

# COMMERCIAL SOLAR

A range of market-leading technologies ideal for large-scale solar thermal systems or integration into existing systems.

*When designing a hot water package, Rheem is a reputable choice to provide an integrated sustainable energy saving solution that satisfies the requirements of our clients.*

Adam Fielding,  
Partner, Perth Office Manager,  
Senior Electrical Engineer  
FLOTH

## CASE STUDY

### KATHERINE DISTRICT HOSPITAL KATHERINE, NT

#### Challenge

Katherine District Hospital is a critical piece of public healthcare infrastructure catering to patients from some of the most remote communities in the Northern Territory, servicing an area of 336,674 km<sup>2</sup>. The hospital needed a major hot water system upgrade, converting from an old heat exchange system to an electric-boosted solar pre-heat system.

#### Hot Water Solution

Rheem provided a renewable energy solution comprised of 24 x Solar Collectors and 3 x RT1000 Stainless Steel Commercial Storage tanks to store the high percentage of solar contribution. The new system services 11 bedrooms, 2 delivery-birth suites, 2 theatres and 3 utility rooms. The tanks were craned to the rooftop, and the pipe work was manifolded to allow ease of tank replacement at end-of-life.



# LOLINE DIRECT SOLAR

SUITED TO MOST COMMERCIAL AND INDUSTRIAL APPLICATIONS



**FAST**   
INSTALLATION

**OVERHEATING**   
PROTECTION

**50** mm  
HIGH FLOW  
FITTINGS

**BMS**  
CAPABLE

The most efficient direct solar system to use and install.

## Highly efficient

Unlike evacuation tube technology, Loline has no progressive efficiency loss, providing prolonged energy savings, making it a more efficient direct solar option at typical hot water temperatures.

## Save time on site

Utilising the collector's internal header along with a unique expansion tube, Loline allows up to 24 collectors in a row to be quickly and easily connected.

## Multiple installation options

A range of tank capacities and any number of solar collectors can be arranged in a variety of combinations with tanks mounted at the same level or below the collectors to suit site requirements.

## Automatic overheating protection

During low-use periods, small amounts of hot water are automatically transferred to storage tanks to prevent collectors overheating and an optional 3-way valve can divert this excess energy to the building recirculation circuit, further reducing operating costs.

## Partial frost protection

Warranted against freeze damage in areas below 400m altitude, and an optional electric or gas water heater can be incorporated in the design to assist freeze protection.

## Multiple boost options

Boost options include heat pump, gas, or electric, and large tanks can be boosted at the top of the solar tank minimising footprint.

## More key features

- Select from 325 litre and 410 litre vitreous enamel storage tanks or RT1000 to 5000 stainless steel storage tanks



### SOLAR RADIATION DATA

		Collector to Tank Ratio – NPT200								
Location	Latitude	Solar Radiation (MJ/m <sup>2</sup> /day)	Best Solar Month	Zone	A610340		A610430		per/1000 litres (RT1000-5000)	
					Min	Max	Min	Max	Min	Max
Darwin	12°	24.7	August	1	2.0	3.0	2.5	4.0	6	9.5
Cairns/ Townsville	17° 19°	24.0	September	1	2.3	3.5	2.8	4.0	6	9.5
Brisbane	27°	23.2	January	3	2.0	3.0	2.5	4.0	7	11
Perth	32°	28.9	January	3	2.0	3.0	2.3	3.5	6	9
Sydney	34°	23.5	December	3	2.2	3.5	2.7	4.0	7	10.5
Adelaide	35°	28.2	January	3	2.0	3.0	2.4	3.5	6	9
Canberra	35°	27.0	January	3	2.0	3.0	2.5	4.0	6	9.5
Melbourne	38°	24.4	January	4	2.0	3.1	2.5	4.0	6.3	10
Hobart	42°	23.6	January	4	2.4	3.5	3.0	4.5	7.5	11
Auckland	36°	23.1	December	2	2.0	3.0	2.4	3.5	2.4	3.5
Wellington	41°	20	November	2	2.0	3.0	2.4	3.5	2.4	3.5
Christchurch	41°	22.2	December	2	2.0	3.0	2.5	4.0	2.5	4.0
Dunedin	45°	18.9	December	3	2.0	3.1	2.5	4.0	2.5	4.0

**Lo Line Direct Solar warranty: 5 years on VE cylinder & collectors, 8 years on SS cylinder, 1 year on parts & labour**

# TECHNICAL DATA

## COMMERCIAL SOLAR PIPE SIZE / PUMP SELECTION / SPEED SETTING – RHEEM LOLINE

Total Number Collectors	Combined Tank & Array Piping Length (m)*	Total Length (flow and return) Between Storage Tanks and Collector Array (m)**													
		10	20	30	40	50	60	70	80	90	100	150	200		
15	30	DN20/20-60/1		DN20/20-60/2						DN20/20-60/3		DN20/32-80/2		DN20/32-80/3	
		DN25/20-60/1													
30	53+	DN25/20-45						-	-	-	-	-	-	-	
		DN25/20-60/2		DN25/20-60/3						DN25/32-80/2		DN32/20-60/2			
	53++	DN25/20-45						-	-	-	-	-	-		
		DN25/20-60/2		DN25/20-60/3						DN25/32-80/2		DN32/20-60/2			
45	63+	-	DN25/32-80/3				-	-	-	-	-	-	-		
	90++	-	DN32/20-45						DN32/20-60/3		DN32/20-60/3				
60	79+	-	DN32/32-80/3						-		-				
		-	DN40/20-45						DN40/20-60/3		DN40/32-80/3				
	120++	-	DN32/32-80/3						-	-	-	-	-		
75	92+	-	-						DN40/32-80/3		-				
		-	-						DN50/20-45		-				
	111++	-	-						DN40/32-80/3		-				
		-	-						DN50/20-45		-				
90	105+	-	-						DN40/32-80/3		-		-		
		-	-						DN50/20-60/3		DN50/32-80/2		DN50/32-80/2		
	159++	-	DN40/32-80/3		-	-	-	-	-	-	-	-	-		
105	118+	-	-	-	-	-	-	-	-	-	DN50/32-80/3		-		
	160++	-	-	-	-	-	-	-	-	-	DN50/32-80/3		-		
120	131+	-	-	-	-	-	-	-	-	-	DN50/32-80/3		-		
	215++	-	-	-	-	-	-	-	-	-	DN50/32-80/3		-		

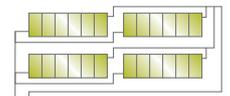
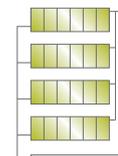
\* Total length of pipe inter-connecting tanks and collector arrays.

\*\* Lineal length.

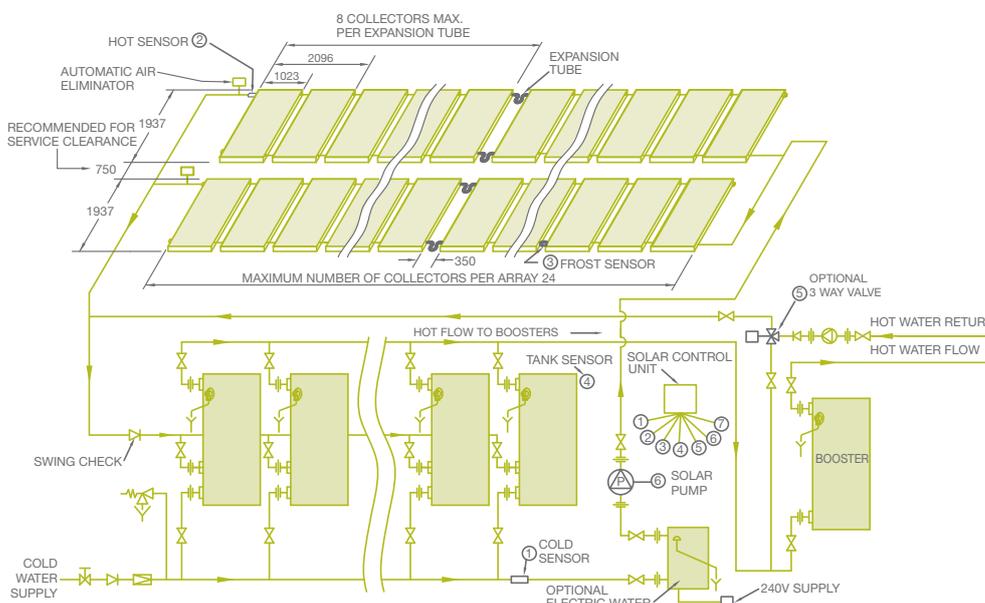
- Notes:
- Pump selections are Grundfos. 20-60 = UPS20-60N, 20-45 = UP20-45N, 32-80 = UPS32-80N
  - UPS20-60N set to speed 3 can be substituted for a UP20-45N, but not the reverse
  - If actual number of panels falls between an array size, use the next biggest array
  - If actual pipe length between tanks and collectors falls between the lengths shown, use the next longest length

+ Parallel Array

++ Side by Side Array



## Typical Installation Commercial Solar Loline Double Array



### NPT200 COLLECTOR TECHNICAL DATA

Overall Dimensions H x W x D	mm	1941 x 1023 x 80
Aperture Area	m <sup>2</sup>	1.86
Weight (empty /full)	kg	36/37
Fluid Capacity	Litres	1.5
Number of Risers		7
Absorber Material		Black Polyester Aluminium
Insulation		Polyester
Glazing		3.2mm Tempered Low Iron
Tray Material		Zincalume®

### MINIMUM INCLINATION ANGLE

Auckland	20°
Hamilton	22°
Wellington	25°
Christchurch	30°
Dunedin	35°
Invercargill	37°

# HS SERIES DRAIN BACK SOLAR

SUITED TO LARGER APPLICATIONS  
OR WHERE FROST OR WATER  
QUALITY ARE A CONCERN



ALL  
WEATHER  
& WATER



10%  
MORE  
EFFICIENT

50mm  
HIGH FLOW  
FITTINGS

BMS  
CAPABLE

The all-weather,  
all-waters, high-efficiency  
solar system.



## Performs in all weather and water

Because fluid drains back when not being used, the HS Series Drain Back Solar can't stagnate or freeze and because it's an indirect system, the collectors are protected against scale build up that can occur in poor water quality areas.

## Even more efficient

High performance CSA2013 collectors made with copper absorber plate and risers, a high absorbing, low-emitting blue Tinnox coating and fibreglass insulation, deliver about 10% more efficiency than other collectors with no progressive loss of efficiency (unlike evacuated tube technology).

## Multiple in-tank boost options

Boost options include heat pump, gas, or electric and can boost at the top of the solar tank minimising footprint.

## Multiple installation options

A range of tank capacities and any number of solar collectors can be arranged in a variety of combinations; tanks must be mounted below the collectors.

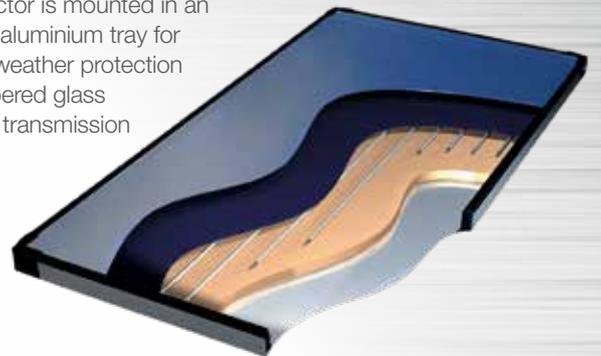
## More key features

- Select from nominal 1000 to 5000 litre storage tanks
- The package includes high efficiency CSA2013 collectors, high capacity carbon steel RT storage tanks, duty/standby solar pump station for built-in redundancy, and CrossFlow delivery skid, plus selected boost plant

### CSA2013 COLLECTOR TECHNICAL DATA

Overall Dimensions H x W x D	mm	1996 x 1043 x 82
Aperture Area	m <sup>2</sup>	1.88
Weight (empty /full)	kg	37/39
Fluid Capacity	Litres	1.9
Number of Risers		13
Absorber Material		Copper
Insulation		38mm Glass Wool
Absorber Surface		Tinnox Sputtered Selective Surface
Frame Material		Extruded Aluminium
Glass		3.2mm Tempered Low Iron

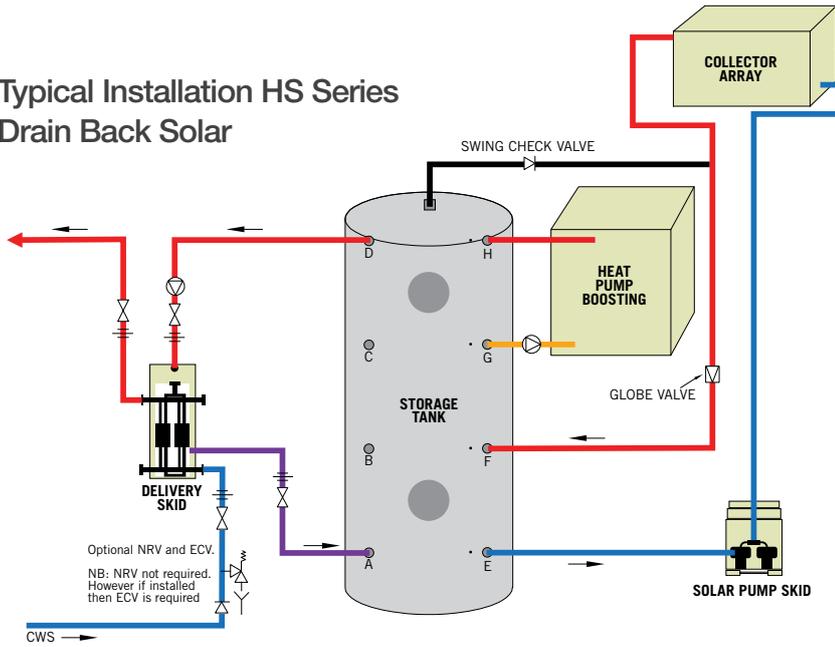
The collector is mounted in an extruded aluminium tray for superior weather protection and tempered glass improves transmission efficiency.



HS Series Drain Back Solar warranty: 8 years on RT stainless steel storage tanks, 5 years on RT carbon steel storage tanks, 5 years on collectors and 1 year on parts & labour

# TECHNICAL DATA

## Typical Installation HS Series Drain Back Solar



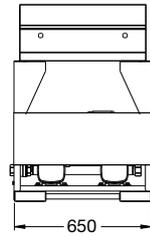
### How does it work?

A number of efficient CSA2013 Commercial Solar Collectors are combined with a centralised heat store to extract the sun's free energy and hold it ready for use. Closed circuit fluid is transferred between the heat store and collectors via a Solar Pump Skid with duty/standby cast iron VSD pumps and controller. The controller regulates the pump speed to provide optimal solar energy transfer for improved efficiency.

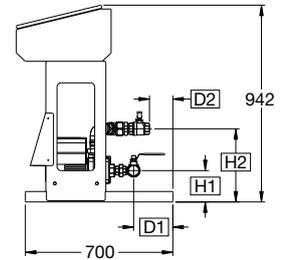
A highly efficient heat exchanger in the Crossflow Delivery Skid then transfers the stored energy to the potable water supply to meet the hot water requirements on demand.

### Installation notes

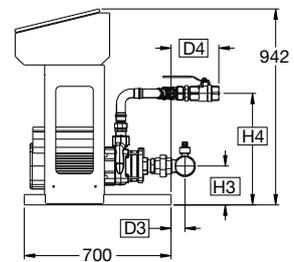
Solar collectors must be located at least one metre above the top of the storage vessel and the maximum height from the base of the storage vessel to the top of the collectors should not exceed 40 metres.



RP013 - RP055



RP103 - RP153



### SOLAR PUMP SKID TECHNICAL DATA

Model	RP013- RP035	RP055- RP103	RP153
Weight	80kg	87-169kg	176kg
Electrical Supply	220-240V AC/50-60Hz	380-415V AC/50-60Hz	380-415V AC/50-60Hz
Min Circuit Size	16 Amps	16 Amps	20 Amps

### COMMERCIAL SOLAR ID PIPE SIZE AND PUMP SELECTION - HS SERIES

Number Collectors	Total Height from Base of Storage Tank to Top of Collector (metres)						
	10	15	20	25	30	35	40
8	DN20/RP013		DN20/RP015			DN25/RP015	
12	DN20/RP015		DN25/RP015				
16	DN25/RP015			DN32/RP035			
20	DN32/RP033			DN32/RP035			
24	DN32/RP033		DN32/RP035				
28	DN32/RP055						
32	DN32/RP055						
36	DN65/RP103			DN40/RP055			
40	DN40/RP055						
45	DN40/RP103						
50	DN40/RP103						
60	DN50/RP103						
70	DN50/RP103						
80	DN50/RP103					DN65/RP103	
90	DN50/RP103			DN65/RP103			
100	DN65/RP153						
125	DN65/RP153						
150	DN65/RP153						

### SOLAR SKID PUMP

Model	DIM 'H1'	DIM 'H2'	DIM 'D1'	DIM 'D2'	DIM 'H3'	DIM 'H4'	DIM 'D3'	DIM 'D4'
RP013	150	350	186	111	-	-	-	-
RP015	150	350	153	114	-	-	-	-
RP033	150	350	184	113	-	-	-	-
RP035	150	350	155	115	-	-	-	-
RP055	165	400	104	46	-	-	-	-
RP103	-	-	-	-	167	516	48	310
RP153	-	-	-	-	187	536	66	310

# TECHNICAL DATA

## Multiple boost options

When solar radiation is low or there's high hot water demand, the system can be boosted to ensure constant hot water supply. Electric heating unit bundles can be fitted via one of two flanges and a variety of fittings allow multiple configurations to be connected such as boosting by auxiliary heat pump or gas water heater.\*

\* See solar applications guide at <https://rheem.co.nz/products/commercial/solar-products/hs-series/bt-collector>

## Electric boosting

- Comes with an adjustable thermostat and visual temperature display.
- Can be interlocked with BMS or solar pump skid to maximise the solar contribution factor (SCF).

## Heat pump boosting – 90% free solar

If a Rheem commercial heat pump is chosen for boosting, the heat pump's high Coefficient of Performance will mean you'll achieve up to 90% solar contribution. That's because for typical annual average radiation, 60% SCF can be achieved from solar collectors and 30% from heat pumps. Plus horizontal models can be stacked two high to reduce plant footprint.

Reduce running costs and energy use even further with optional 3-way valve (available with both Loline + HS Series Drain Back solar).

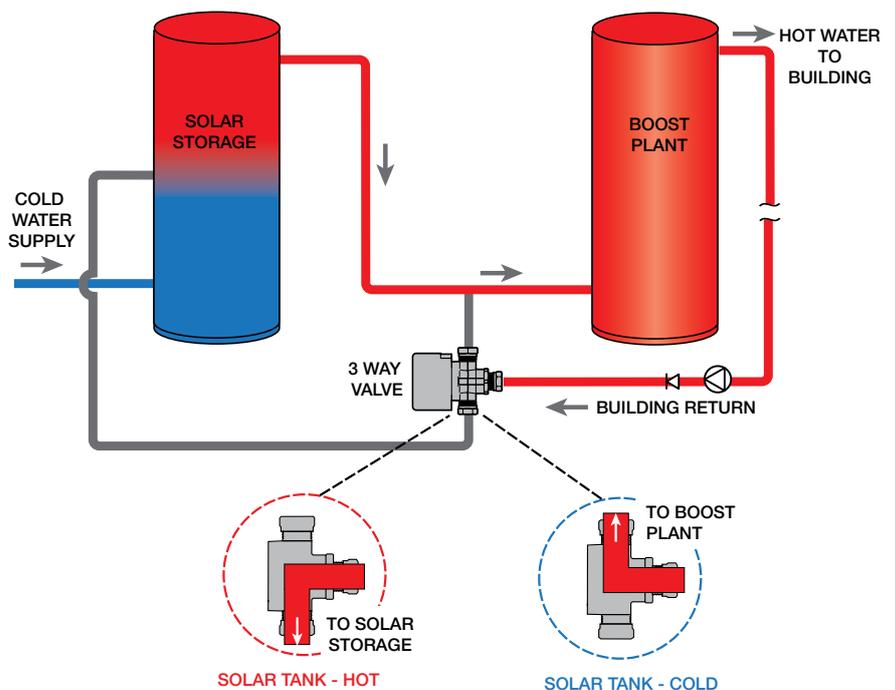
The available energy in the storage tank can be monitored to maximise solar energy use and reduce running costs.

When there's enough energy in the solar storage tank, the WaterMark Certified 3-way valve diverts building return water to the solar storage. This passes through the in-line boost plant without further heating, using free solar energy to maintain ring main temperature.

Conversely, when there's not enough energy detected in the solar storage tank, the building return water is diverted through the in-line boost plant to maintain ring main temperature.



Rheem HS Series solar with electric boosting in the top of solar tanks. Katherine Hospital NT.



# PREMIER HILINE INDIRECT SOLAR

SUITED TO SMALL  
ROOFTOP APPLICATIONS  
LIKE SPORTS FIELDS



**LIGHTWEIGHT  
STAINLESS STEEL**

**ALL WEATHER  
& WATER**  
SS IS NOT SUITABLE FOR POOR WATER QUALITY



**300L  
CAPACITY**

**MULTI-BOOST  
OPTIONS**

The lightweight,  
simple commercial  
solar system.



## Lightweight efficiency

The 300 litre stainless steel storage tank sits on the roof, reducing footprint on the ground and the thermosiphon design efficiently transfers energy from the collectors into the tank without the need for circulators and primary flow and return lines.

## Built-in freeze protection

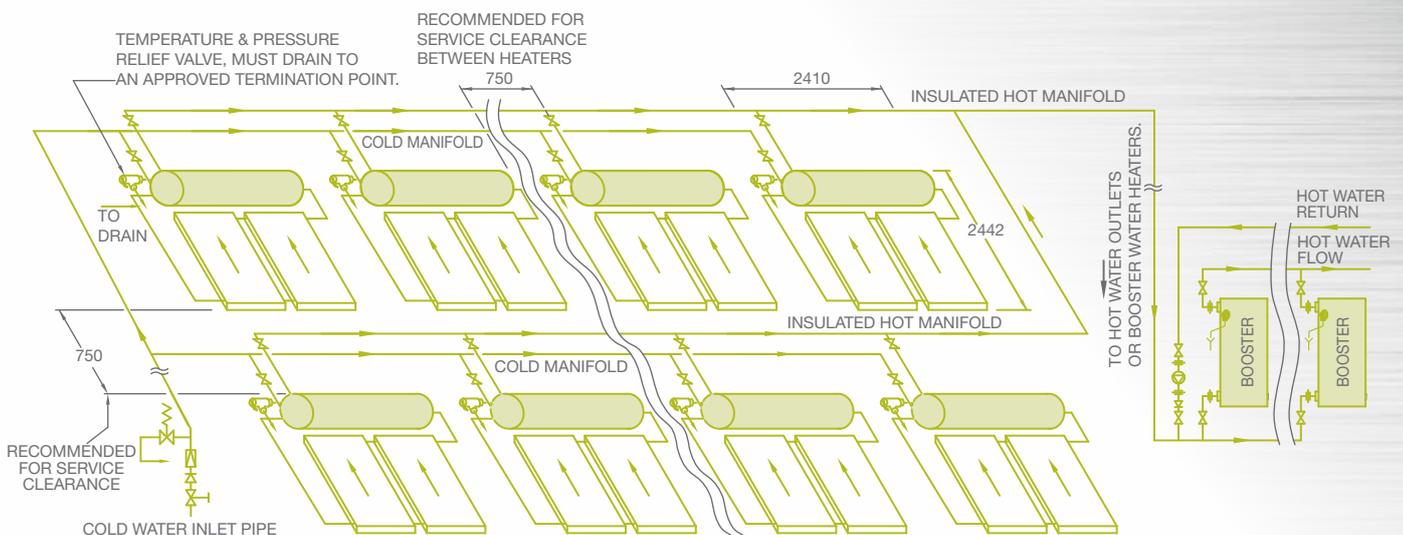
Uses propylene glycol as the heat transfer fluid to deliver freeze protection to as low as -28°C.

## Ideal for scaling water regions

Because it's an indirect system, water never goes through the collector, making it ideal for scaling water areas.

SP2000 COLLECTOR TECHNICAL DATA			
Overall Dimensions H x W x D	mm	1996 x 1043 x 82	
Aperture Area	m <sup>2</sup>	1.88	
Weight (empty /full)	kg	45/49	
Fluid Capacity	Litres	3.8	
Number of Risers		35	
Absorber Material		Steel	
Insulation		38mm Polyester	
Absorber Surface		Black Polyyster Powdercoat	
Frame Material		Extruded Aluminium	
Glass		3.2mm Tempered Low Iron	

## Typical Installation



Premier HiLine Indirect Solar warranty: 3 years on cylinder,  
5 years on collector, 1 year on parts & labour

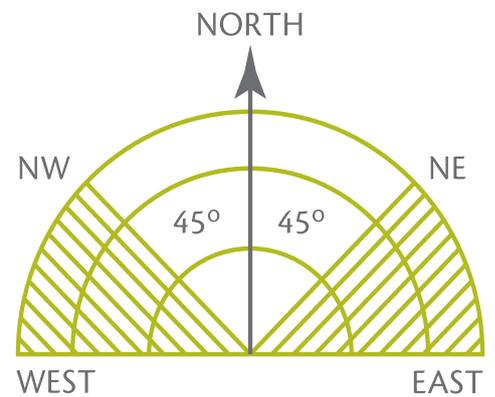
# INSTALLATION TIPS

## Five key tips for delivering maximum performance from your commercial solar system.

1. Collectors should ideally face due north (in the southern hemisphere); facing as far as north-east and north-west will cause approximately 5% drop in operating efficiency.
2. Collectors should be inclined at approximately the latitude angle, however 15° either way is acceptable, but not less than 10° from the horizontal.
3. For flat roof installations, Rheem can supply variable pitch frames suitable for either one or two collectors with pre-set pitch angles of 20 to 30 degrees in 2.5 increments.
4. Metallic flow and return lines only **MUST** be used between the solar storage tanks and the collectors.
5. The pipe must be well insulated and sheathed if externally mounted. AS/NZS 3500.4 has guidelines specific to the zone and see the relevant Pipe Size and Pump Selection Table for the correct specification of pipe size.

## Collector positioning

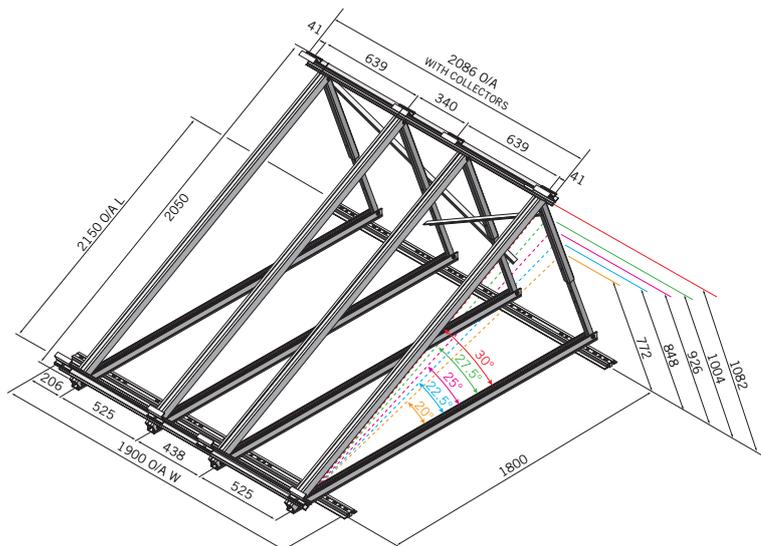
Recommended Aspect N.E. to N.W.



# SOLAR FRAMES

## Variable Pitch Stand

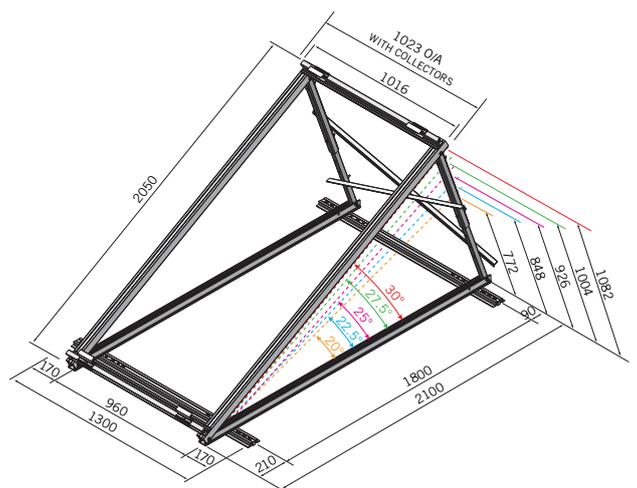
Made from extruded aluminium section to offer excellent corrosion protection, Variable Pitch Stands can be mounted on flat or near flat roofs. The inclination angle can be set between 20 to 30 degrees in 2.5 increments.



Variable Pitch Frame - 2 collectors 204026

## With Pitch Frame

For pitched roof installation Pitch Kits are available, and are certified for use up to a height of 10 metres.



Variable Pitch Frame - 1 collector 204025

Note: Rheem collector frames are designed in accordance with the relevant sections of AS/NZS 1170.0:2002, AS/NZS 1170.1:2002, AS/NZS 1170.2:2011, AS/NZS 4600:2005, AS/NZS 1664.1:1997, AS 1720.1:2010.

It is the responsibility of the designer to determine the actual wind load acting on the solar frame and collector assembly for the installation site and satisfy themselves as to the suitability of the frame and collector assembly.

Fixing of frames to building members must be designed by a structural engineer.