Solar module
Art. S001-S002-S004

Function

The solar modules are employed in the primary circuits of solar systems to manage the thermodynamic cycle of the heat-transfer fluid between the solar panels and the hot water storage tank.
The S004 module is also equipped with electronic controller which, through a sophisticated monitoring system and safety functions, ensures the total protection of the system during its operation.


S001


S002


S004

Product range

Art.	Size	Circulator	Circulator control signal		PWM signal cable	Code
			ON/OFF	PWM		
S001	3/4"	NO PUMP	X	X	X	93S001AE05SC
S001 •	3/4"	Wilo ST 20/6	√	X	X	93S001AE05
S001 •	3/4"	Grundfos 15/6	√	X	X	93S001AE05G
S001	3/4"	Taco ES2 15-70	√	X	X	93S001S166
S001	3/4"	Grundfos UPM3 15-75 ELECTRONIC CIRCULATOR	√	√	NOT INCLUDED*	93S001S163
S001	3/4"	Wilo RSTG 15/7.5 ELECTRONIC CIRCULATOR	√	√	INCLUDED	93S001S164
S001	3/4"	Wilo Para ST 15/6 ELECTRONIC CIRCULATOR	√	X	X	93S001S165
S001	3/4"	Hefei Xinhu GPA 20-7.5 III	√	√	NOT INCLUDED*	93S001S167
S002	3/4"	NO PUMP	X	X	X	93S002AE05SC
S002 •	3/4"	Wilo ST 20/6	√	X	X	93S002AE05
S002 •	3/4"	Grundfos 15/6	√	X	X	93S002AE05G
S002	3/4"	Taco ES2 15-70	√	X	X	93S002S166
S002	3/4"	Grundfos UPM3 15-75 ELECTRONIC CIRCULATOR	√	√	NOT INCLUDED*	93S002S163
S002	3/4"	Wilo RSTG 15/7.5 ELECTRONIC CIRCULATOR	√	√	INCLUDED	93S002S164
S002	3/4"	Wilo Para ST 15/6 ELECTRONIC CIRCULATOR	V	X	X	93S002S165
S002	3/4"	Hefei Xinhu GPA 20-7.5 III	√	√	NOT INCLUDED*	93S002S167

• *Products equipped with circulators "Wilo ST 20/6" and "Grundfos 15/6" are intended for sale in non-EU countries.*
**To be purchased separately in case of connection with electronic controller with PWM signal.*

Product range with centralized control unit

Art.	Size	Circulator	Circulator control signal		PWM signal cable	Code
			ON/OFF	PWM		
S004+S303	3/4"	NO PUMP	X	X	X	93S004SCS303
S004+S303 ●	3/4"	Wilo ST 20/6	√	X	X	93S004AE05S303
S004+S303 ●	3/4"	Grundfos 15/6	√	X	X	93S004AE05GS303
S004+S303	3/4"	Grundfos UPM3 15-75 ELECTRONIC CIRCULATOR	√	√	NOT INCLUDED*	93S004S163S303
S004+S303	3/4"	Wilo RSTG 15/7.5 ELECTRONIC CIRCULATOR	√	√	INCLUDED	93S004S164S303
S004+S303	3/4"	Wilo Para ST 15/6 ELECTRONIC CIRCULATOR	√	X	X	93S004S165S303
S004+S303	3/4"	Taco ES2 15-70	√	X	X	93S004S166S303
S004+S303	3/4"	Hefei Xinhu GPA 20-7.5 III	√	√	NOT INCLUDED*	93S004S167S303
S004+S305	3/4"	NO PUMP	X	X	X	93S004SCS305
S004+S305 ●	3/4"	Wilo ST 20/6	√	X	X	93S004AE05S305
S004+S305 ●	3/4"	Grundfos 15/6	√	X	X	93S004AE05GS305
S004+S305	3/4"	Grundfos UPM3 15-75 ELECTRONIC CIRCULATOR	√	√	NOT INCLUDED*	93S004S163S305
S004+S305	3/4"	Wilo RSTG 15/7.5 ELECTRONIC CIRCULATOR	√	√	INCLUDED	93S004S164S305
S004+S305	3/4"	Wilo Para ST 15/6 ELECTRONIC CIRCULATOR	√	X	X	93S004S165S305
S004+S305	3/4"	Taco ES2 15-70	√	X	X	93S004S166S305
S004+S305	3/4"	Hefei Xinhu GPA 20-7.5 III	√	√	NOT INCLUDED*	93S004S167S305

● *Products equipped with circulators "Wilo ST 20/6" and "Grundfos 15/6" are intended for sale in non-EU countries.*
**To be purchased separately in case of connection with electronic controller with PWM signal.*

Technical specifications

PERFORMANCE

Fluids used:	Water and glycol solutions
Maximum percentage of glycol:	See specifications page 6
Maximum operating pressure:	10 bar
Calibration of safety valve:	6 bar
Temperature of the heat transfer fluid:	See specifications page 6
Safety valve temperature range:	+160°C
Minimum pressure on the intake side:	See specifications page 6
Opening check valves minimum pressure:	Δp: 2Kpa (200 mm c.a.)
Manometer scale:	0 ÷ 10 bar
Thermometers scale:	0 ÷ 160°C

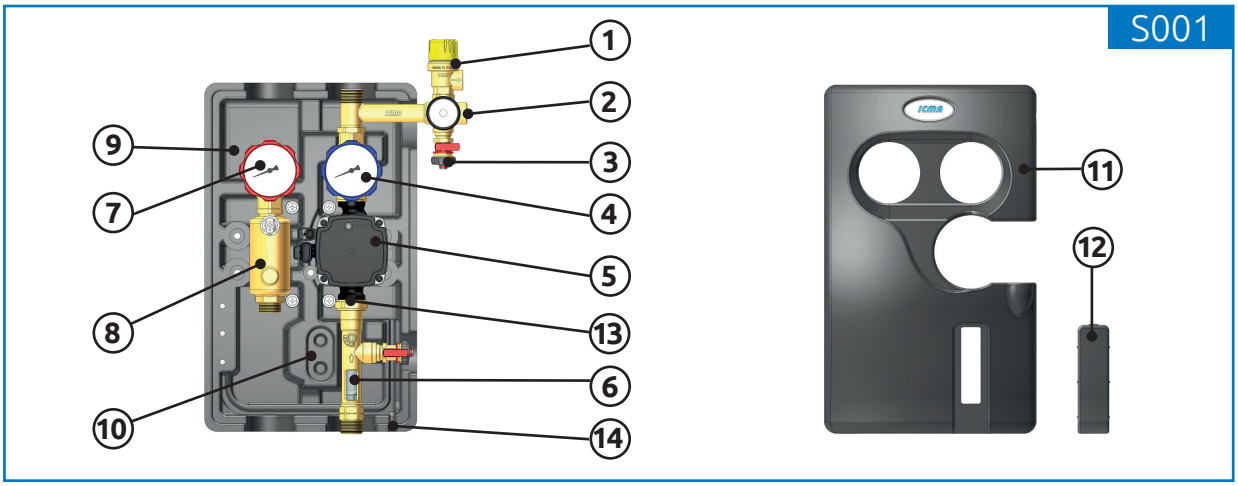
CONNECTIONS

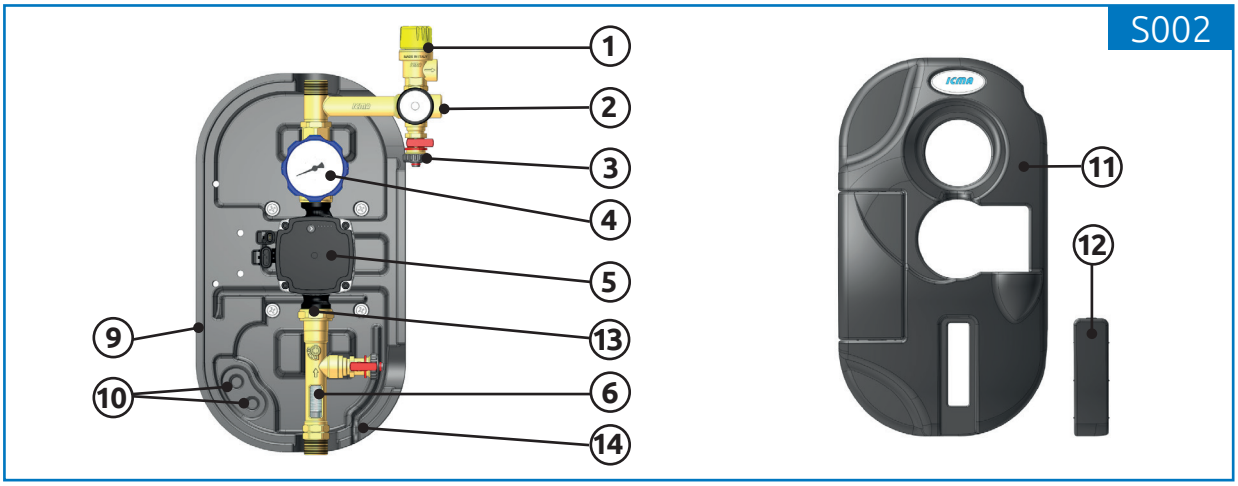
System connections:	G3/4" M
Safety valve connections :	G1/2" F
Connection with expansion tank:	G3/4" M
Filling/emptying connections with hose:	Ø13 mm

MATERIALS

Brass components:	Brass CW617N - EN 12165
Seals:	PTFE
Sealing elements:	EPDM Perox
Flat seals:	See specifications page 6
Insulation shell:	PPE
Conductivity of isulation shell λ(ΔT):	0.041 (W/mK)

Components





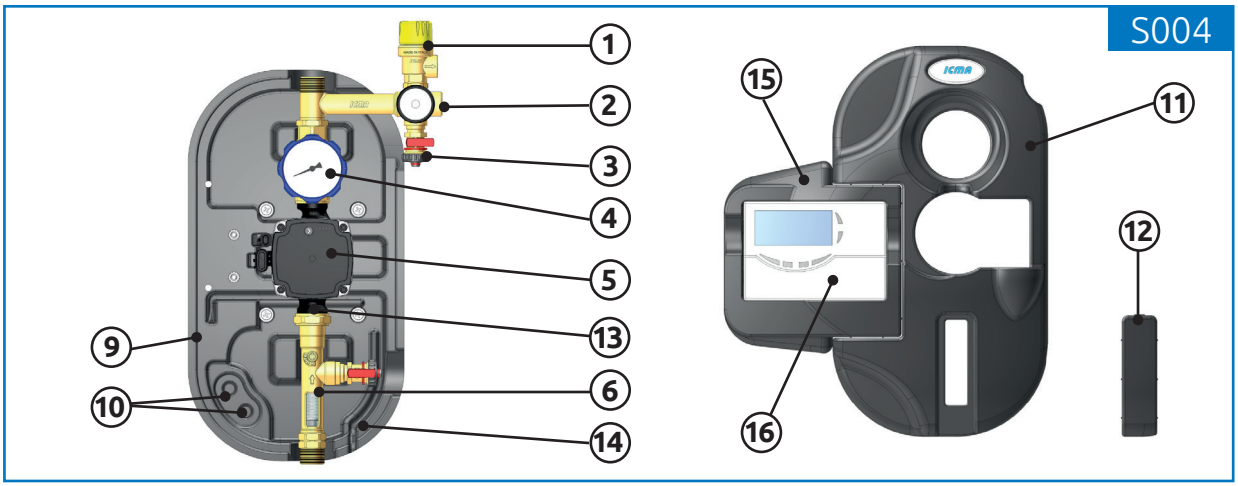
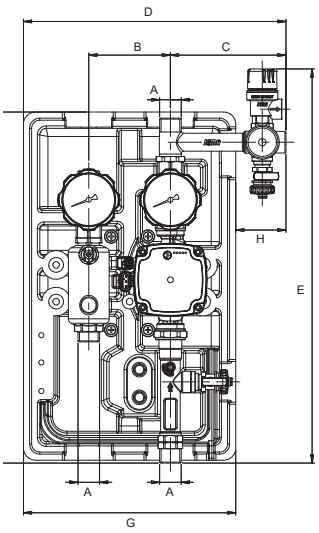


Table 1

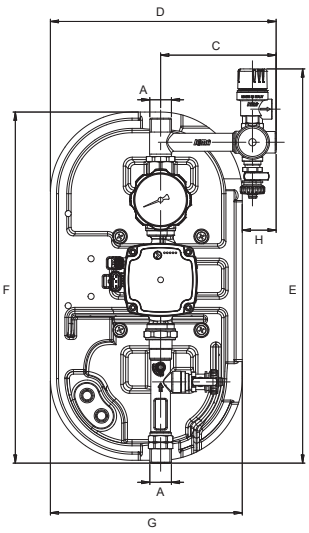
1. Safety valve for solar energy systems
2. Instrument holder connection with manometer
3. Taps for filling, emptying and washing the system
4. Shut off valve with thermometer and built-in check valve
5. Circulator
6. Flowmeter
7. Shut off valve with thermometer and built-in check valve
8. Deaerator
9. Preformed insulating base
10. Hose connection
11. Preformed insulating cover
12. Inspection compartment insert
13. Pump connector
14. Cable duct groove
15. Electronic controller frame
16. Electronic controller S303/S305

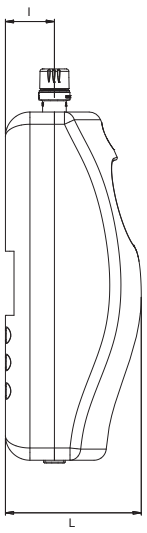
Dimensions

S001

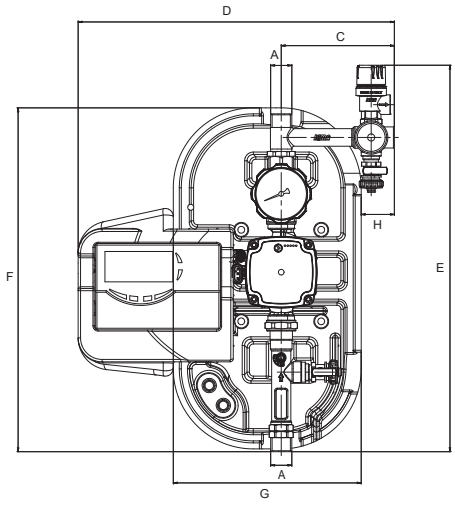


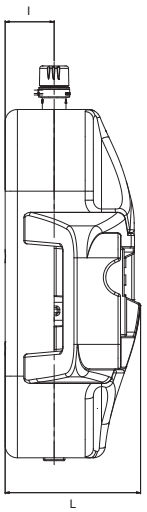
S002





S004





CODE	A	B	C	D	E	F	G	H	I	L	WIGHT (KG)
S001	G 3/4" M	100	140	321,5	483	430	260	60	60	170	7.0
S002	G 3/4" M	/	140	276,5	483	430	235	40	60	170	5.0
S004	G 3/4" M	/	140	395,5	483	430	235	40	60	166	5.5

Table 2

Technical specifications

The solar module receive a signal from the external controller which, having at least two temperature sensors (one is positioned on the panel outlet pipe and the other is an immersion sensor in the boiler), constantly reads the temperature difference and keeps it within the established range, which normally varies between 5 and 8 °C. If the Δt between the panel and the boiler is found to be over the established set point, the controller starts up the pump on the module to provide the lacking thermal load. If, on the other hand, the Δt is narrower than the one set, the internal pump will be disabled.
For further clarification about the electronic controller functioning, consult the technical documentation about art. S303 and S305.

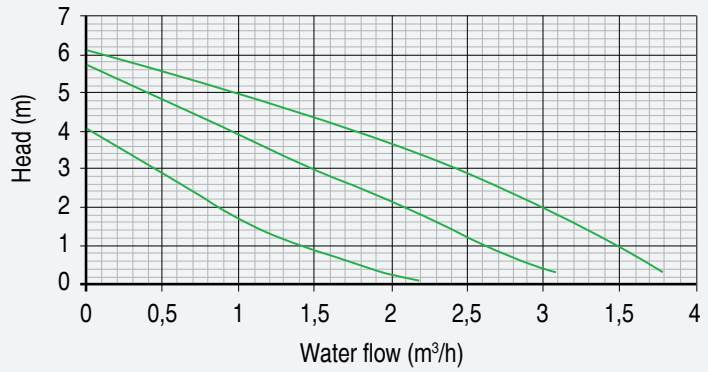
Circulators range

Art. S160 - Synchronous circulation pump with 3 speeds

Technical specifications

Brand:	Wilo
Model:	Solar ST20/6
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	2 ÷ 110°C
Max temperature:	140°C for short periods
Max operating pressure:	10 bar
Protection level:	IP44
Energy class (EEI):	C
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	0,049 bar

HYDRAULIC CHARACTERISTICS

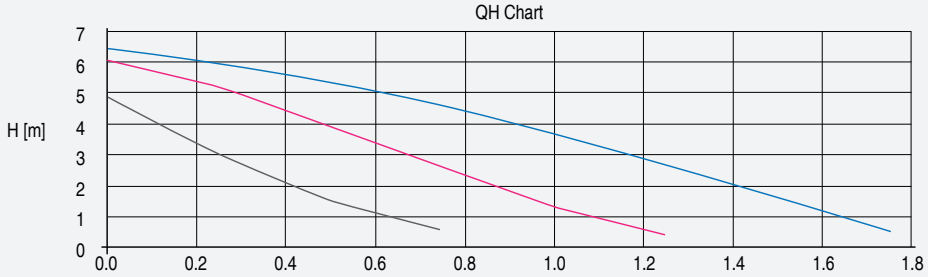


Art. S160G - Synchronous circulation pump with 3 speeds

Technical specifications

Brand:	Grundfos
Model:	Solar 15/65
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	2 ÷ 110°C
Max temperature:	140°C for short periods
Max operating pressure:	10 bar
Protection level:	IP44
Energy class (EEI):	C
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	
• T=85°C	0,049 bar
• T=90°C	0,270 bar
• T=110°C	1,080 bar

HYDRAULIC CHARACTERISTICS

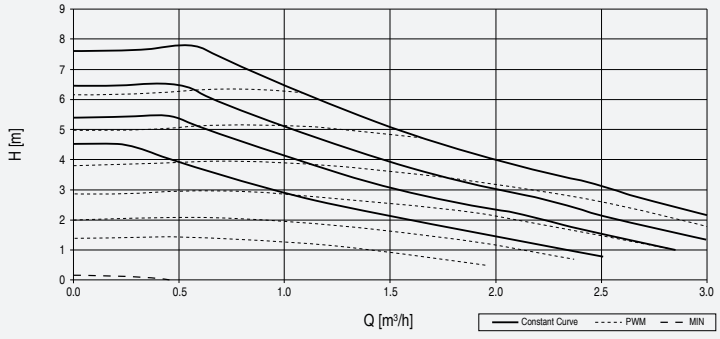


Art. S163 - Circulator with 4 constant curves, 4 PWM curves profile C

Technical specifications

Brand:	Grudfos
Model:	UPM3 SOLAR 15-75 130
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50Hz
Working temperature (cast iron body):	2 ÷ 110°C
Working temperature (PPS body):	2 ÷ 95°C
Max temperatura (cast iron body):	130°C for short periods
Max operating pressure:	10 bar
Protection level:	IPX4D
Energy class (EEI):	≤0.20
PWM signal cable code:	C64P3280153 (NOT INCLUDED)
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	
• T=75°C/95°C/110°C	0,050 bar

HYDRAULIC CHARACTERISTICS

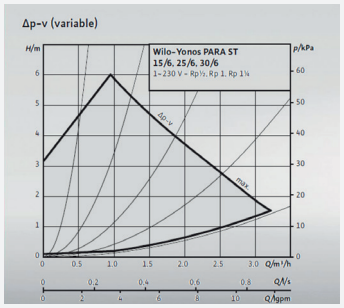


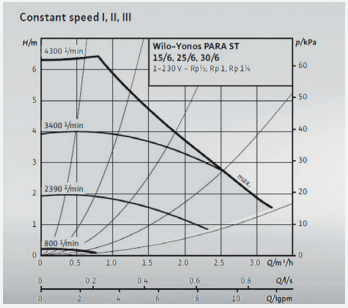
Art. S165 - Circulator with 3 constant curves, ΔP variable

Technical specifications

Brand:	Wilo
Model:	Para 15-6
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	
• Ambient temperature = 58°C	2 ÷ 100°C
• Ambient temperature = 62°C	2 ÷ 90°C
• Ambient temperature = 66°C	2 ÷ 80°C
• Ambient temperature = 71°C	2 ÷ 70°C
Max operating pressure:	10 bar
Protection level:	IPX4D
Energy class (EEI):	≤0.20
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	
• T=85°C	0,049 bar
• T=90°C	0,270 bar

HYDRAULIC CHARACTERISTICS





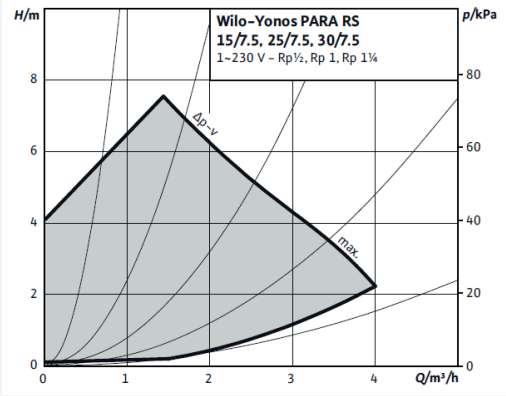
Art. S164 - Circulator with 3 constant curves, ΔP variable, 2 PWM curves

Technical specifications

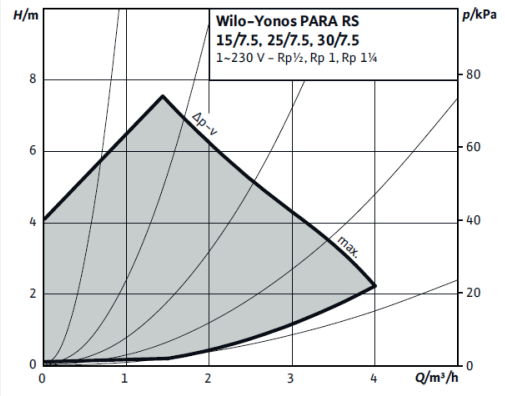
Brand:	Wilo
Model:	Yonos PARA RSTG 15/7.5 RK
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	
• Ambient temperature = 52°C	2 ÷ 110°C
• Ambient temperature = 57°C	2 ÷ 95°C
• Ambient temperature = 60°C	2 ÷ 90°C
• Ambient temperature = 67°C	2 ÷ 70°C
Max temperature:	130°C for short periods
Max operating pressure:	10 bar
Protection level:	IPX4D
Energy class (EEI):	≤0.21
Maximum percentage of glycol:	20%
Minimum pressure on the intake side:	
• T=50°C	0,049 bar
• T=95°C	0,441 bar
• T=110°C	1,079 bar

HYDRAULIC CHARACTERISTICS

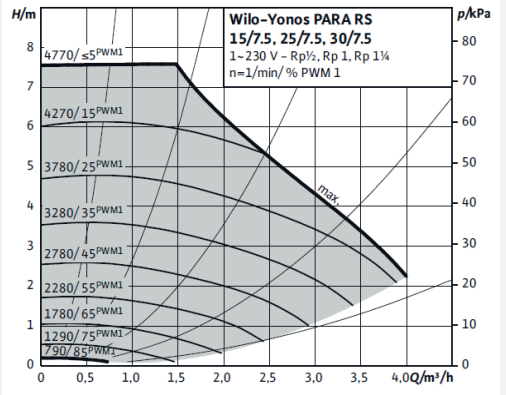
Δp-v (variable)



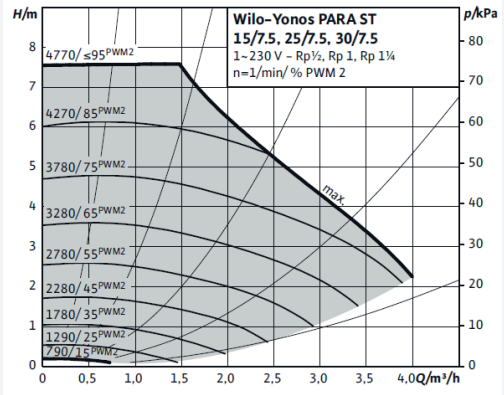
Δp-v (variable)



External control via PWM 1



External control via PWM

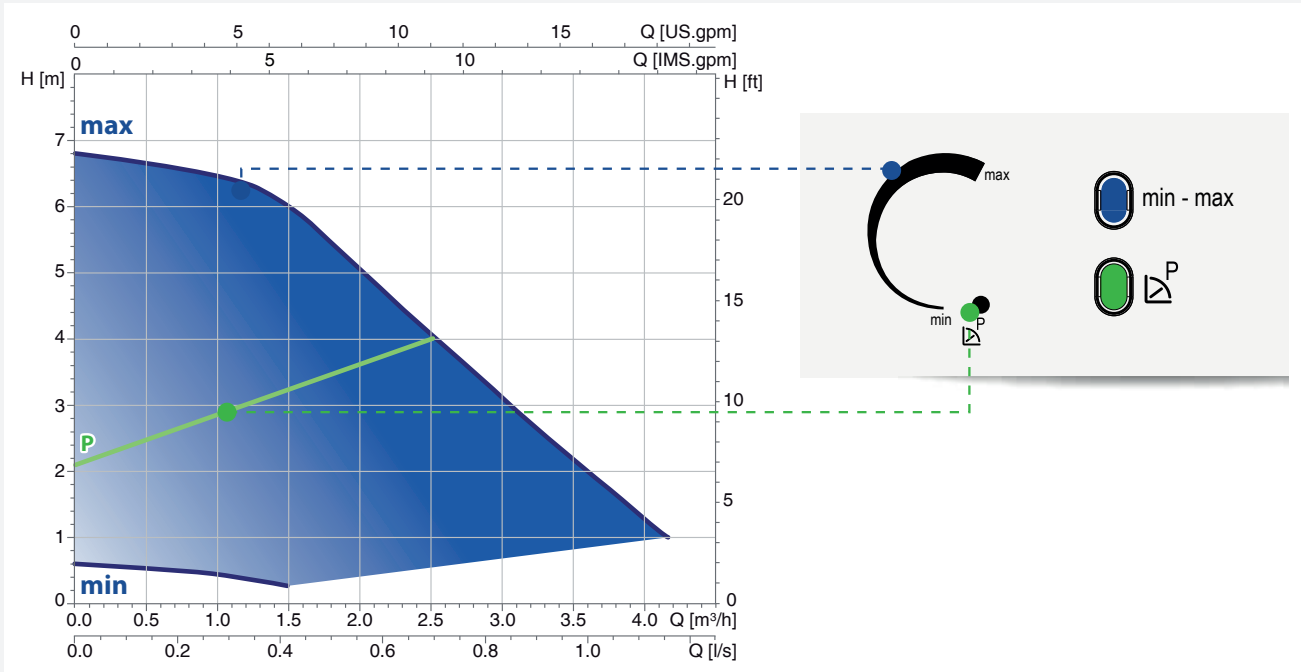


Art. S166 - Circulator with 1 proportional-pressure curve - min-max mode – Fixed speed

Technical specifications

Brand:	Taco
Model:	ES2 solar 15-70
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	Cellulosic fibers with NBR
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	
• Ambient temperature = 30°C	30 ÷ 110°C
• Ambient temperature = 35°C	35 ÷ 90°C
• Ambient temperature = 40°C	40 ÷ 70°C
Max operating pressure:	10 bar
Protection level:	IP44
Energy class (EEI):	≤0.21
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	
• T=85°C	0,049 bar
• T=90°C	0,270 bar
• T=110°C	1,080 bar

HYDRAULIC CHARACTERISTICS

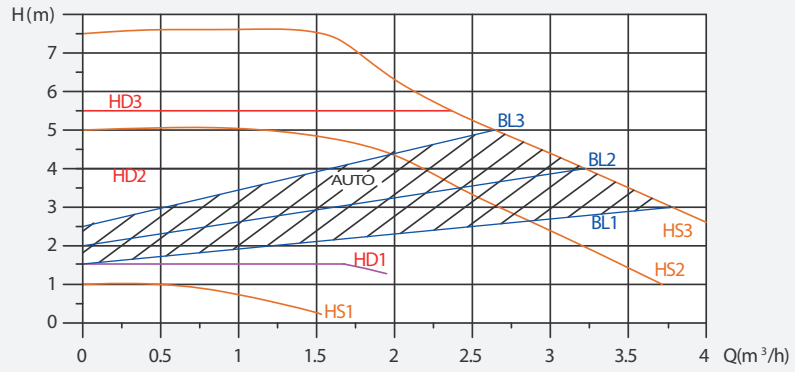


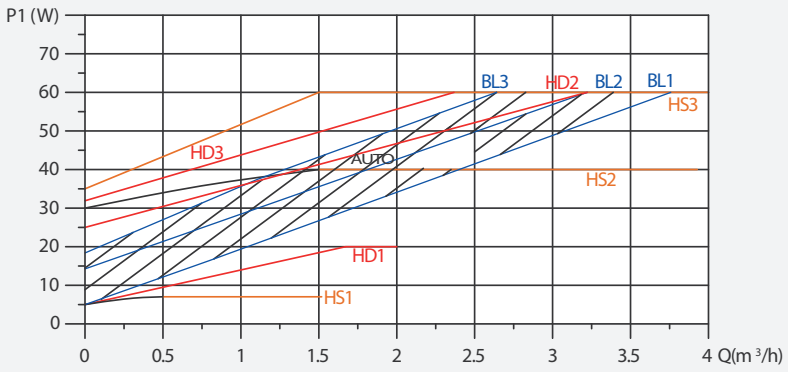
Art. S167 - Circulator with 3 constant curves, 3 PWM curves

Technical specifications

Brand:	Hefei Xinhu
Model:	GPA 20-7.5 III
Centre to centre distance	130 mm.
Connections:	G1" M
Flat seals:	EPDM
Electrical power supply:	230 V - 50/60 Hz
Operating temperature:	
• Ambient temperature = 30°C	30 ÷ 110°C
• Ambient temperature = 50°C	50 ÷ 110°C
• Ambient temperature = 70°C	70 ÷ 100°C
Max operating pressure	10 bar
Protection level:	IP44
Energy class (EEI):	≤0.20
PWM signal connector code:	C65S1670153 (NOT INCLUDED)
Maximum percentage of glycol:	50%
Minimum pressure on the intake side:	
• T=75°C	0,05 bar
• T=90°C	0,5 bar
• T=110°C	1,08 bar

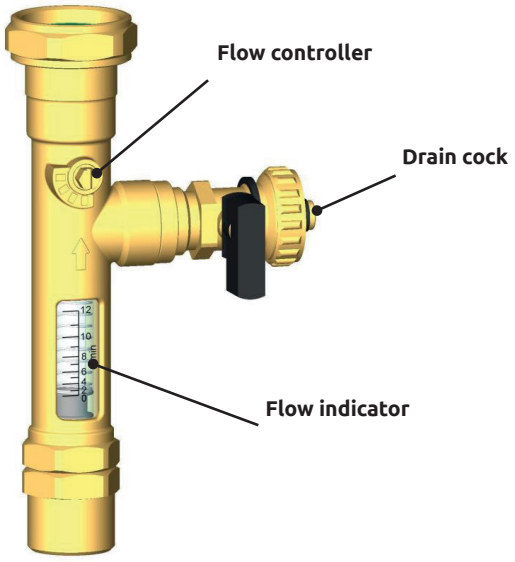
HYDRAULIC CHARACTERISTICS



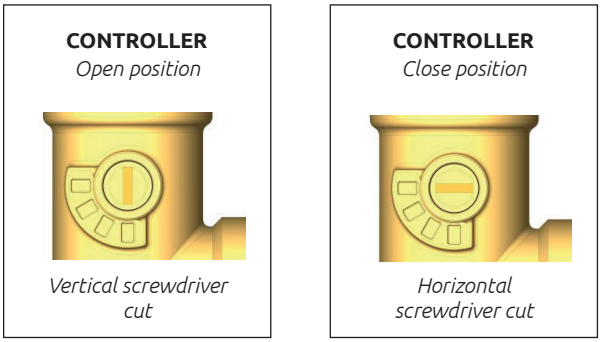


Flow meter

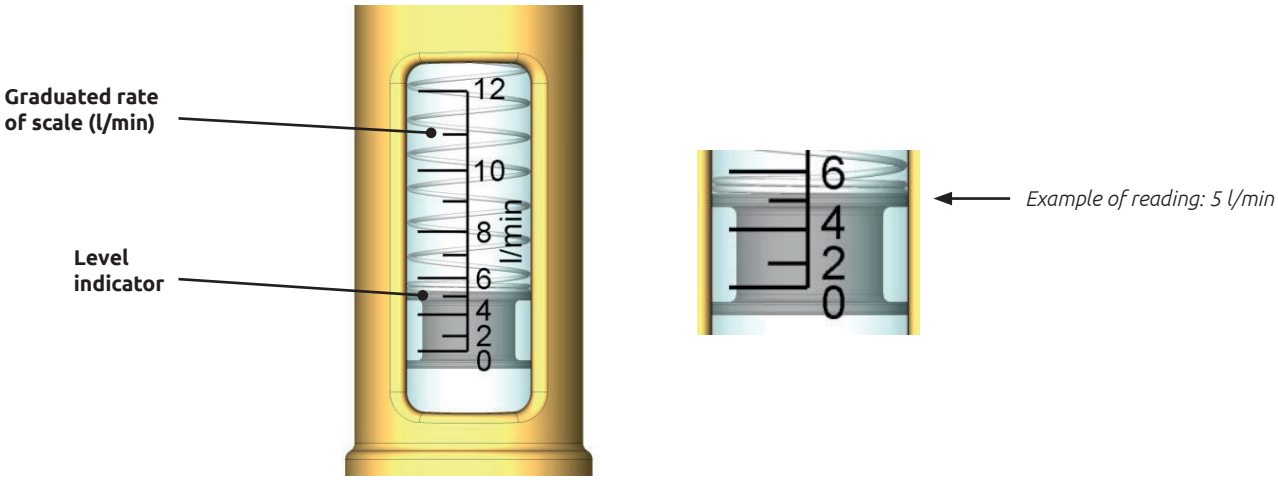
The flowmeter 6 (Table1-page 4) is an instrument to measure the flow of the heat-transfer fluid circulating in the system.
It is possible to read in real time the value of the flow in the circuit with the flow indicator (Pict.3), This device is equipped with a glass having a graduated rate of flow scale, with a calibration spring and with a movable indicator that varies its position according to the flow inside the glass. The flow rate reading are explained the paragraph below.
The flow meter is also equipped with a manual flow regulator, adjustable with a screwdriver.
For proper operation, the flow meter must be installed in a vertical position.
The scale range is 0-12 l/min.



Pict. 3



Flow rate reading



Pict. 4

Safety

Read assembly and operating instructions carefully before starting up the system in order to prevent accidents and damage to the system caused by improper use. Remember that your rights under the warranty will be forfeited if you make any changes to the system or tamper with it during assembly and construction without authorisation. In addition, you must follow the requirements of the regulations listed below:

Operating conditions

The limits on operating values specified must not be exceeded under any circumstances. Safe operation is guaranteed if you comply with the general conditions and limits on operating valves described in this information sheet.

Safety standards for assembly and inspection

Assembly and inspection operations must always be performed by qualified, authorised personnel familiar with the instructions contained herein. Make sure the system is shut down before performing any work on it.

Electrical connections

Electrical connections must be made by qualified personnel. Connecting cables must be positioned in the cavity provided for the purpose in the insulating shell so as to avoid contact with the body of the pump motor and with pipes.
Check that the power supply voltage is as specified on the plate before turning on the pump. All connections must be made as required by law.

Maintenance

Maintenance work must always be performed by qualified, authorised personnel familiar with the instructions contained herein. Make sure the system is shut down before performing any work on it. When replacing the pump, turn the on/off valve, return connection4 (Table1-page 3) and flow control valve 7 (Table1-page 3) to the off position.

WARNING! Depending on operating conditions in the pump and the system, the surface temperature could be very high. Touching the pump directly comports a risk of burning!