

## SOLAR COLLECTORS

The new GOBI has undergone a complete transformation for 2011 making it the industry's best flat plate collector. By redesigning the frame and incorporating state of the art components, the GOBI has a reduced profile and even better performance. With 3 sizes and 2 absorber surface types to choose from, there is a GOBI collector for every type of solar water heating application.

**Thinnest Profile** – The redesigned frame is easier to handle for installers and offers the end user a streamlined, sleek look on their roof compared to bulky traditional flat plate collectors.

**Rated Top Performance** – New SRCC ratings certify that the GOBI now ranks among the best OG-100 collectors. The high energy output of the GOBI offers maximum performance out of the solar hot water system.

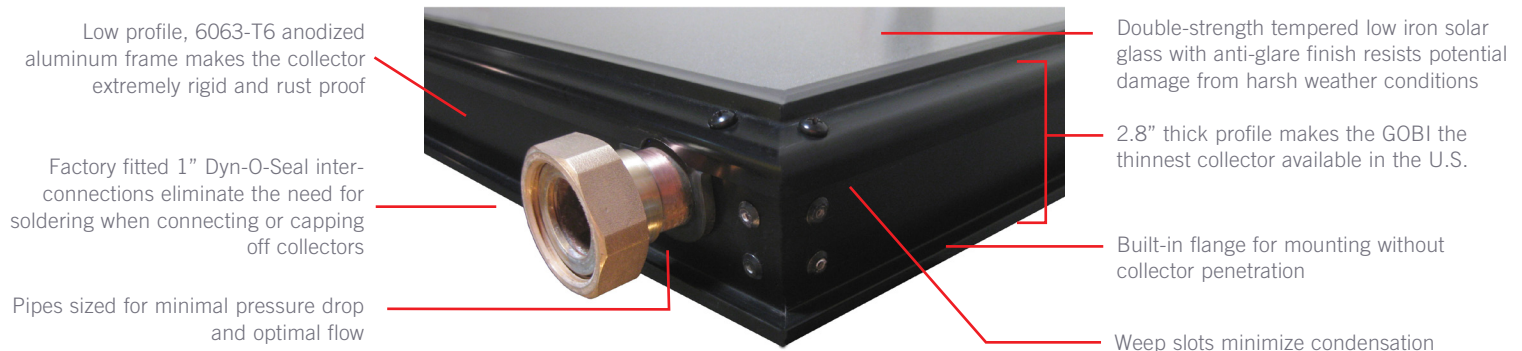
**Easiest to Install** – The GOBI retains its unique Dyn-O-Seal (DOS) union interconnection method. DOS unions come factory assembled and eliminate the time consuming task of soldering each collector together in an array.

### New Design Features

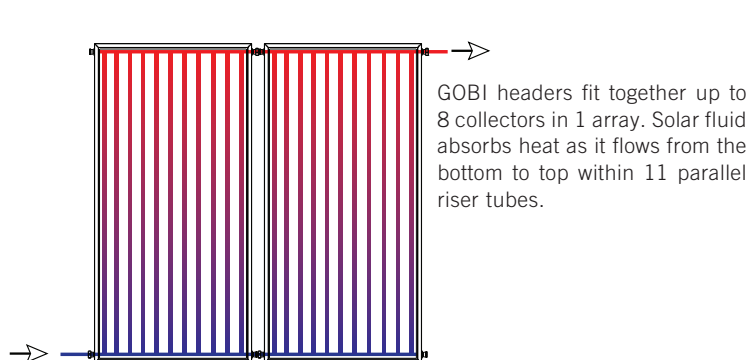
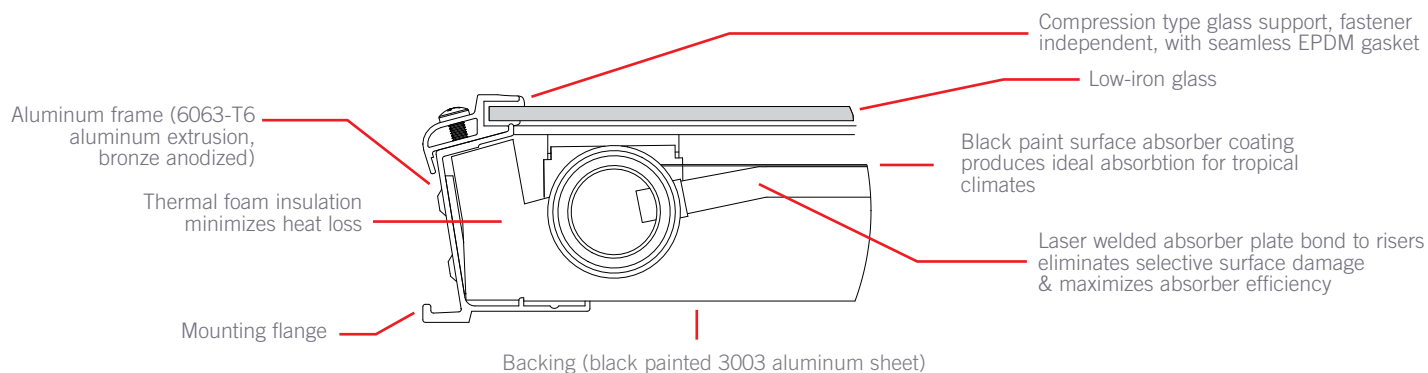
- 1" reduction in frame thickness
- Improved insulation
- Full plate absorber
- Rounded frame edge
- OG-100 certified with higher performance and efficiency



*DOS unions are included to connect and cap off collectors*

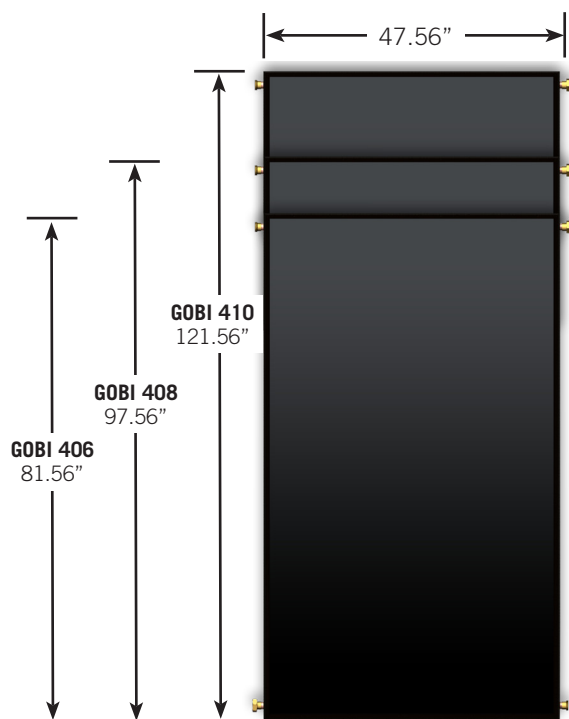


# TECHNICAL SPECIFICATIONS - SEMI SELECTIVE COLLECTORS



## SRCC SRCC OG-100 RATINGS (CLEAR DAY)

Category (Ti - Ta)	GOBI 406 002	GOBI 408 002	GOBI 410 002
Certification Number	2010115B	2010116C	2010116A
A (-9°F)	27.5	35.5	42.57
B (9°F)	21.8	29.2	36.71
C (36°F)	14.6	21.2	28.28
D (90°F)	3.20	8.80	12.42
E (144°F)	0.02	1.10	0.83



NOTE: GOBIs all have a depth of 2.8"

MODEL	GOBI 406 002	GOBI 408 002	GOBI 410 002
Gross Area	26.94 ft <sup>2</sup>	32.23 ft <sup>2</sup>	40.15 ft <sup>2</sup>
Net Area	24.91 ft <sup>2</sup>	29.83 ft <sup>2</sup>	38.3 ft <sup>2</sup>
Dry Weight	74 lbs.	102 lbs.	127 lbs.
Fluid Capacity	0.6 gal	0.7 gal	0.8 gal
Maximum Operating Pressure	150 psi (10.34 Bar)		
Recommended Design Flow Rate (glycol/water mix)	0.8 gal/min	1.0 gal/min	1.25 gal/min
Recommended Design Flow Rate (water)	0.7 gal/min	0.8 gal/min	1.0 gal/min
Wind Load Certification	50 psf (2.39 kPa)		

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**heliodyne**  
SOLAR HOT WATER

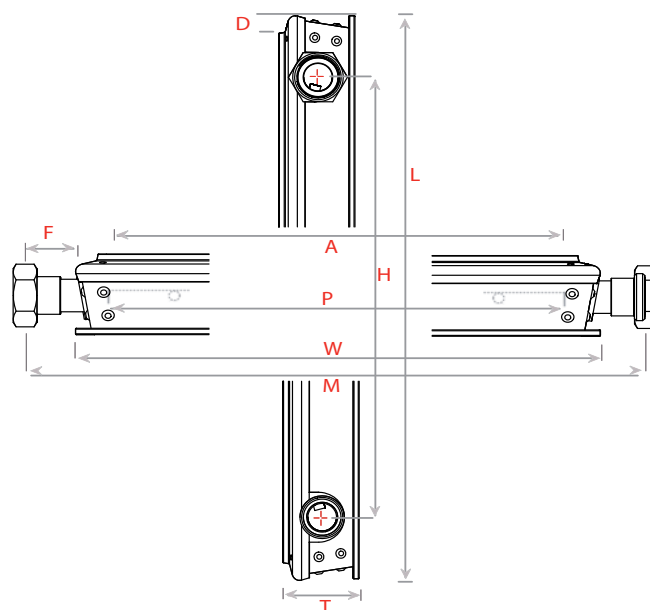
# 2. TECHNICAL SPECIFICATIONS

## COLLECTOR SPECIFICATION

### 1.1. Technical Specifications for Gobi

DIM	DESCRIPTION	UNITS	GOBI 406	GOBI 408	GOBI 410
L	Length	inch	81.56	97.56	121.56
W	Width		47.56		
T	Thickness		2.75		
H	Header Length		76.88	92.88	116.88
M	Header Width		50.25		
A	Aperture Length		79.25	95.25	119.25
	Aperture Width		45.25		
P	Plate Length		78.0	94.0	118.0
	Plate Width		46.25		
D	Flashing Base		0.61		
F	Flashing Header		1.93		
L x W	Gross Area	ft <sup>2</sup>	26.94	32.22	40.15
A <sub>L</sub> x A <sub>W</sub>	Net Area	ft <sup>2</sup>	24.90	29.93	37.47
g	Dry Weight	lb.	74	102	127
G	Full Weight	lb.	80	108	135
V	Volume	Gal.	0.6	0.7	0.8
-	Max Pressure	PSI	150 (10 Bar)		
-	Test Pressure	PSI	300 (20 Bar)		
-	Stag. Temp.	°F	397.6 (203 °C)		

Distance box-to-box between Gobis: 2.68"

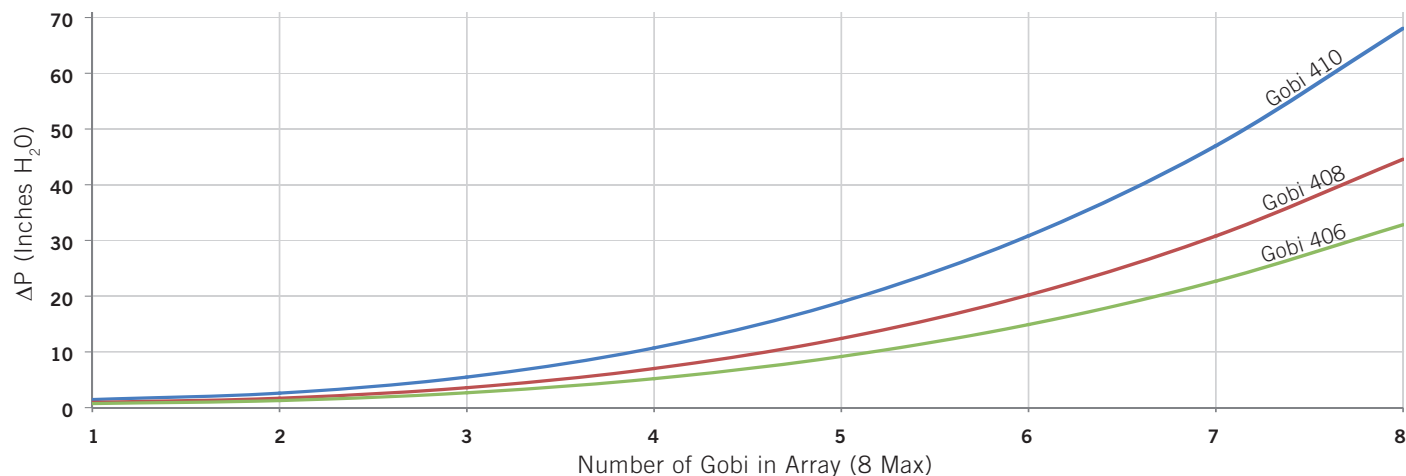


### 1.2. Flow and Pressure Loss<sup>1</sup>

#### RECOMMENDED DESIGN FLOW RATES WITH GLYCOL<sup>2</sup>

GOBI 406	GOBI 408	GOBI 410
0.85 Gal / min	1.0 Gal / min	1.25 Gal / min

PRESSURE DROP PLOT



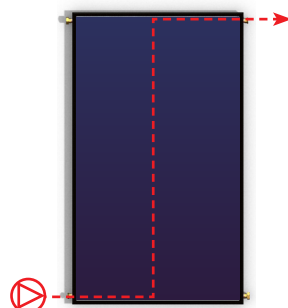
<sup>1</sup> Losses calculated at recommended Gobi design flow rates for 50/50 propylene glycol / water solution.

<sup>2</sup> Minimum flow rates shown. Do not exceed recommended flow rates by more than (3) times.

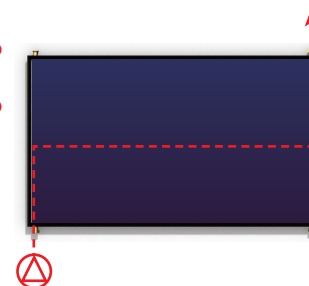
# 3. GOBI ORIENTATION AND PLUMBING



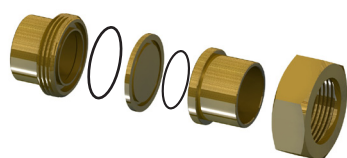
**TILT ANGLE**  
 Combi DHW: 45°  
 DHW / Pool: 35°  
 + / - 15° ✓



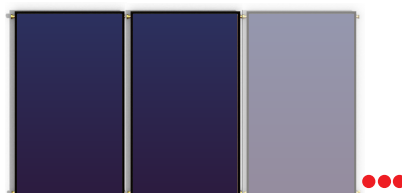
**Closed-loop** ✓  
**Open-loop** ✓  
**Drain Back** ✓



**Closed-loop** ✓  
**Open-loop** ✓  
**Drain Back** ✗



→ **2x**



OR

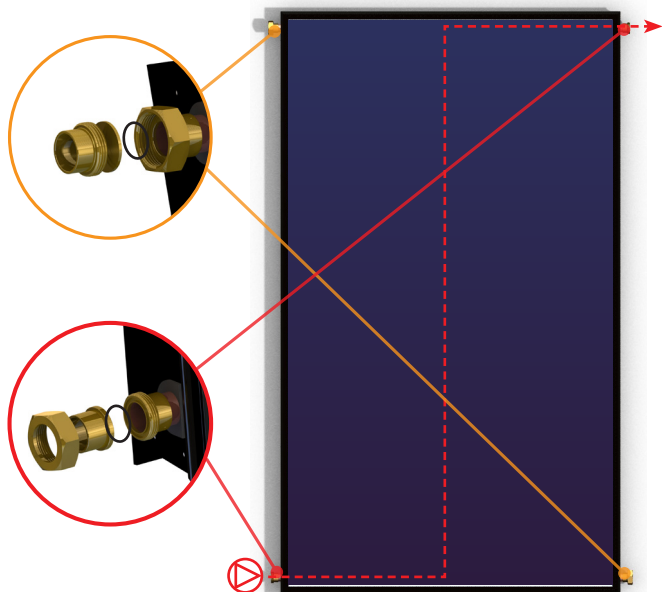


Figure 1.3.-1 DOS-Disc Assembly (p/n: 50013)

Figure 1.3.-2 Two DOS-Discs Per Vertical Array

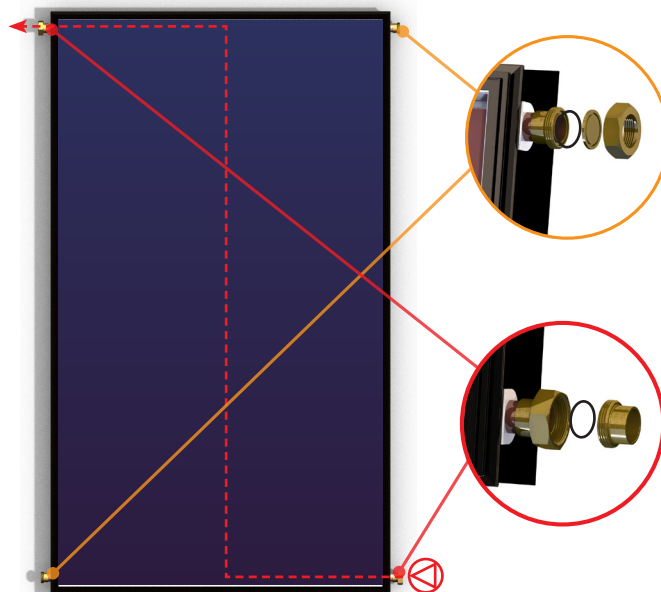
Figure 1.3.-3 Two DOS-Discs Per Horizontal Collector

## DOS Connections



Flow path: lower left corner to top right corner

OR

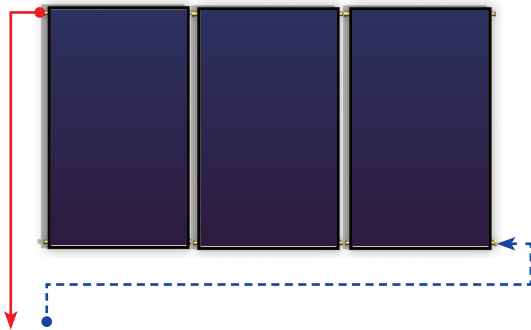


Flow path: lower right corner to top left corner

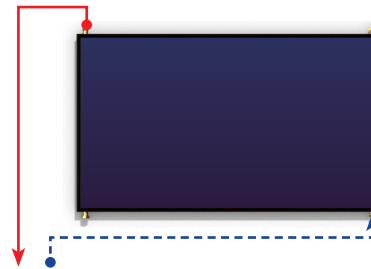
### Gobi Collector Plumbing

Use copper piping on the collector loop, solder to appropriate conditions in technical specifications. Always plumb in reverse return with the longest line the cold, or use automatic balancing valves. Insulate piping for least losses; use rubber based insulation with environment protection or Solar Flex Tube from Heliodyne. Gobi collectors can be put in portrait arrays of up to eight. Install bleed vents for filling at local high points.

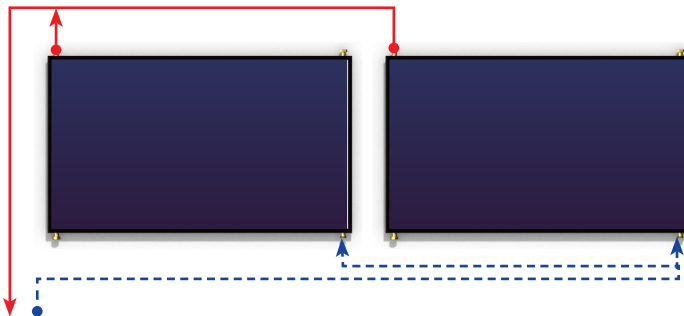
#### 4.2.0. Portrait Single Collector or Array



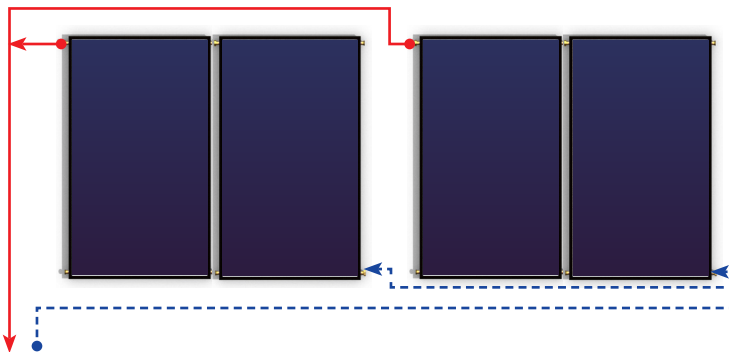
#### 4.2.1. Single Horizontal Collector



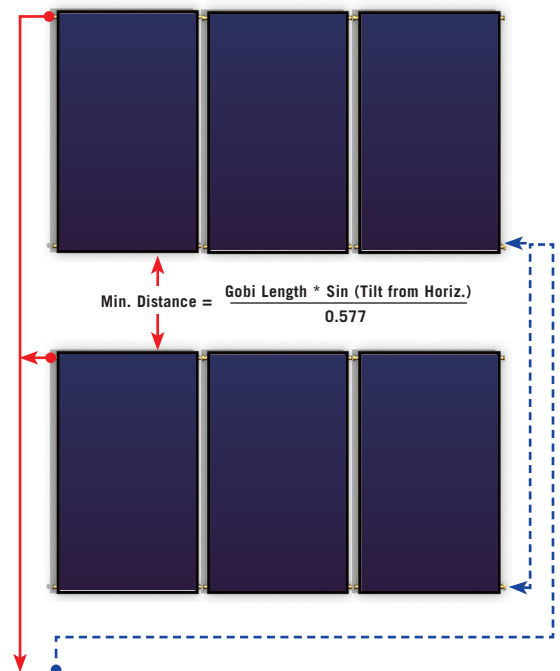
#### 4.2.2. Multiple Horizontal Collectors



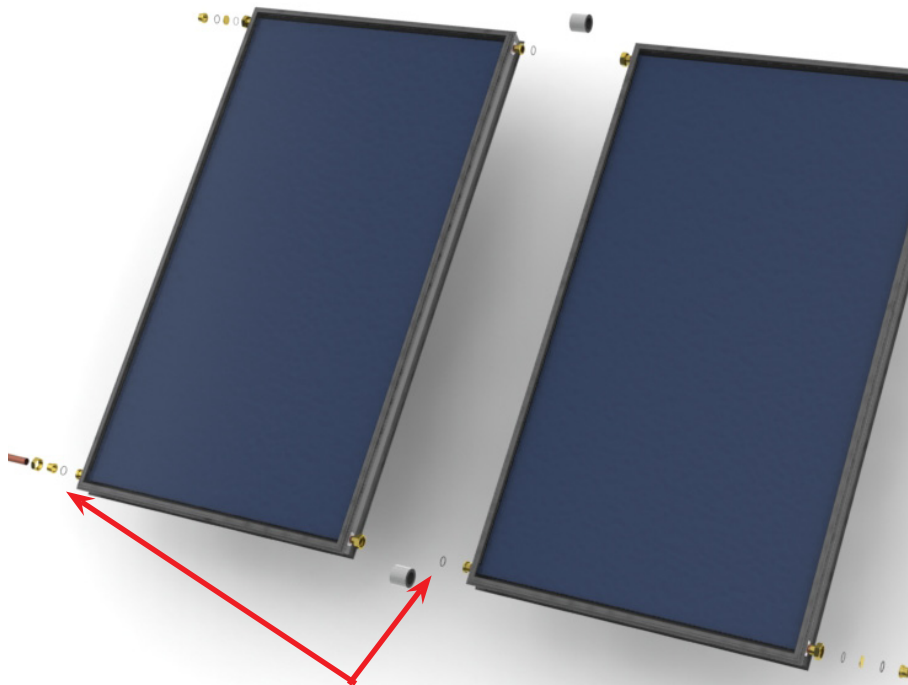
#### 4.2.3. Multiple Horizontally Aligned Portrait Arrays



#### 4.2.4. Multiple Vertically Aligned Portrait Arrays



For detailed information on collector mounting hardware, please see Heliodyne's Flush-Mount and Rack-Mount Hardware Installation Manuals.



Each Collector comes with two DOS O-rings attached to the GOBI frame in a plastic pouch. The O-rings are to be inserted before tightening down the mating half-unions on the collectors.



### Collector Sensor (T<sub>1</sub>)

Connect the temperature sensor as close as possible to the collector outlet header. The T1 sensor can be either a lugnut strapped onto the pipe header, or as an 1/2" NPT immersion well sensor. o the outlet header of the last collector in the array. A DOS combo fitting with sensor well is recommended to ensure optimal sensor connection.



### DOS Combo Fitting

A DOS combo fitting at the collector hot outlet header will combine a temperature sensor immersion well with a 1/2" NPT connection for an air valve connection. This fitting is recommended to ensure optimal sensor connection.

### Air Vents

Install air vents at the collector outlet at the highest point in the system. Heliodyne recommends also installing a high-temperature ball valve in line before the air vent. This ball valve can be shut after commissioning to help protect the air vent against stagnation temperatures. \*\*Make sure to insulate Combo Fitting & over sensor with high temp. rated insulation that is UV protected\*\*

Copper pipe is preferred material for collector feed and return lines. Cast iron piping is permitted in closed-loop glycol systems. Pre-insulated Solar Flextube shown to the right is also good option for small residential systems (1-3 collectors). Do not use galvanized pipe: it is not compatible with high temperature or propylene glycol.





# 4. COMMISSIONING

## 4.0. Calculate System Fluid Volume and Necessary Glycol Concentration

Find the total fluid capacity by adding in the volume of the collectors, HPAK and supply and return lines. With the total volume, use the equation below to find out necessary gallons of glycol. Glycol concentration should be 40 – 60% for proper inhibitor concentration, regardless of required freeze protection. A higher concentration than is required for freeze protection is recommended in case of errors in fluid calculation. Dyn-O-Flo HD propylene glycol is the recommended heat transfer liquid; the substitution of any other heat-transfer fluid can cause irreparable damage and/or create health and safety hazards. Use mineral spring water or good quality tap water and only fill system when collectors are cold.

SYSTEM COMPONENT	FLUID CAPACITY (GAL.)
GOBI 406	0.60
GOBI 408	0.70
GOBI 410	0.80

ASTM B88 COPPER TUBING	GALLONS / 100'
Type M 1/2" (5/8" OD)	1.32
Type M 3/4" (7/8" OD)	2.68
Type M 1" (1-1/8" OD)	4.54
Type M 1-1/4" (1-3/8" OD)	6.80
Type M 1-1/2" (1-5/8" OD)	9.51
Type M 2" (2-1/8" OD)	16.5

## 4.1. Flush the Collector Loop

Before filling the collector loop with Dyn-O-Flo HD glycol solution, flush and pressure test the collector loop with water to remove solder material and check the system for leaks. Rinse system with 1-2% TSP solution then drain.

Ensure that collectors are covered during water flush to protect against sudden changes in system pressure.

## 4.1. Filling the the Collector Loop

1. Cover the collectors to prevent heating, or commence the fill at night when collectors are cool.

**WARNING: Collectors must be cool or covered to prevent damage during charging**

2. Remove/Isolate the expansion tank.
3. Open all Air Vents to aid in removal of air from the system.
4. If using a filling station: connect the filling inlet valve to a site mains supply hose or filling station supply hose. Connect the other fill valve to a return hose which can drain into a bucket or floor drain. Fill and Flush the collector loop until fluid runs clear.
5. If no filling station is available, fill system from highest point (air valve port)
6. Pressurize loop up to mains pressure (60 – 80 psig.) and check for leaks.
7. Purge air out of the pumps if the pumps are not self-priming.
8. Reinstall or unisolate expansion tank.
9. Fill expansion tank with water cycling mains pressure on and off.
10. Pressurize solar loop to desired operating pressure and then isolate and remove filling station.
11. After the final fill of the system, monitor the pressure gauge for drops in pressure, inspect all joints for leaks.
12. After the system is run for the first time for a couple of hours, it is normal for the initial pressure to drop as air comes out of solution. Re-pressurize the system as needed.
13. Place sysetm in automatic differential solar control operation.
14. After the first few days of operation, all of the air in a closed-loop system should be removed. If available, shut the ball valves in line with the top air vents to protect the air vent plastic floats against stangation damage.

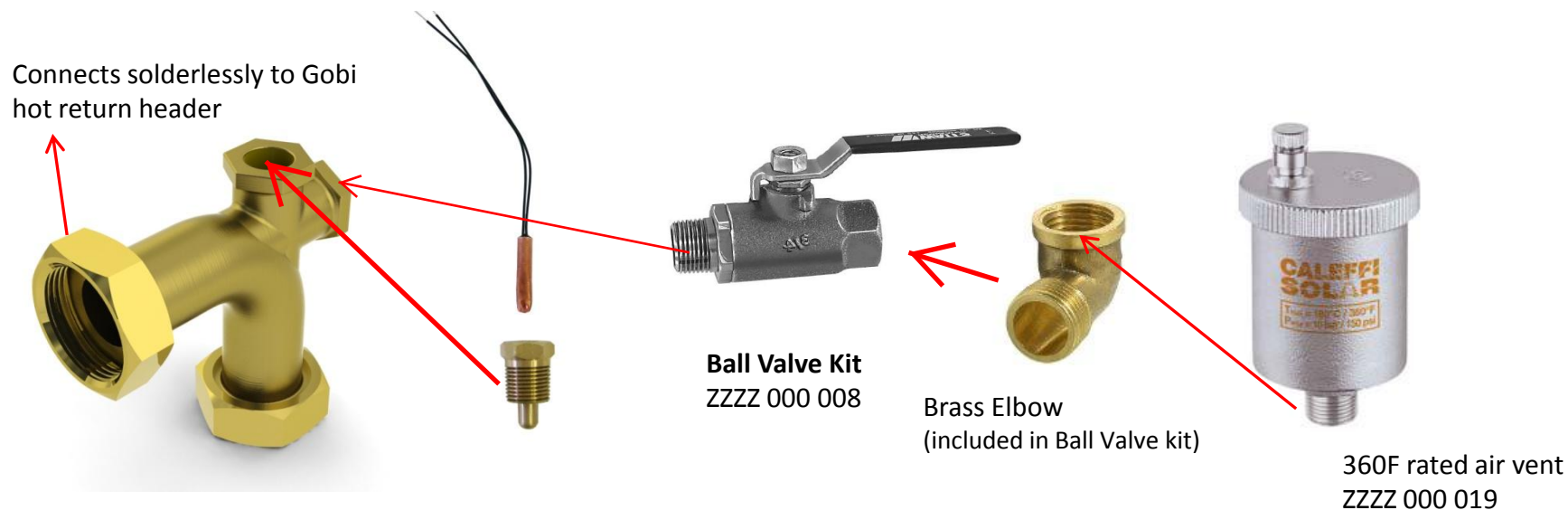
# The Dyn-O-Seal Combo Fitting

The Dyn-O-Seal Combo Fitting, Air Vent, and Ball Valve Kit allow for connecting an air vent and sensor, solderlessly, to hot return of Gobi collector array.

- Dyn-O-Seal Combo Fitting. Includes (2) ½" NPT ports, well sensor with ½" threaded well, and hex key. **\*\*Make sure to insulated all around fitting & sensor\*\***
- Ball Valve Kit. Includes 420F rated ball valve and brass ½" NPT elbow
- 360F rated Air Vent. **For use only when purging air from collectors During commissioning.** Ball valve allows for removal of air vent and elbow once system has reached optimal pressure (50 psi initially)



PIPE FLASH KIT



**Dyn-O-Seal Combo Fitting** ZZZZ 007 000

Comes with 10K ohm well sensor & well and Hex

Key to tighten well around sensor\*\*Use 3M Scotchlok sensor connectors for connecting to 18-24 gauge 2 strand sensor wire\*\*

**heliodyne**  
SOLAR HOT WATER



# Automatic air vent and shut-off valve for solar systems

## 250 series

**CALEFFI**  
**SOLAR**



### Function

Automatic air vents are used in the closed circuits of solar heating systems. They allow air contained in the fluid to be released automatically during the filling process, through a valve operated by a float in contact with fluid in the system.

The shut-off valves are used in combination with the automatic air vents to isolate them after filling the circuit of solar heating systems.

These series of products have been specially made to work at high temperatures with a glycol medium.

### Product range

Code 250041A Automatic air vent for solar systems size 1/2" M NPT  
Code NA29284 Shut-off valve for automatic air vent size 1/2" M NPT x 1/2" F NPT

### Technical specifications of 250 series valve

Materials: - body: brass chrome plated  
- cover: brass chrome plated  
- control spindle: stainless steel  
- float: high resistance polymer  
- seals: EPDM

Medium: water, glycol solutions  
Max. percentage of glycol: 50%

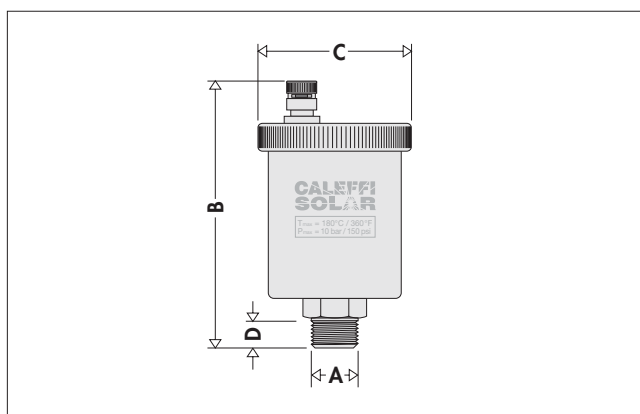
Working temperature range: -20 to 360°F (-30 to 180°C)

Max. working pressure: 150 psi (10 bar)

Max. discharge pressure: 75 psi (5 bar)

Connection: 1/2" M NPT

### Dimensions



Code	A	B	C	D	Weight (lb)
250041A	1/2"	4"	Ø2 1/8"	1/2"	0.7

### Technical specifications of valve NA29284

Materials: - body: brass chrome plated  
- ball: brass chrome plated  
- seals: P.T.F.E.

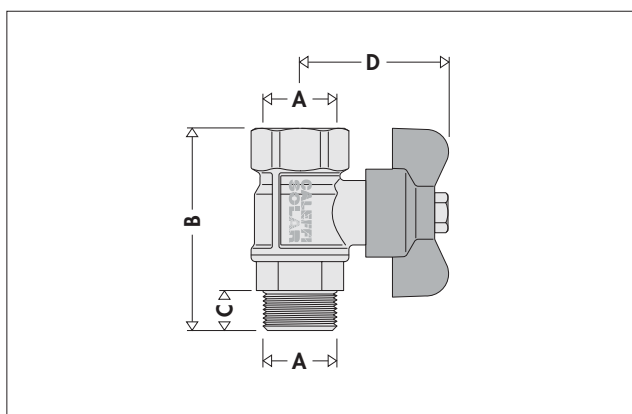
Medium: water, glycol solutions  
Max. percentage of glycol: 50%

Working temperature range: -20 to 360°F (-30 to 180°C)

Max. working pressure: 150 psi (10 bar)

Connection: 1/2" F x 1/2" M NPT

### Dimensions

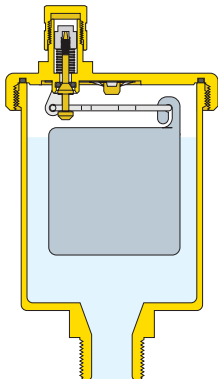


Code	A	B	C	D	Weight (lb)
NA29284	1/2"	2 7/8"	1/2"	1 1/2"	0.5

### Operating principle

The accumulation of air bubbles in the valve body causes the float to drop so the air vent valve opens.

This phenomenon occurs, and consequently, the valve functions correctly, as long as the water pressure remains below the maximum discharge pressure.

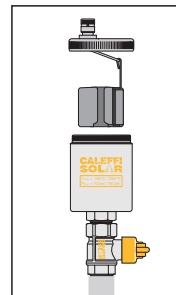


### Maintenance

The 250 series automatic air vent is made to allow checking of the internal mechanism.

Access to the moving parts that govern the air vent is attained by simply removing the top cover.

A shut-off valve must be installed before the 250 series device to allow shut off to simplify any maintenance work and for shutting off after the filling phase.



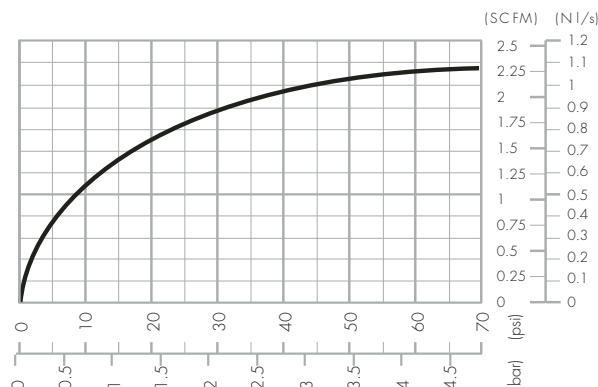
### Construction details

#### Resistance to temperature

The high performance level of this series of automatic air vent valves, required in solar heating systems, is ensured by using materials that are highly resistant to temperature. The materials allow the vent function with glycol water temperatures up to 360°F (180°C).

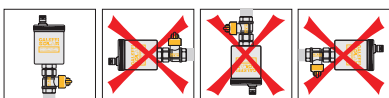
### Hydraulic characteristics

#### Discharge capacity when the system is being filled

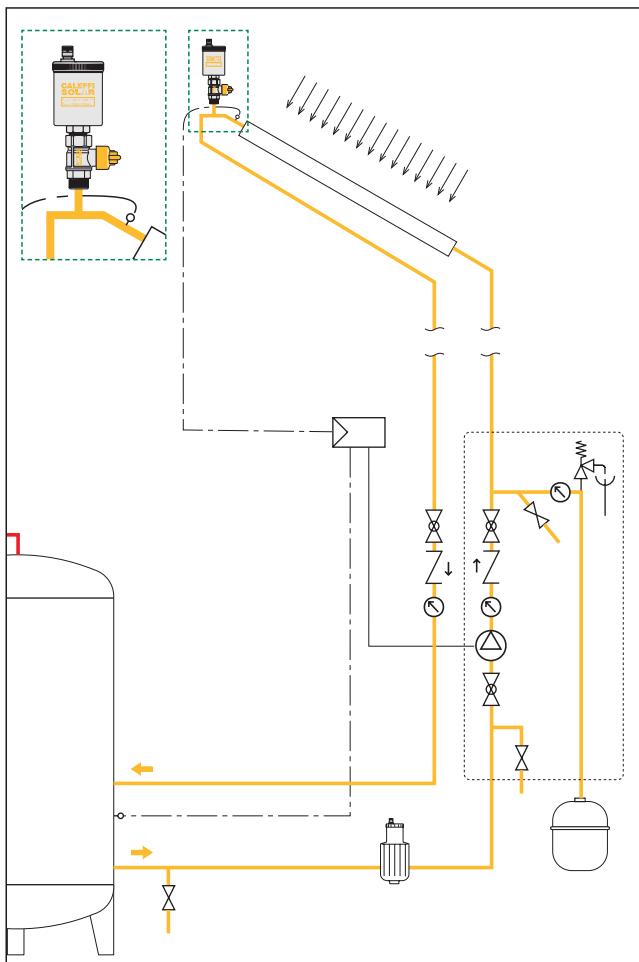


### Installation

250 series automatic air vents must be installed in a vertical position, typically on the top of the solar heating system panels and at points in the circuit where air bubbles gather that need to be discharged. They must always be installed in combination with a shut-off valve. This is necessary since the vent valves must be shut off after use to remove the air during the filling and starting up phase of the system.



### Application diagram



## SPECIFICATION SUMMARIES

### 250 series

Automatic air vent for solar heating systems. 1/2" Male NPT connections. Brass body and cover. Chrome plated. Float in high resistance polymer. Seals in high resistance elastomer. Medium: water and glycol solutions. Maximum percentage of glycol: 50%. Working temperature range: -20 to 360°F. Maximum working pressure: 150 psi. Maximum discharge pressure: 75 psi.

### Code NA29284

Shut-off valve for automatic air vent for solar heating systems. 1/2" F NPT x 1/2" M NPT connections. Chrome plated brass body and ball. Seals in high resistance elastomer. Medium: water and glycol solutions. Maximum percentage of glycol: 50%. Working temperature range: -20 to 360°F. Maximum working pressure: 150 psi.