The Oventrop Quality Management System is certified to DIN-EN-ISO 9001

Application:
Multifunctional controller for wall attachment with additional pre-installed switching schemes for the control of a solar thermal installation and for heating circuit regulation. The combination of preinstalled switching schemes and freely adjustable additional functions, allows the controller to perform complex controls.

Function:
The controller "Regtronic PM" is preloaded with control concepts for the majority of common solar installations. Once the most appropriate installation scheme is entered, the controller is ready to operate. Additional functions can be individually controlled in a few steps by inputting additional parameters.

Connection:
The controller is operated with a supply voltage of 230 V. It is equipped with inputs for PT 1000 sensors for temperature monitoring, Grundfos flow sensors and digital flow sensors. The controller is also equipped with 230 V outputs and a voltage free contact.

Control description:
"Regtronic PE, Resol DeltaSol BS/2, Regtronic PC, Regtronic SE"
The solar pump keeps running as long as the collector temperature is slightly higher than the temperature of the storage cylinder and as long as the latter has not yet reached its maximum temperature. The pump output can either be operated as two point or speed regulated controller. Protective functions for pump operation and overheating of solar liquid are inbuilt. Depending on the controller and switching scheme, up to two collectors or storage cylinders together with the relevant outputs for the pumps or diverting valves can be controlled. Outputs not in use are freely programmable and can be used for other control functions.

"Regtronic PX"
Switching scheme 1010
The solar circuit pump starts if the collector temperature is slightly lower than the target temperature of the storage cylinder. If the primary circuit temperature exceeds the target temperature, the secondary circuit pump starts and the storage cylinder is loaded with heat. With the temperature in the primary circuit dropping, the secondary circuit pump stops and the temperature in the primary circuit can rise again.
When the complete storage cylinder has reached its target temperature, it is increased to the maximum temperature in steps of 5°C.

Switching scheme 1020 and 1030
The solar circuit pump starts if the collector temperature is slightly lower than the target temperature of the storage cylinder.
If the primary circuit temperature exceeds the target temperature, the secondary circuit pump starts and the upper section of the storage cylinder is loaded with heat. If the temperature in the primary circuit decreases, the secondary circuit pump stops.
If the solar heat return is low and the primary circuit temperature does not increase again during a certain time, the lower part of the storage cylinder is loaded or the second storage cylinder is loaded at a low temperature.
When the storage cylinder has reached its target temperature, the latter is increased to the maximum temperature in steps of 5°C and the complete storage cylinder is loaded.
Outputs not in use are freely programmable and can be used for other control functions.

Multifunctional controller "Regtronic"

"Regtronic PM"
The controller "Regtronic PM" is preloaded with the control schemes of the other "Regtronic" controllers together with its own additional functions. Typical examples are the switching of an output if a certain temperature is exceeded or undercut or the maintenance of certain temperature differences with the help of speed controlled pumps. This way, a wood burning boiler can be controlled or a storage cylinder can be recycled if a certain temperature has been reached.

Choice of the optimum Oventrop solar controller

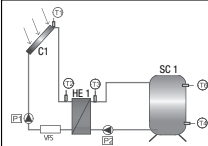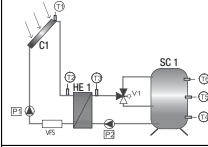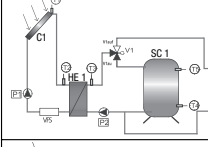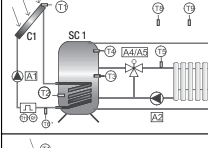| Function	Recommended control
Simple solar installation for heating of potable water	"Regusol E" and "Regusol EL" with integrated controller **"OV Regtronic PE" or "Resol DeltaSol BS/2"**
Simple solar installation for heating of potable water and support of the heating system	"Regusol E" and "Regusol EL" with integrated controller **"OV Regtronic PC"**
Simple solar installation for heating of potable water with visualised display	"Regusol E" and "Regusol EL" with integrated controller **"OV Regtronic SE"**
Solar installation with heat exchanger for the control of up to three additional functions	"Regusol X-Uno 15" "Regusol X-Uno 25" with integrated controller **"Regtronic PX"**
Complex solar installation with custom control functions	Separate controller **"Regtronic PM"**
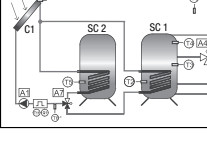
Summary controllers

Controller	"DeltaSol BS/2"	"Regtronic PE"	"Regtronic PC"	"Regtronic SE"	"Regtronic PX"	"Regtronic PM"
Item no.	**136 95 40**	**136 95 42**	**136 95 44**	**136 95 46**	**136 95 48**	**136 95 50**
Application	Heating of potable water	Heating of potable water	Heating of potable water and support of the heating system	Heating of potable water and support of the heating system. Menu command with the help of an installation assistant	Heating of potable water and support of the heating system. Controls with heat exchanger	Heating of potable water and support of the heating system (Flexible programming)
Energy measurement (e.g. using the electronic Grundfos flow sensor or digital flow sensors)			X	X	X	X
Number of inputs[1] (PT 1000/flow rate[2])	2 (2 / 0)	2 (2 / 0)	8 (6 / 1)	6 (4 / 1)	12 (10 / 1)	12 (10 / 1)
Number of outputs[1] (freely programmable)	1 (0)	1 (0)	4 (3)	2 (0)	6 (3)	6 (6)
Speed controlled pump output	1	1	4	1	6	6
Integrated in the stations	"Regusol E" "Regusol EL"	"Regusol E" "Regusol EL"	"Regusol E" "Regusol EL"	"Regusol E" "Regusol EL"	"Regusol X-Uno 15" "Regusol X-Duo 15" "Regusol X-Uno 25" "Regusol X-Duo 25"	

Choice of the preinstalled controller schemes
By using the freely programmable outputs, the switching schemes can be extended by temperature difference controls with functions such as return temperature increase, boiler activation, wood boiler activation, circulation function, threshold function as well as heating and cooling function can be easily controlled.

The below mentioned pipework configurations can be realised with the Oventrop controllers.

Pipework configuration	"DeltaSol BS/2"	"Regtronic PE"	"Regtronic PC"	"Regtronic SE"	"Regtronic PX"	"Regtronic PM"
				●	●	●
					●	●
					●	●
						●
						●

[1] Depending of the chosen pipework configuration, the number of available in- and outputs can vary!
[2] 2 inputs (1 x flow, 1 x temperature) are allocated at the controller for the electronic flow sensor with integrated temperature sensor

Pipework configuration	"DeltaSol BS/2"	"Regtronic PE"	"Regtronic PC"	"Regtronic SE"	"Regtronic PX"	"Regtronic PM"
			●			●
						●
				●		●
				●		●
				●		●
	●	●	●	●		●
			●	●		●
			●			●
			●			●
			●	●		●

"●" Existing controller scheme

Functional description "Regtronic PE": Configuration summary and parameters

Preinstalled switching schemes	1
Total number of outputs	1 output, 230 V, 1 A: cos φ = 0.7-1.0
Freely programmable outputs	none
Inputs	2 inputs, PT1000

Typical controller settings:	
Parameters	**Typical settings**
Maximum storage cylinder temperature Desired maximum storage cylinder temperature. In case of active collector cooling, it can even reach the safety cutoff temperature.	65 °C
Start up difference solar pump Excessive temperature of collector compared with storage cylinder required for start of solar pump.	7 K
Cutoff difference solar pump Minimum excessive temperature of collector compared with storage cylinder for solar pump operation.	3 K
Minimum output of speed controlled pump Always 100% when activating an actuator.	30 %
Collector protection function Solar liquid is transported through the collector until the maximum storage cylinder temperature is reached.	on
Activating temperature collector protection	120 °C
Recooling function Storage cylinder is cooled down via the collectors to prevent overheating of the system in case of anew solar radiation.	off
Storage cylinder recooling temperature.	40 °C
Tube collector function Cyclic circulation for temperature monitoring if temperature sensor is not sited directly at the controller.	off

Functional description "Regusol BS2": Configuration summary and parameters "DeltaSol BS"

Preinstalled switching schemes	1
Total number of outputs	1 output, 230 V, 1 A: cos φ = 0.7-1.0
Freely programmable outputs	none
Inputs	2 inputs, PT1000

Typical controller settings:

Parameters	Typical settings
Maximum storage cylinder temperature Desired maximum storage cylinder temperature. In case of active collector cooling, it can even reach the safety cutoff temperature.	60 °C
Start up difference solar pump Excessive temperature of collector compared with storage cylinder required for start of solar pump.	6 K
Cutoff difference solar pump Minimum excessive temperature of collector compared with storage cylinder for solar pump operation.	4 K
Minimum output of speed controlled pump Always 100% when activating an actuator.	30 %
Collector limiting temperature Collector is switched off by locking the solar circuit pump to avoid damage to solar components.	140 °C
Recooling function Storage cylinder is cooled down via the collectors to prevent overheating of the system in case of anew solar radiation.	off
Activating temperature system cooling.	120 °C
Minimum collector temperature function Prevents repeated activation of solar pump with low collector temperatures.	off
Minimum collector temperature.	10 °C
Frost protection function Prevents freezing up of collector by circulating hot storage cylinder water.	off
Frost protection temperature.	4 °C
Tube collector function Cyclic circulation for temperature monitoring if temperature sensor is not sited directly at the controller.	off

Functional description "Regtronic PC": Configuration summary and parameters

Preinstalled switching schemes	5
Total number of outputs	1 output, 230 V, 1 A: cos φ = 0.7-1.0
Freely programmable outputs	up to 3
Inputs	8 inputs, storage cylinder, collector, free position, 6 x PT 1000, 1 x Grundfos flow sensor for flow and temperature measurement, alternatively: digital flow sensor, Wilo flow sensor

Typical controller settings:

Parameters	Typical settings
Maximum storage cylinder temperature Desired maximum storage cylinder temperature. In case of active collector cooling, it can even reach the safety cutoff temperature.	65 °C
Start up difference solar pump Excessive temperature of collector compared with storage cylinder required for start of solar pump.	7 K
Cutoff difference solar pump Minimum excessive temperature of collector compared with storage cylinder for solar pump operation.	3 K
Minimum output of speed controlled pump Always 100% when activating an actuator.	30 %
Collector protection function Solar liquid is transported through the collector until the maximum storage cylinder temperature is reached.	on
Activating temperature collector protection.	120 °C
System protection function Collector is switched off by locking the solar circuit pump to avoid damage to solar components.	on
System protection temperature.	135
Recooling function Storage cylinder is cooled down via the collectors to prevent overheating of the system in case of anew solar radiation.	off
Recooling temperature of storage cylinder.	40 °C
Frost protection function Prevents freezing up of collector by circulating hot storage cylinder water.	off
Frost protection temperature.	3 °C
Tube collector function Cyclic circulation for temperature monitoring if temperature sensor is not sited directly at the controller.	off
Energy measurement function Measurement of solar heat return via temperature difference and flow. Different flow sensors and antifreeze liquids can be used.	on
Multifunctional controller Freely programmable outputs for the realization of temperature difference control, threshold function, wood boiler activation or circulation function.	off

Functional description "Regtronic PX": Configuration summary and parameters

Preinstalled switching schemes	3
Total number of outputs	6 outputs, 230 V, 1 A; cos φ = 0.7-1.1 1 output volt free
Freely programmable outputs	up to 3
Inputs	12 inputs, 10 x PT 1000 1 x Grundfos flow sensor for flow and temperature measurement, alternatively: digital flow sensor, Wilo flow sensor

Typical controller settings:

Parameters	Typical settings
Maximum storage cylinder temperature Desired maximum storage cylinder temperature. In case of active collector cooling, it can even reach the safety cutoff temperature.	80 °C
Target temperature Minimum storage cylinder loading temperature. Depending on the switching scheme, two different loading sections or storage cylinders can be differentiated.	60 °C upper section 40 °C lower section
Starting difference solar pump Required collector temperature compared with storage cylinder loading temperature to start solar circuit. This temperature is lower than the storage cylinder temperature.	-5 K
Temperature difference target temperature "on" The solar circuit must reach this excessive temperature compared with the target temperature to start the loading circuit pump of the storage cylinder circuit.	7 K
Temperature difference target temperature "off" Below this solar circuit temperature, the loading circuit pump of the storage cylinder circuit stops.	3 K
Bypass time Time of regeneration required by the collector to load the storage cylinder with a higher temperature. If the time of regeneration is exceeded, the section with the lower temperature is loaded if different sections or two storage cylinders are loaded.	10
Minimum output of speed controlled pump Always 100% when activating an actuator.	30 %
Collector protection function Solar liquid is transported through the collector until the maximum storage cylinder temperature is reached.	on
Activating temperature collector protection.	120 °C
System protection function Collector is switched off by locking the solar circuit pump to avoid damage to solar components.	on
System protection temperature.	135
Recooling function Storage cylinder is cooled down via the collectors to prevent overheating of the system in case of anew solar radiation.	off
Recooling temperature of storage cylinder.	40 °C
Frost protection function Prevents freezing up of collector by circulating hot storage cylinder water.	off
Frost protection temperature.	3 °C
Tube collector function Cyclic circulation for temperature monitoring if temperature sensor is not sited directly at the controller.	off
Pump protection function Pumps are regularly activated for short periods to protect them from getting stuck.	on
Energy measurement function Measurement of solar heat return via temperature difference and flow. Different flow sensors and antifreeze liquids can be used.	on
Multifunctional controller Freely programmable outputs for the realization of temperature difference control, threshold function, wood boiler activation or circulation function.	off

Functional description "Regtronic PM": Configuration summary and parameters

Preinstalled switching schemes	14
Total number of outputs	6 outputs, 230 V, 1 A; cos φ = 0.7-1.1 1 output volt free
Freely programmable outputs	up to 6
Inputs	12 inputs, 10 x PT 1000 1 x Grundfos flow sensor for flow and temperature measurement, alternatively: digital flow sensor, Wilo flow sensor

Typical controller settings:

Parameters Depending on the switching scheme, the controller automatically selects the relevant parameter.	**Typical settings**
Maximum storage cylinder temperature Desired maximum storage cylinder temperature. In case of active collector cooling, it can even reach the safety cutoff temperature.	65°C
Start up difference solar pump Excessive temperature of collector compared with storage cylinder required for start of solar pump.	7 K
Cutoff difference solar pump Minimum excessive temperature of collector compared with storage cylinder for solar pump operation.	3 K
Target temperature Minimum storage cylinder loading temperature. Depending on the switching scheme, two different loading sections or storage cylinders can be differentiated.	60 °C Section 1 40 °C Section 2
Starting difference solar pump Required collector temperature compared with storage cylinder loading temperature to start solar circuit. This temperature is lower than the storage cylinder temperature.	-5 K
Temperature difference target temperature "on" The solar circuit must reach this excessive temperature compared with the target temperature to start the loading circuit pump of the storage cylinder circuit.	7 K
Temperature difference target temperature "off" Below this solar circuit temperature, the loading circuit pump of the storage cylinder circuit stops.	3 K
Bypass time Time of regeneration required by the collector to load the storage cylinder with a higher temperature. If the time of regeneration is exceeded, the section with the lower temperature is loaded if different sections or two storage cylinders are loaded.	10 min
Minimum output of speed controlled pump Always 100% when activating an actuator.	30 %
Heating circuit Possible settings: "Off", "Duration", "Automatic", "Summer", "Party", "Emission".	Automatic
Heating up of water Possible settings: "Off", "Automatic", "Automatic-Time", "Priority".	Automatic
Heating compnesation curve Defines the flow temperature depending on the outside temperature. The higher the value, the higher the increase of the flow temperature with the outside temperature decreasing.	2
Outside temperature smoothing Obtains the average value of the outside temperature for weather guidance to avoid the influence of short-time temperature fluctuations.	average

Functional description "Regtronic PM": Configuration summary and parameters (continuation)

Typical controller settings:	
Parameters Depending on the switching scheme, the controller automatically selects the relevant parameter.	**Typical settings**
dT Storage cylinder Offset displacement for boiler activation correcting the heating curve if the room temperature is too high or too low.	0 °C
Collector protection function Solar liquid is transported through the collector until the maximum storage cylinder temperature is reached.	on
Activating temperature collector protection.	120 °C
System protection function Collector is switched off by locking the solar circuit pump to avoid damage to solar components.	on
System protection temperature	135°C
Recooling function Storage cylinder is cooled down via the collectors to prevent overheating of the system in case of anew solar radiation.	off
Buffer recooling temperature	40 °C
Frost protection function Prevents freezing up of collector by circulating hot storage cylinder water.	off
Frost protection temperature	3 °C
Tube collector function Cyclic circulation for temperature monitoring if temperature sensor is not sited directly at the controller.	off
Pump protection function Pumps are regularly activated for short periods to protect them from getting stuck.	on
Energy measurement function Measurement of solar heat return via temperature difference and flow. Different flow sensors and antifreeze liquids can be used.	on
Multifunctional controller Freely programmable outputs for the realization of temperature difference control, threshold function, wood boiler activation or circulation function.	off

Resistance table PT 1000 to check the correct functions of the temperature sensors supplied with the solar controllers

Temperature in °C	Resistance in Ohm	Temperature in °C	Resistance in Ohm
-30	882	60	1232
-20	921	70	1271
-10	960	80	1309
0	1000	90	1347
10	1039	100	1385
20	1077	120	1461
30	1116	140	1535
40	1155	200	1758
50	1194		

Printed on paper free from
chlorine bleaching.