

Solar pump stations



278 and 279 series



Function

Solar pump stations are used on the primary circuit of solar thermal water heating systems to control the temperature of the hot water storage. The pump inside the unit is activated by the signal from a differential temperature controller. The unit contains the functional and safety devices for optimum circuit control. They are available with both supply and return connection or with return connection only.

The iSolar™ PLUS temperature differential controller, code 257260A (optional), is suitable for management and control of 10 pre-configured solar thermal system arrangements installed in an optional insulation jacket (code 278011) that mounts to the top of the pump station for a nice clean assembly and simplified wiring.

Solar pump stations are pre-assembled and leak-tested. Components include three-speed pump with wide flow rate range, safety relief valve, ball valves with built-in flow checks in return (and supply/flow for dual-line models, not available in drainback model), temperature gauges in return (and supply/flow for dual-line models), pressure gauge, manual air vent (dual-line models only), expansion tank connection, connections for flushing and filling, and foam insulation.

Product range

- Code 278751A Single-line solar pump station with 3 speed pump, return connection and flow meter scale 2 to 8 gpm.....connection 3/4" female
- Code 278751 Single-line solar pump station without pump, return connection and flow meter scale 2 to 8 gpm.....connection 3/4" female
- Code 279051A Dual-line solar pump station with 3 speed pump, supply and return connections, flow meter scale 2 to 8 gpm
.....connections 3/4" female
- Code 279051 Dual-line solar pump station without pump, supply and return connections, flow meter scale 2 to 8 gpm
.....connections 3/4" female
- Code 278951A Single-line solar pump station for drainback with 3 speed pump, return connection and flow meter scale 2 to 8 gpm
.....connections 3/4" female

Technical specifications

Materials

Shut-off valve body: brass
 Check valve: brass
 Temperature gauge: steel/aluminum

Air Separator

Body: brass

Instrument holder fitting

Body: brass
 Sealing gaskets: EPDM
 O-Ring seal elements: EPDM

Flow meter

Body: brass
 Transparent level gauge: PS
 Flow indicator: brass
 Hydraulic seals: EPDM

Insulation

Material: PP
 Average thickness: 3/4 inch (20 mm)
 Density: 2.8 lb/ft³ (45 kg/m³)
 Working temperature range: 23 - 250°F (-5-120°C)
 Thermal conductivity: 0.263 BTU-in/hr-ft²·°F 0.037 W/(m·K)
 at 50°F (10°C)
 Reaction to fire (UL94): class HBF

Performance

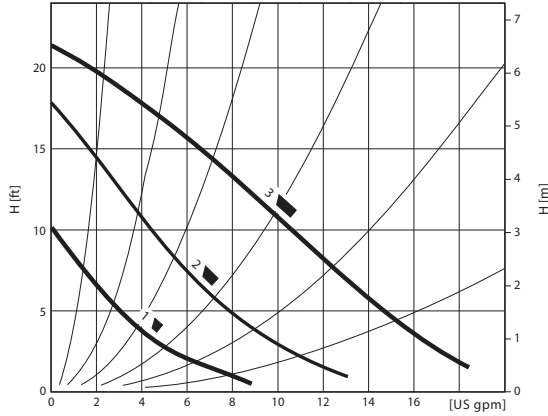
Suitable fluids: water, glycol solution
 Max. percentage of glycol: 50%
 Maximum working temperature:
 air separator side supply: 320°F (160°C)
 pump side return: 230°F (110°C)
 Max. working pressure: 145 psi (10 bar)
 Safety relief valve working temperature range: -20 to 320°F (-30-160°C)
 Safety relief valve setting: 90 psi (6 bar)
 Check valve min. opening pressure (Δp): 1/4 psi (2 kPa)
 Shut-off and check valves working temperature range:
 -20 to 320°F (-30-160°C)
 Flow meter working temperature range: 15 to 230°F (-10-110°C)
 Flow rate adjustment range: 2 to 8 gpm
 Flow rate indicator accuracy: ±10%
 Pressure gauge scale: 0 to 145 psi (0-10 bar)
 Temperature gauge scale: 32 to 320°F (0-160°C)
 Connections: 3/4" female straight thread
 Fitting adapters, purchase separately:
 1/2", 3/4", 1" male straight thread for SolarFlex™
 and sweat connections
 3/4"

Hose connection: 3/4"
 Fill/drain connections: with hose connection 9/16" OD (15 mm)

Pump Model Wilo Star S-21

Three-speed pump: Wilo Star S21U-15-130
 Body: cast iron
 Electric supply: 115 V 60 Hz
 Max. pressure: 140 psi (10 bar)
 Max. liquid temperature: 230°F (110°C)
 Min. liquid temperature: 14°F (-10°C)
 Max. current: 0.97 A
 Max. power consumption: 110 W
 Protection class: CSA enclosure 2
 Agency approval: cULus

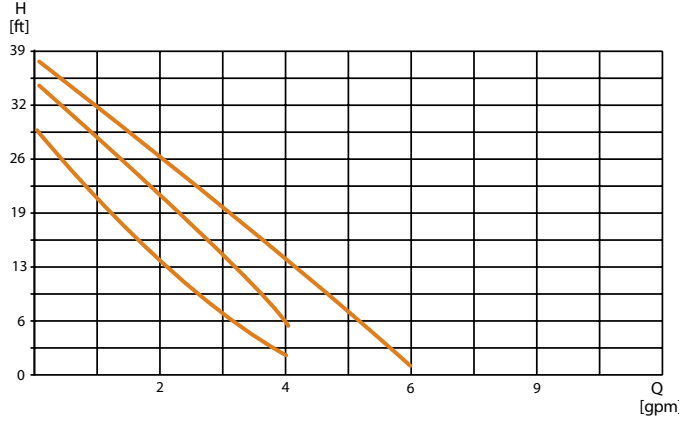
Flow range: 0 to 18 gpm (0 to 1.1 l/s)
 Head range: 0 to 21 ft (0 to 6.4 m)



Pump Model Grundfos Solar 15-100 Drainback

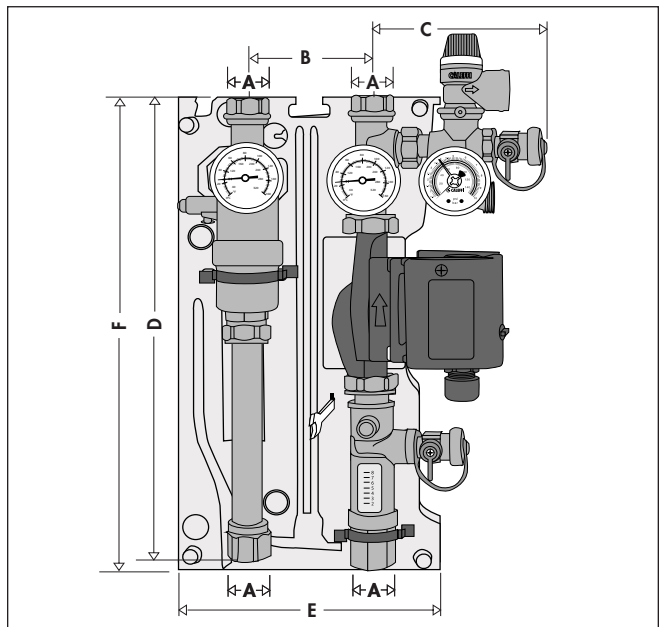
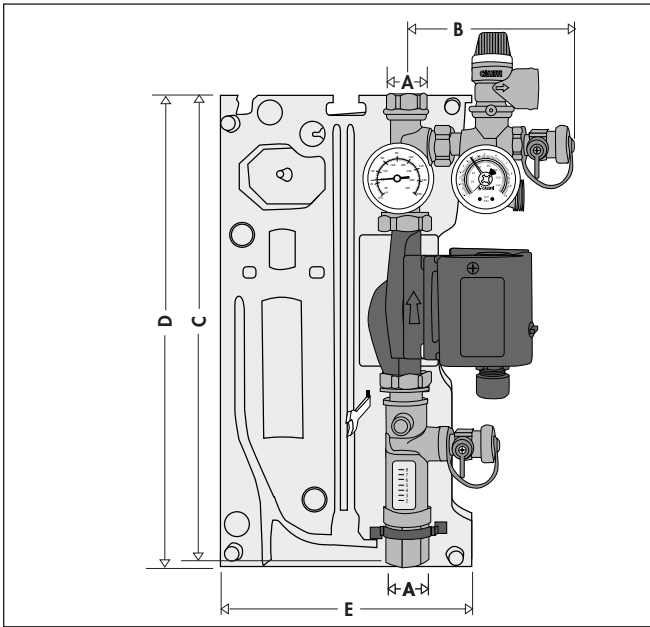
Three-speed pump: Grundfos Solar 15-100U 130
 Body: cast iron
 Electric supply: 115 V 60 Hz
 Max. pressure: 140 psi (10 bar)
 Max. liquid temperature: 230°F (110°C)
 Min. liquid temperature: 14°F (-10°C)
 Max. current: 0.93 A
 Max. power consumption: 117 W
 Agency approval: UL 778, CSA22.2/108 per Intertek

Flow range: 0 to 8.4 gpm (0 to 0.5 l/s)
 Head range: 0 to 36 ft (0 to 11.0 m)



NOTE: Pump data per Manufacturer technical specifications.

Dimensions



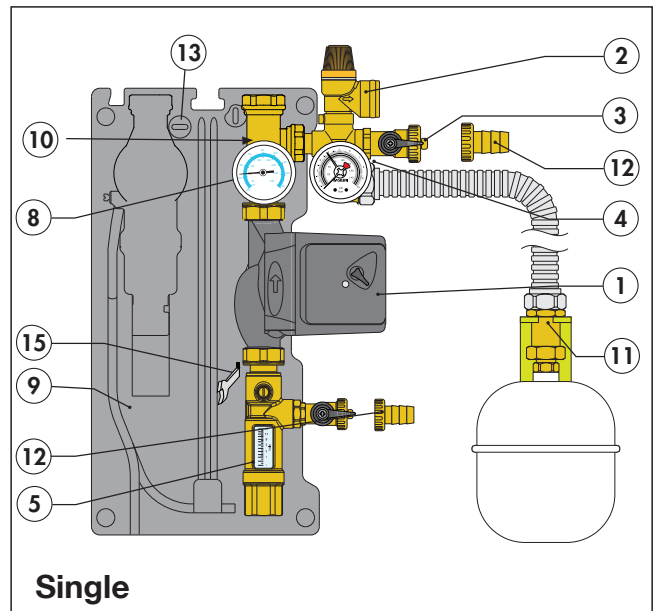
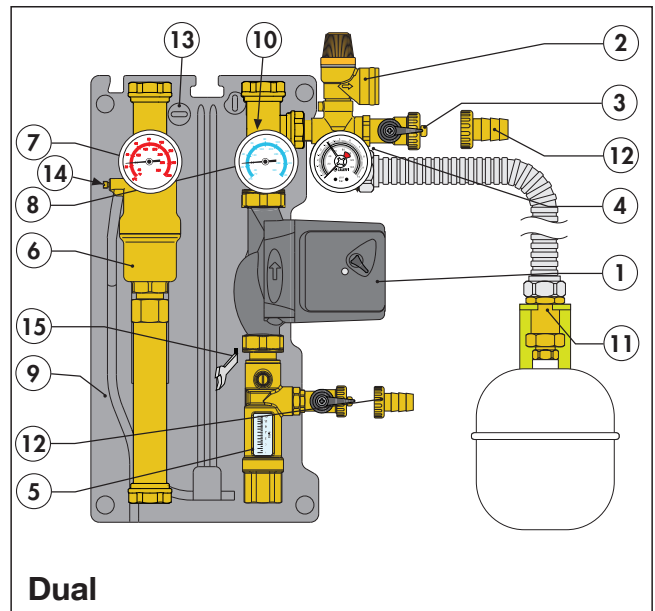
Code	278751A	278751 (no pump)	279951A
A		¾"	
B		5¼"	
C		15"	
D		15¾"	
E		8"	
Weight	14 lb (6.4 kg)	10 lb (4.5 kg)	14 lb (6.4 kg)

Code	279051A	279051 (no pump)
A		¾"
B		4"
C		5¼"
D		15"
E		8"
F		15¾"
Weight	17 lb (7.7 kg)	12 lb (5.5 kg)

Characteristic components

- 1) Circulation pump
- 2) Safety relief valve
- 3) Fill/drain valve with control lever
- 4) Instrument holder fitting with pressure gauge
- 5) Flow meter
- 6) Air separator with air vent and shut-off valve with check valve
- 7) Supply (flow) temperature gauge
- 8) Return temperature gauge
- 9) Pre-formed shell insulation
- 10) Shut-off ball valve with check valve and temperature gauge holder knob (Drainback station does not have a check valve)
- 11) Connection kit for expansion tank (purchase separately)
- 12) Hose connection
- 13) Mounting bracket
- 14) Manual air vent release screw head
- 15) 9 mm hex wrench for shut-off ball valve and flow meter valve

Connection adapter fittings are purchased separately, see page 5.

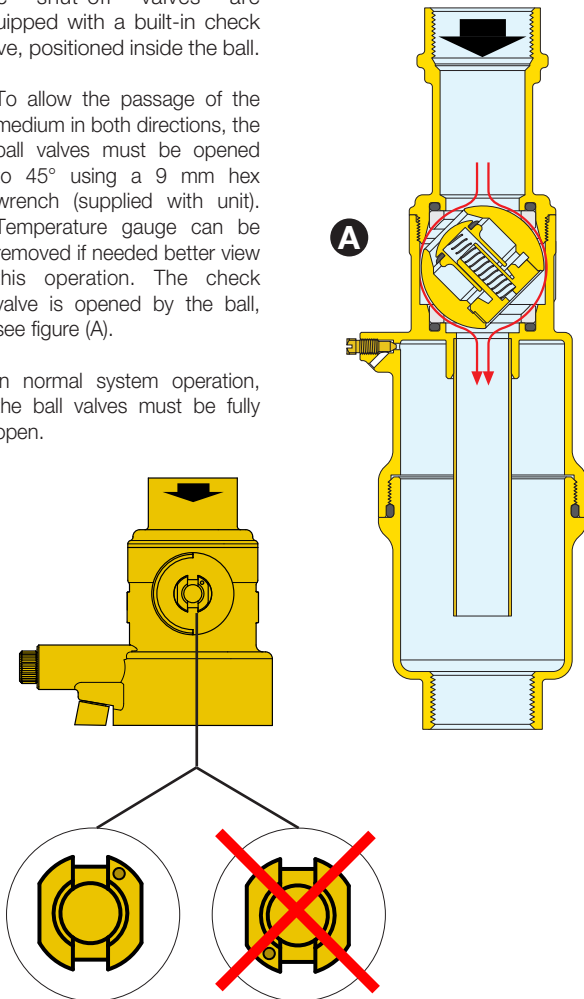


Shut-off and check valves

The shut-off valves are equipped with a built-in check valve, positioned inside the ball.

1. To allow the passage of the medium in both directions, the ball valves must be opened to 45° using a 9 mm hex wrench (supplied with unit). Temperature gauge can be removed if needed better view this operation. The check valve is opened by the ball, see figure (A).

2. In normal system operation, the ball valves must be fully open.

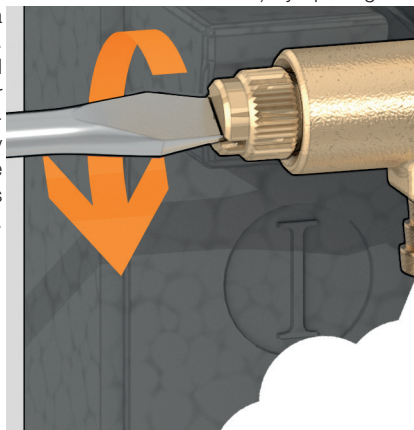


Correct position

Incorrect position

Air separator

The solar pump stations with supply and return connections (279 series) are equipped with an air separator on the supply line. The gases separated from the heat transfer medium collect at the top of the air separator. The collected gases must be evacuated from time to time (every day after putting into operation and afterwards, depending on the quantity of air, once a week or once a month) by opening the manual air vent with a suitably sized screwdriver. To maintain optimal efficiency of the solar thermal system, afterwards, it is necessary to discharge air from the system every six months using the air separator.

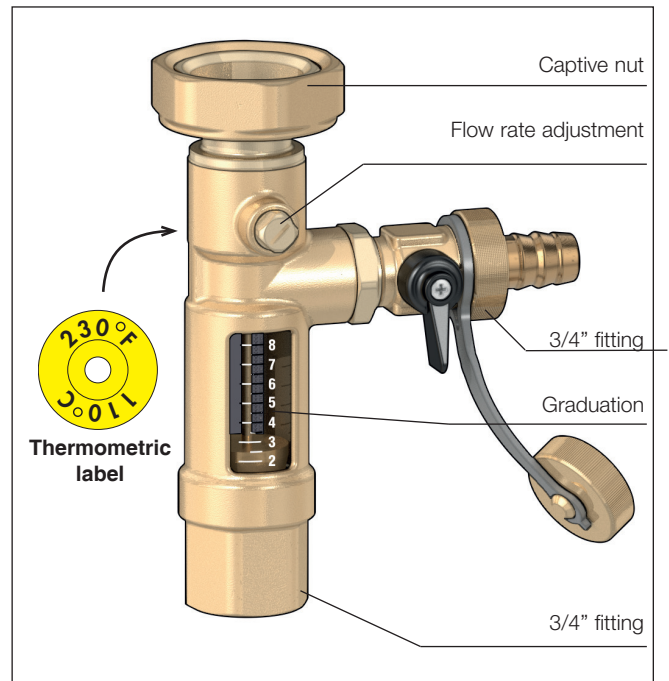


Flow meter

The flow meter is a flow rate measuring device, float equipped, with an adjustment ball valve.

The meter has a range of 2 to 8 gpm.

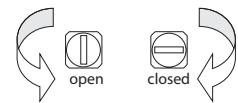
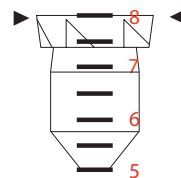
The flow meter must always be installed in a vertical position.



A thermometric label on the back of the flow meter signals if the maximum permitted temperature (230°F/110°C) has been exceeded: white = temperature not exceeded; dark = maximum temperature exceeded. Warranty will be void if this label is removed.

The reading is taken from the top edge of the float

Important! Use only a 9mm hex wrench (supplied with unit) to adjust the flow meter.



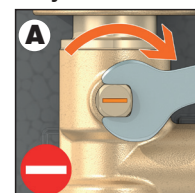
Correction for different density liquids

Changes in flow rate readings remain within the indicated accuracy ($\pm 10\%$) for glycol percentages of up to 50%.

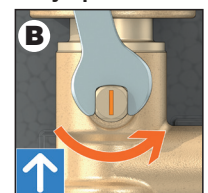
Complete closing and opening of the valve

The valve can be fully closed or fully open. A slot on the valve adjusting stem indicates the status of the valve.

Fully closed



Fully open



Pump station fittings

Kits designed for connecting 278 and 279 pump stations to SolarFlex™ stainless steel piping with EPDM insulation to complete solar water heating system installations.



1/2" SolarFlex™ connection directly to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26640	3/4" male thread x 3/4" male thread



1/2" SolarFlex™ connection directly to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26740	3/4" male thread x 3/4" male thread



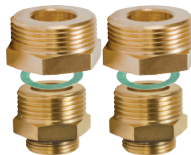
3/4" SolarFlex™ connection directly to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26650	3/4" male thread x 1" male thread



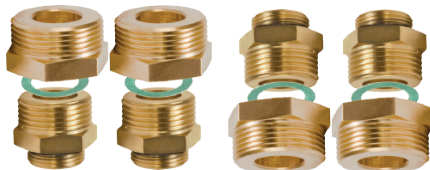
3/4" SolarFlex™ connection directly to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26750	3/4" male thread x 1" male thread



1" SolarFlex™ connection directly to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26660	3/4" male thread x 1 1/4" male thread



1" SolarFlex™ connection directly to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26760	3/4" male thread x 1 1/4" male thread

Kits designed for connecting 278 and 279 pump stations to copper piping with sweat connections to complete solar water heating system installations.



1/2" sweat fittings to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26649	3/4" male thread x 1/2" sweat fitting



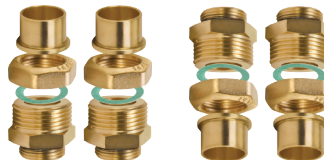
1/2" sweat fittings to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26749	3/4" male thread x 1/2" sweat fitting



3/4" sweat fittings to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26659	3/4" male thread x 3/4" sweat fitting



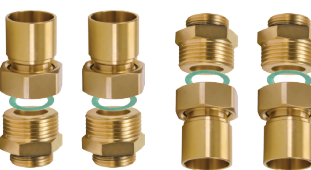
3/4" sweat fittings to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26759	3/4" male thread x 3/4" sweat fitting



1" sweat fittings to top or bottom 3/4" female thread* connection.
2 each.

Code	Description
NA26669	3/4" male thread x 1" sweat fitting



1" sweat fittings to top and bottom 3/4" female thread* connection.
4 each.

Code	Description
NA26769	3/4" male thread x 1" sweat fitting

*all threads referenced on this page are straight (metric) threads.

Replacement Pumps



Replacement pumps fits current solar pump stations 278 & 279.
 3 speed 115 V
 1" male union thread.
 Agency approval: cULus.

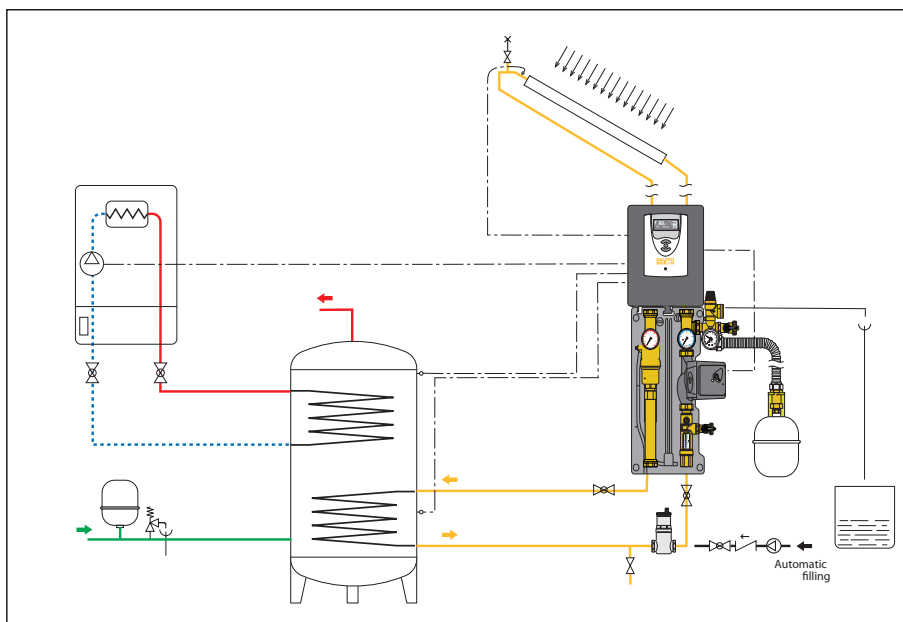
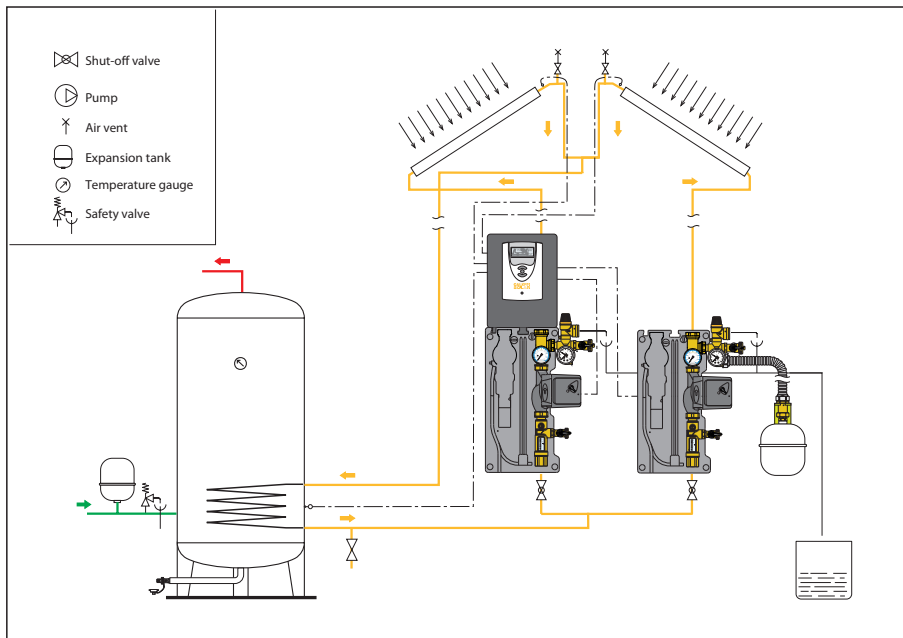


Replacement pump fits current drainback station, code 278951A.
 3 speed 115 V
 1" male union thread.
 Agency approval: UL778, CSA22.2/108.

Code	Description
NA12170	Wilo Star S-16, 13' head / 8 gpm
NA12168	Wilo Star S-21, 21' head / 18 gpm

Code	Description
NA12171	Grundfos Solar 15-100 Drainback, 36' head / 8.4 gpm

Application diagrams



Replacement temperature gauges



Temperature gauges fit 278 & 279 solar stations. Scale: 32 to 320° F (0 to 160° C).

Code	Description
F29759	1½" red dial temperature gauge
F29758	1½" blue dial temperature gauge

SPECIFICATION SUMMARY

278 series

Solar Pump Station: Single-line solar pump station for pressured closed-loop systems with or without pump. Connections ¼ inch female straight thread. Brass body. Steel and aluminum temperature gauges in return connection. EPDM seals, O-Rings and gaskets, asbestos free. PP insulating shell, thermal conductivity 0.263 BTU·in/hr·ft²·°F 0.037 W/(m·K) at 50°F (10°C). Ball valves with built-in flow checks in return line. Expansion tank connection ½ inch male straight thread. Filling/drain hose connections ¾ inch male hose thread. Suitable fluids: water or 50 percent maximum glycol solution. Maximum working temperature 350 degrees F (175 degrees C). Maximum working pressure 145 psi (10 bar). Safety relief valve temperature range minus 20 to 320 degrees F (minus 30 to 160 degrees C). Safety relief valve factory set at 90 psi (6 bar). Minimum opening shut-off and check valve differential pressure ¼ psi (2 kPa). Flow meter scale 2 to 8 gpm. Maximum return flow meter temperature 265 degrees F (130 degrees C). Pressure gauge scale 0 to 145 psi (0 to 10 bar). Temperature gauge scale 32 to 320 degrees F (0 to 160 degrees C). Code 278751 station without pump. Code 278751A includes Wilo Solar Star S-21 3 speed pump. Cast iron body. Power supply 115V - 60 Hz. Maximum pressure 140 psi (10 bar). Maximum temperature 230 degrees F (110 degrees C). Agency approval: cULus. Provide with SolarFlex adapter or sweat fittings for top and bottom return connections, ½ inch, ¾ inch or 1 inch.

279 series

Solar Pump Station: Dual-line solar pump station for pressured closed-loop systems with or without pump. Connections ¼ inch female straight thread. Brass body. Steel and aluminum temperature gauges in return and flow (supply) connections. EPDM seals, O-Rings and gaskets, asbestos free. PP insulating shell, thermal conductivity 0.263 BTU·in/hr·ft²·°F 0.037 W/(m·K) at 50°F (10°C). Ball valves with built-in flow checks in return and flow (supply) lines. Expansion tank connection ½ inch male straight thread. Filling/drain hose connections ¾ inch male hose thread. Suitable fluids: water or 50 percent maximum glycol solution. Maximum working temperature 350 degrees F (175 degrees C). Maximum working pressure 145 psi (10 bar). Safety relief valve temperature range minus 20 to 320 degrees F (minus 30 to 160 degrees C). Safety relief valve factory set at 90 psi (6 bar). Minimum opening shut-off and check valve differential pressure ¼ psi (2 kPa). Flow meter scale 2 to 8 gpm. Maximum return flow meter temperature 265 degrees F (130 degrees C). Pressure gauge scale 0 to 145 psi (0 to 10 bar). Temperature gauge scale 32 to 320 degrees F (0 to 160 degrees C). Code 279051 station without pump. Code 279701A includes Wilo Solar Star S-21 3 speed pump. Cast iron body. Power supply 115V - 60 Hz. Maximum pressure 140 psi (10 bar). Maximum temperature 230 degrees F (110 degrees C). Agency approval: cULus. Provide with SolarFlex adapter or sweat fittings for top and bottom flow (supply) and return connections, ½ inch, ¾ inch or 1 inch.

278951A drainback pump station

Solar Pump Station: Single-line solar pump station for drainback systems with pump. Connections ¼ inch female straight thread. Brass body. Steel and aluminum temperature gauges in return connection. EPDM seals, O-Rings and gaskets, asbestos free. PP insulating shell, thermal conductivity 0.263 BTU·in/hr·ft²·°F 0.037 W/(m·K) at 50°F (10°C). Ball valves with built-in flow checks in return line. Expansion tank connection ½ inch male straight thread. Filling/drain hose connections ¾ inch male hose thread. Suitable fluids: water or 50 percent maximum glycol solution. Maximum working temperature 350 degrees F (175 degrees C). Maximum working pressure 145 psi (10 bar). Safety relief valve temperature range minus 20 to 320 degrees F (minus 30 to 160 degrees C). Safety relief valve factory set at 90 psi (6 bar). Minimum opening shut-off and check valve differential pressure ¼ psi (2 kPa). Flow meter scale 2 to 8 gpm. Maximum return flow meter temperature 265 degrees F (130 degrees C). Includes Grundfos Solar 15-100U pump. Cast iron body. Power supply 115V - 60 Hz. Maximum pressure 140 psi (10 bar). Maximum temperature 230 degrees F (110 degrees C). Agency approval: UL standard 778 and CSA standard C22.2 No. 108 certified by Intertek. Provide with SolarFlex adapter fittings for top and bottom return connections, ½ inch, ¾ inch or 1 inch.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



Caleffi North America, Inc.
3883 W. Milwaukee Road
Milwaukee, WI 53208
Tel: 414-238-2360 · Fax: 414-238-2366
sales@caleffi.com · www.caleffi.com
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