

MA10/MA25 DHW thermostatic mixing valve

(scald protection for potable water and DHW systems)



Suitable for
thermosiphon systems



Thermostatic mixing valve for installation into hot water circuits as scald protection.

The thermostatic mixing valve MA10/MA25 is used for limiting the hot water temperature, e.g. in thermosiphon systems or in solar potable water systems.

- No auxiliary electric energy required
- Continuously adjustable between 35 ... 65 °C
- Installation in the hot water flow, in systems with stub or circulation pipes
- Screwed or soldered connections possible
- Any installation position possible

RESOL MA10

Thermostatic mixing valve, ET R 1"

Price bracket B | Article no.: **280 013 40**

RESOL MA25

Thermostatic mixing valve, ET R 1 1/4"

Price bracket B | Article no.: **280 015 50**

Reducing bushes

ET 3/4", Set of 3 units for MA10

Price bracket B | Article no.: **280 013 50**

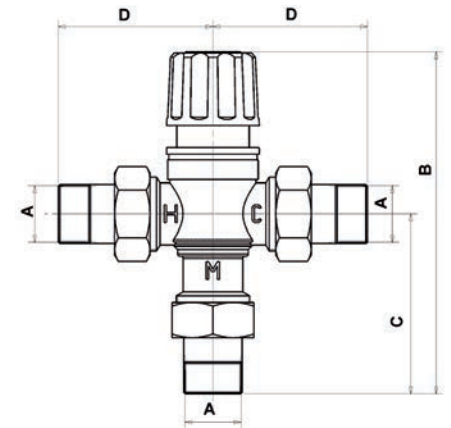
Reducing bushes

ET 1", Set of 3 units for MA25

Price bracket B | Article no.: **280 015 60**

Larger quantity? Ask for an offer!

TECHNICAL DATA



	A	B	C	D
MA10* R 3/4"	149 mm	81.5 mm	70 mm	
MA10 R 1"	115 mm	47.5 mm	36 mm	
MA25* R 1"	161 mm	89.5 mm	78 mm	
MA25 R 1 1/4"	121.5 mm	50 mm	38.5 mm	

* Dimensions incl. reducing bushes

H = hot water inlet

C = cold water inlet

M = mixed water outlet

Housing: dezincification-resistant brass

Guide component: PTFE

Internal seal: EPDM

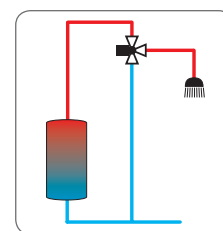
External seal: asbestos-free, flat-sealing

Operating pressure: max. 10 bar

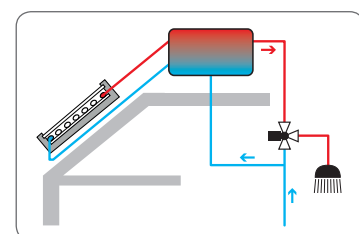
Max. temperature hot water inlet: max. 90 °C

Adjustment range mixed water outlet:
35 ... 65 °C

EXAMPLE



Solar thermal potable water system



Thermosiphon system

RESOL International



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Contact person: Symen Schoustra

If you are interested in RESOL products and are based outside Germany, you are welcome to contact RESOL Germany or our local distributors. We will gladly provide you with contact data of further distributors upon request.

In order to strengthen our international sales we are looking for strong partners all over the world who are interested in a long-term cooperation with RESOL.

General Terms and Conditions

I. Scope

1. The following General Terms and Conditions apply to all supplies and services provided by RESOL – Elektronische Regelungen GmbH (referred to hereinafter as "RESOL").
2. Together with these General Terms and Conditions, all transactions are also subject to the supplementary clause "overall reservation of title" of the Central Association of the Electrical and Electronics Industry as amended. Together with these General Terms and Conditions, all foreign transactions are also subject to the interpretation rules of the Incoterms® 2010 on concluding the agreement.
3. Deviating, contradictory or supplementary provisions from these General Terms and Conditions are only binding on RESOL, even when known, if these have been explicitly recognised in writing by RESOL for the respective translation.
4. The text of the currently valid version of these General Terms and Conditions can be downloaded free of charge on the Internet at www.resol.de.

II. Contract conclusion/offer and acceptance

1. Purchase orders/orders (offers) are binding on the purchaser for four weeks counting from receipt by RESOL. Purchase orders/orders become legally binding on being executed by RESOL, otherwise only with the contents of the written order confirmation from RESOL. Verbal agreements or those reached by phone only become part of the contract on being confirmed in writing by RESOL. The same applies to orders through the Internet or E-mail.
2. Cost estimates, drawings, technical documents, suggestions for solving problems and other documents received by the purchaser from RESOL before concluding the contract remain RESOL's property until the contract is concluded. At RESOL's request, these are to be returned to RESOL if no contract is concluded. The documents or parts therefore must not be duplicated in any manner or otherwise made accessible to third parties without explicit consent from RESOL.

III. Prices and conditions of payment

1. Prices are to be understood net "EXW Hattingen, Incoterms® 2010" and do not include packaging, statutory value added tax, freight with transport insurance, customs, postage or any other delivery costs. Deliveries within the EU single market (intra-trading) are only exempt from VAT if the consignee's valid value added tax identification number (VAT ID No.) is stated in the purchase order to RESOL.
2. Payments are due without deduction within 30 days from the date of the invoice. Payments by notes or cheques are ruled out. Punctual payment depends on the date of payment being received by RESOL. In the event of delayed payment, RESOL can claim default interest amounting to nine percentage points above the currently valid base rate. If several due receivables are still outstanding, RESOL is entitled to stipulate which individual invoices will be balanced by the incoming payment. The customer shall receive corresponding notification.
3. If RESOL should receive notification, after written order confirmation, with regard to material financial deterioration on the part of the customer or if there should be other justified doubts as to the customer's creditworthiness, RESOL is entitled to proceed with deliveries only against collateral security or prepayment. If the customer is in arrears, RESOL can postpone further deliveries and services until payment of the outstanding receivables, unless the customer makes prepayment.
4. RESOL reserves the right to make deliveries against prepayment in individual cases.
5. The purchaser is only entitled to offset with counter claims or withhold payments in cases that are undisputed or have been finally and conclusively established.

IV. Delivery and passage of risk

1. The goods shall be dispatched at the customer's risk, even if the freight order is issued by RESOL and at RESOL's costs. Fixed delivery deadlines are only binding if agreed by contract or confirmed by RESOL. A delivery is deemed to be punctual according to the point in time of handing the goods over to the forwarder or another company entrusted with transport/shipping.
2. Packaging is charged at cost price. On request, RESOL ships goods in environment-friendly returnable boxes, whereby return of the boxes must be free of charge for RESOL.

V. Reservation of title

1. RESOL reserves title of ownership to all delivered goods until complete payment of all invoices arising from the business relationship with the customer. This also applies when the purchase price has been paid for certain deliveries of goods determined by the customer, as the reservation of title acts as security for all RESOL's balance claims.

Processing of goods supplied by and still owned by RESOL shall always take place on behalf of RESOL without resulting in any obligations for RESOL. If the goods belonging to RESOL are mixed, blended or combined with other items, the customer already assigns resulting ownership or co-ownership rights to the new item to RESOL at this point in time and shall keep the item for RESOL with all due care. The customer is only allowed to resell the goods owned by RESOL in the course of regular business transactions insofar as the customer is not in arrears with payments.

2. The customer is not allowed to assign the goods as security or to pledge or sell them "en bloc" to third parties insofar as this is detrimental to RESOL's reservation of title. On concluding the purchase agreement with RESOL, the customer already assigns to RESOL all claims arising from the resale or claims based on other legal grounds against a purchaser including all ancillary rights as collateral security in the full amount, i.e. not just the proportional value. RESOL accepts such assignment. The customer is still entitled to collect the receivables insofar as the customer is not in arrears with payments to RESOL. If the value of the item acting as security under reservation of title exceeds RESOL's total claim by more than 20 %, RESOL is obliged to make corresponding re-assignment at the customer's request.
3. If RESOL takes goods back at the customer's request without entering into any legal obligation, this shall not constitute withdrawal from the contract. The acceptance of such returned goods is at RESOL's free discretion. Returned goods shall only be accepted if RESOL has issued written consent in advance. The approved return consignment must be made free house, stating the invoice or delivery note number: RESOL shall issue a test report for every return consignment. If the goods are found to be in perfect condition, RESOL shall issue the customer with a credit note amounting to at least 25 % of the net invoice amount, after deduction of a handling fee.

VI. Material defects and liability

1. The customer is obliged to inspect the goods delivered by RESOL straightaway for any signs of visible transport damage. Any faults detected on goods receipt shall be reported immediately in writing to RESOL. In the case of justified complaints, RESOL is obliged to proceed with reworking or replacement delivery, at RESOL's choice. If reworking or replacement delivery should be in vain, the customer can only demand redhibitory action; any reduction is excluded. Complaints whose return delivery has to take place free of charge and that require a detailed fault report will be inspected with the results documented in a test report. The customer retains ownership of the part subject to complaint; in the case of unjustified fault complaints, the test report includes an offer to the customer for return delivery free of charge, or scrapping free of charge.
2. Minor changes to the construction, form and design of the delivered goods are permitted and deemed to be contractual insofar as they are not detrimental to the intended purpose, quality and functionality. RESOL products are subject to constant technical progress and on-going development. RESOL therefore reserves the right to make modifications without special notification.
3. If the customer supplies RESOL with parts for the product being produced and supplied by RESOL in execution of an order issued by the customer, RESOL is indemnified from any liability for material defects insofar as the item supplied by RESOL is faulty on account of a fault in the part supplied by the customer. RESOL is not obliged to inspect the part delivered by the customer for execution of the order to see whether it is free of faults and functionally suitable for processing. The same applies to parts delivered to RESOL by third parties by order and for the account of the customer.
4. Any damages claims filed against RESOL for any legal reason whatsoever, also for breach of information, notification and care obligations prior and parallel to the contract and for positive contract violation and tortious action, are excluded insofar as the damage was not caused by wilful intent or gross negligence. The above liability disclaimer does not apply to the lack of properties warranted by RESOL explicitly or in writing and intending to protect the customer precisely from the damage that has occurred. Other claims from the customer on RESOL such as collateral damage, installation costs and lost profits are excluded.
5. RESOL's liability for faulty products pursuant to the product liability law shall not be affected by the above provisions. If RESOL receives third-party claims for damages under the product liability law or other statutory liability provisions or if RESOL suffers damage in any other way (e.g. through re-call actions), the customer shall indemnify RESOL from all third-party action insofar as the damage was caused by a fault for which the customer is accountable.

VII. Place of fulfilment and jurisdiction

The place of fulfilment and jurisdiction for all disputes arising from the contractual relationship between the customer and RESOL shall be RESOL's registered place of business, or the customer's registered place of business at RESOL's choice. The contractual relationships between RESOL and the customer shall be subject to German law.

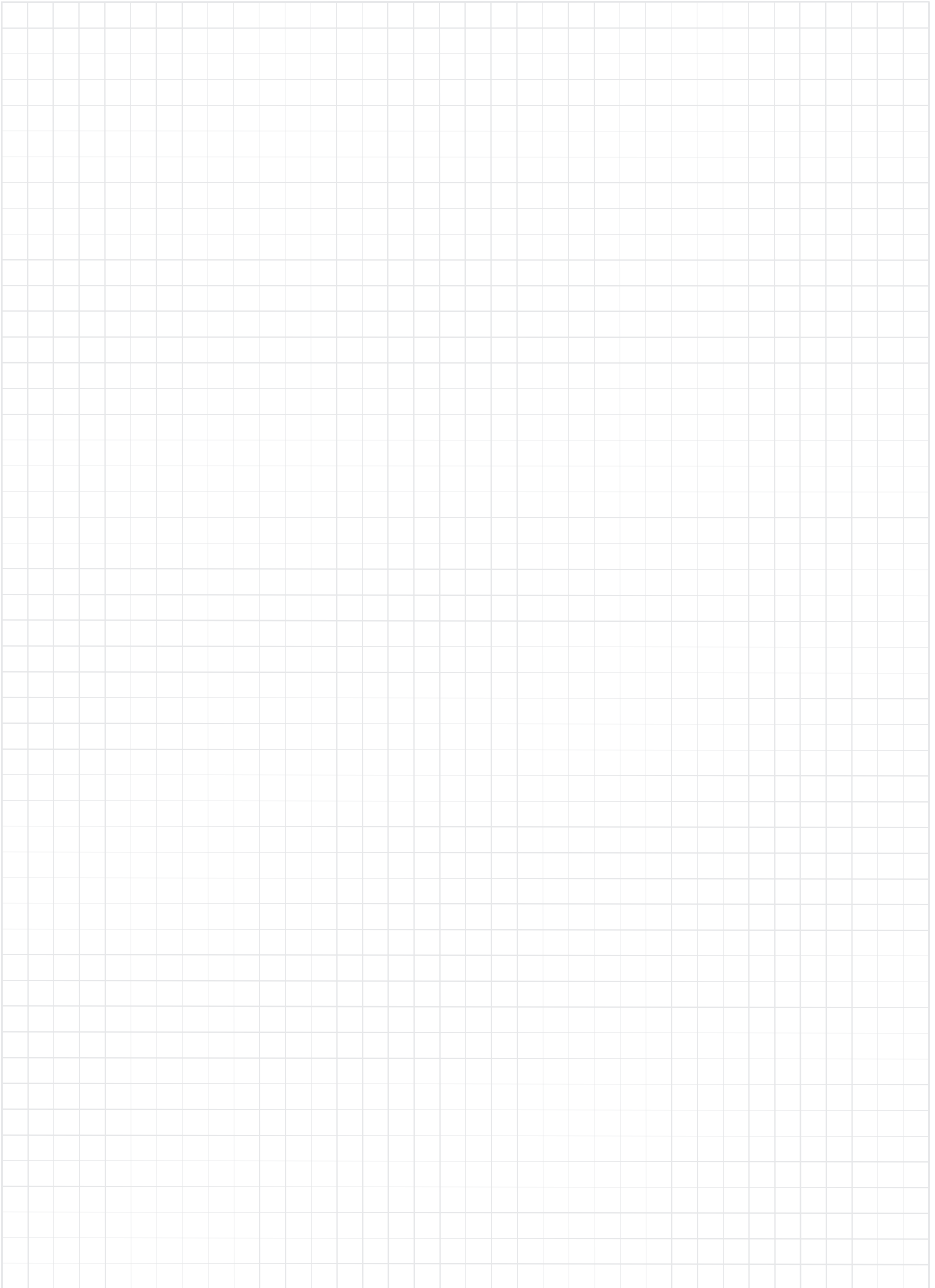
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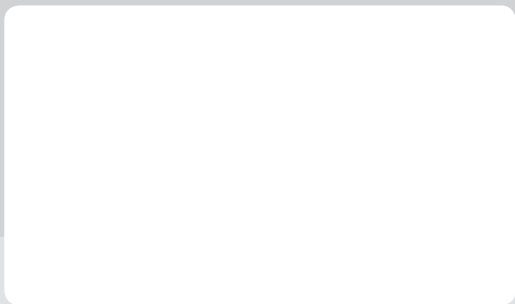
Note

All data mentioned in this catalogue correspond to the current standard of knowledge during printing, January 2018. The data are correct to the best of our knowledge. As faults can never be excluded, no liability is assumed for incorrect information. Subject to change of product range. The products shown represent some examples – the illustrations may differ from the original product in shape and colour.

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