

# C-30

## Differential Temperature Controls and performance accessories

- two easy-to-stock models handle most solar domestic hot water systems



### C-30-1S

For systems requiring

- no freeze protection
- recirculate freeze protection (field - selectable)



### C-30-1S-2F

For systems requiring

- freeze protection via positive action drain-down valves



**INDEPENDENT ENERGY INC.**

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*Controls that help your business grow*

# Features C-30-1S

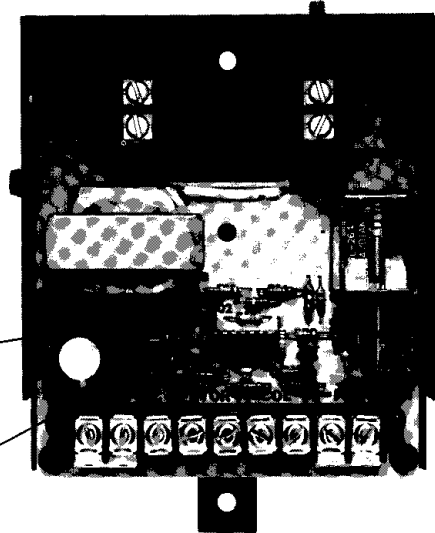
– Engineered for solar domestic hot water systems requiring no freeze protection or recirculate freeze protection.

**Independent Energy Reliability** – every C-30 undergoes two intensive computer test series to assure proper function *plus* a 12 hour burn-in performance test under automatic monitoring conditions. Helps stop control-related service calls.

**Interference Protected** – State-of-the-art circuitry protects controls from lighting and electrical noise.

**Adjustable Storage High Temperature Limit** – Standard on all C-30's. Accessible via removable of cover (secured by 2 screws). Range: 105° F–212° F+. Turn dial to "out" if high limit is not desired.

**Power-On LED Indicator** – Red light.



**Fast Field Wiring** – Wiring terminal strips end need for wire nuts or lugs to attach sensor and AC wires.

**High Output Relays** –  
1/3 HP Standard  
1/2 HP Optional

**3 Position Mode Switch** – On-Auto-Off operation allows fast system performance check

**Output-On LED Indicator** – Red Light.

**Field Selectable Recirculate Freeze Protection** – C-30-1S is shipped with no freeze protection. Recirculate freeze protection easily enabled in the field. See "Freeze Protection" for details.

Independent Energy "Snap Switch" Thermostat sensors may be wired in series with "Collector" or "Freeze" thermistor (std IE sensor) to provide multipoint freeze detection.

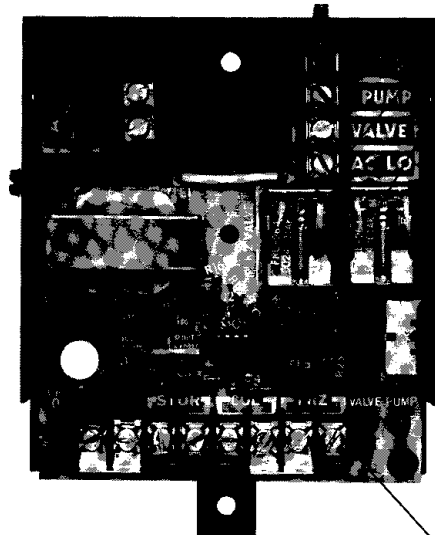
*C-30 offers lasting quality and value. Simple to – spec, stock, install*

# C-30-1S-2F

– Engineered for solar domestic hot water systems requiring one differential temperature control output and a separate output providing drain-down freeze protection.

**C-30-1S-2F offers, as Standard Equipment:**

- Adjustable Storage High Temperature Limit
- Power-On and Pump-On LED Indicators
- Independent Energy Reliability Testing and Interference Protection
- Quick-Connect Terminal Strips
- 3 Position Mode Switch



1/3 HP Differential Output Relay

Valve Output Relay  
117 VAC, 2A MAX.

Drain-down via Primary or Secondary Freeze Protection.

Primary: Drain-down output de-energized @ 44° F ± 2° F by internal control circuitry. Based on input from std. Independent Energy 10K ohm thermistor sensor. See "Freeze Protection" for details.

Secondary: Sensor terminal strip includes "Freeze Snap Switch" position. Provides 24 VAC for IE "snap switch thermostat sensor" connection. Drain-down initiated by control in response to snap switch opening and/or primary control circuit.

Valve-"Energized" LED Indicator. Green Light

## Options

**General** - applicable to C-30-1S and C-30-1S-2F

**8°F on/3°F off Differential Output** - An alternative to the standard 20/5 differential.

**62°F-104°F Adjustable Storage High Temperature Limit Range** - An alternative to the standard 105°F-212°F+ range.

**Normally on Output (SPDT)** - C-30 switches power to a second destination whenever the differential output is not energized. See Wiring/Installation Data for each model.

**Conformal Coating** - A moisture-resistant spray coating is applied to circuit board. Recommended for high-humidity environment.

**230 VAC, 50/60 Hz Operation** - Available for worldwide operation. Available with 1/3 HP differential relay only.

### C-30-1S only

**1/2 HP Output Relay** - Installed at same circuit board location as std. 1/3 HP relay. For ratings above 1/2 horsepower - consult factory.

**AC Line Cord and Outlet** - An alternative to hard wiring with conduit. Simplifies installation. C-30 is available with line cord only, or line cord plus outlet.

### C-30-1S-2F only

**High Limit Drain-Down** - Output 2 de-energizes drain-down valve upon attaining storage high limit as well as at 44°F±2°F.

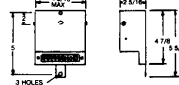
**AC Line Cord and Outlet or Outlets** - C-30-1S offers this option in the following combinations:  
 -LC: Line Cord only, no outlets  
 -LCOP: Line cord and one outlet connected to pump output only.  
 -LCOV: Line cord and one outlet connected to valve output only.  
 -LCO Line cord and one outlet for valve and another outlet for pump.

## Specifications

**General** - applicable to C-30-1S and C-30-1S-2F  
 C-30 is applicable to air or hydronic systems

Shipping Weight - 2.5 lb.

Mounting Dimensions (Overall) -



Control Accuracy - ±2.5°F

Thresholds (Differential) - 20°F on/5°F off (Std.)  
 8°F on/3°F off (optional)

Storage High Temperature Shutoff Range -  
 Std. 105°F-212°F+  
 Optional 62°F-104°F

Control Operating Environment -  
 32°F-122°F Ambient Temperature  
 0%-95% relative humidity (non condensing)

Input Power -  
 Std. 117 VAC ±10%, 60 Hz, 1A, 2 watts  
 Optional: 230 VAC ±10%, 50/60 Hz, 1A, 2 watts  
 Sensor Terminal Strip - Class 2, 30 VAC MAX., 25A MAX.

### C-30-1S only

**Freeze Protection** - C-30-1S shipped with no freeze protection (locked out by factory-installed jumper at "freeze" terminal strip position). To enable recirculate freeze protection, see Freeze Protection - C-30-1S. In recirculate mode: Output on @ 45°F±1.5°F off @ 45°F±1.5°F

One or more GC-1 snap switch thermostats must be wired in series with collector or "freeze" thermostats to provide secondary freeze protection.

**Output Power** -  
 Std. 1/3 HP, 10 A/117 VAC, output normally off  
 Optional: 1/3 HP, 10 A/117 VAC, 2 contacts - 1 normally on & normally off. (Specification of - NO option)

- 1/2 HP, 10 A/117 VAC, output normally off.
- 1/2 HP, 5 A/230 VAC, output normally on.
- 1/2 HP, 5 A/230 VAC, output normally off.

**Operational Modes** - Controlled by 3 position switch.

On - C-30-1S energizes output.

Auto - C-30-1S controls output automatically in response to sensor inputs.

Off - C-30-1S removes power from output.

Note: In off position, AC power is removed from output, but not from control. To remove all AC power from control, disconnect power at breaker box or unplug control from AC outlet (-LC or -LCO Models).

### C-30-1S-2F

**Freeze Protection** - C-30-1S-2F is shipped with drain-down freeze protection energized as standard equipment based on collector sensor input.

Drain-down @ 44°F±2°F

Re-energize @ 20°F above drain temperature

**Primary** drain-down may be initiated by sensor input from:

-Collector Sensor

-Std. IE Sensor wired to "Freeze" Terminal Strip Position" (see "Freeze Protection")

Note that installer has capability to select collector sensor or std. IE sensor at "Freeze" position to initiate drain-down. This is either/or, but not both.

**Secondary** drain-down must be initiated by a snap switch thermostat or series of snap switch thermostats wired to "freeze snap switch" terminal strip position. This is in addition to above described freeze protection.

Note: When control de-energizes drain-down output via snap switch signal, power on light is off. AC power is still present in control.

**Output Power (Output 1)** -

Std: 117 VAC, 1/3 HP, 10 A MAX, output normally off.  
 Optional: 117 VAC, 1/3 HP, 10 A MAX, 2 contacts one normally on, one normally off, (NO option).  
 230 VAC, 1/3 HP, 5 A MAX, output normally off.

**Output Power (Output 2)** -

Std: 117 VAC ±10%, 2 A MAX, output normally on.  
 Optional: 230 VAC ±10%, 1 A MAX, output normally on.

**Operational Modes** -

Off - Circulator & Valve de-energized. Note: In off position AC power is not removed from the control.

To remove all power from control, disconnect power at breaker box or unplug control from AC outlet. (-LC, -LCOV, -LCOP, -LCO Models)

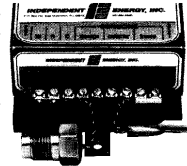
Auto - Automatic operation in response to sensor inputs.

On - Circulator On. Valve controlled in response to sensor inputs.

## Freeze Protection C-30-1S

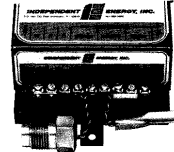
### 1. No Freeze Protection:

Control shipped with freeze protection locked out via jumper at "Freeze" sensor terminal strip position. Do not remove jumpers if no freeze protection is necessary.



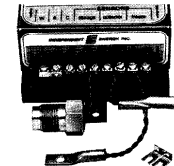
### 2. Recirculate Freeze Protection Using Collector Sensor:

To activate, move jumper as shown.



### 3. Recirculate Freeze Protection Using Separate Independent Energy 10K Ohm Thermistor Sensor at "Freeze" Terminal Strip Position:

To activate, move jumper and wire as shown. **Secondary Freeze Protection** Wire GC-1 snap switch sensor in series with collector sensor or in series with sensor wired to "Freeze" terminal strip position. See application note A-01-281 for details.

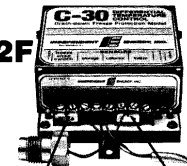


### C-30-1S-2F

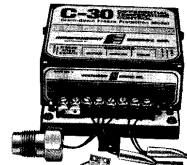
#### 1. Primary Freeze Protection:

A. Control shipped with freeze protection provided by collector sensor only. Do not remove jumpers #1 and #2 if freeze protection via collector sensor is desired.

B. Freeze protection provided by standard IE 10K ohm thermistor sensor wired to "freeze" terminal strip position. Remove jumper #1 and wire as shown.

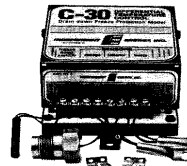


jumper 2 jumper 1



#### 2. Secondary Freeze Protection

Drain decision may be provided by



"Snap Switch". Thermostat sensor (or series of sensors) wired to "freeze snap switch" terminal strip position as shown. "Freeze Snap Switch" position provides 24V for this purpose. Remove jumper #2 and wire as shown. See application note A-02-281 for details.

Indicates wire connection of snap switch thermostat only. For actual GC-1 thermostat specification - see "Sensors".

# Wiring/Installation Data

**General** – C-30 circuit boards are field replaceable via removal of 2 screws. Screws are located at extreme lower right & left hand corner of circuit board.

## Multipoint Freeze Sensing

When providing recirculate or draindown freeze protection with Independent Energy, Inc. solar controls, Independent Energy, Inc. requires multipoint freeze sensing for compliance with its California Warranty (on controls sold through distribution and warranted by Independent Energy, Inc.). In addition, warranty coverage is extended only to those controls installed with freeze protection overriding the turn on/turn off differential.

Independent Energy, Inc. strongly recommends this practice for controls installed in the remainder of the U.S. and abroad where its one year warranty is in effect.

**C30-1S:** Wire GC-1 snap switch sensor in series with standard IE sensor wired to "collector" or "freeze" terminal strip position. *SEE Application Note A-01-281 for details.*

**C30-1S-2F:** Wire GC-1 snap switch sensor to "freeze snap switch" sensor terminal strip position. *SEE Application Note A-02-281 for details.*

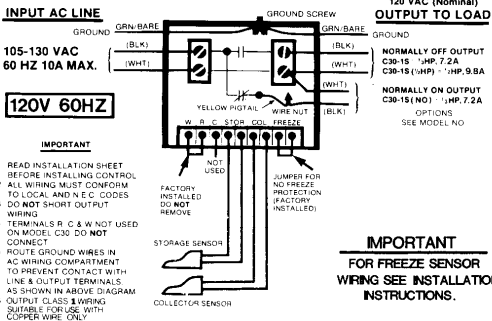
IE Warranties its controls for recirculate or draindown systems of up to 3 collectors or 120 square feet of collector surface, whichever is less. For larger installations, consult factory.

## Important Installation Instructions

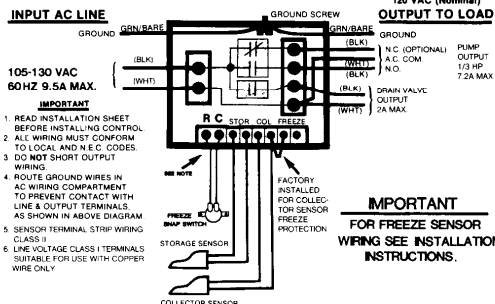
1. Ensure collector array is properly grounded. Compensate for electrical insulators such as dielectric unions, teflon tape in pipe joints, and antifreeze solutions.
2. Properly terminate all power wiring in compliance with all local and NEC codes.
3. Double check to ensure that input and output electrical ratings of control are not exceeded.

Read instruction sheet before installing control.

## C-30-1S



## C-30-1S-2F



# Ordering Information

## C-30-1S

### Includes as std. equipment:

- Adjustable storage high temperature limit (105-212° F+)
- field selectable recirculate freeze protection or no freeze protection
- UL Listed
- "Power on & output on" LED indicators
- "On-Auto-Off" mode switch
- 20/5 Differential

The following options are available and are added to the std. C-30-1S by adding the order code as a suffix:

Options	Order Code	UL Listed
8° F Turn On/3° F Turn Off	(8/3)	Yes
Line Cord	-LC	No
Line Cord & Outlet (1/3 HP MAX.)	-LCO	Yes
1/2 HP Relay	(1/2 HP)	Yes
230 VAC, 50-60 Hz operation	(230 VAC)	No
Output normally on (available with 1/3 HP output only)	NO	No
High limit range 62° F-104° F	H (PADJ)	Yes

Ex: C-30-1S (8/3) indicates an 8/3 differential  
C-30-1S (8/3)-LCO indicates an 8/3 differential plus a line cord & outlet.

## C-30-1S-2F

### Includes, as standard equipment:

- Output 1 – Adjustable Storage High Temperature Limit (range: 105° F-212° F+)
- Output-on LED indicator
- 20/5 differential thresholds
- 1/3 HP Relay

- Output 2 – Drain-down
- Valve "energized" LED indicator

The following options are available and are added to the standard C-30-1S-2F by adding the following order codes as suffixes.

General Options	Order Code	UL Listed
Line Cord	-LC	No
Line Cord & 1 Pump Outlet	-LCOP	No
Line Cord & 1 Valve Outlet	-LCOV	No
Line Cord & 2 Outlets (1 valve, 1 pump)	-LCO	Yes
230 VAC, 50/60 Hz operation	(230 VAC)	No
Conformal Coating	(CC)	Yes

Options – Output 1	Order Code	UL Listed
8° F On/3° F Off Threshold	(8/3)	Yes
Normally – On Output (1/3 HP Only)	(NO)	No
62° F-104° F Adjustable Storage High Temperature Limit Range	H (PADJ)	Yes

Option – Output 2	Order Code	UL Listed
Drain upon reaching storage high temperature limit	-2FH	Yes

Ex. C-30-1S (8/3) -2FH -LCO indicates C-30 with a differential output providing 8/3 thresholds, the capability to drain on high limit as well as freezing conditions, plus a line cord and two outlets.

C-30-1S (NO) -2F -(230 VAC) indicates a C-30 with the normally open option or output 1, a standard drain output configuration, and 230 VAC 50/60 Hz operation.

## Fit Kits – Ordered as separate products

Fit Kits	Order Code
Taco Circulators: 006, 007, 008	TA-30
Grundfos Circulators (1 & 2 speed) UPS20-42F, UP25-42SF, UP26-64F, UP25-64SF, UM25-18SU. For others consult your IE rep or consult factory.	G-30
Grundfos 3 Speed	G3-30
Sunspool Drain-Down Valve	SV-30

See Independent Energy price sheets for cost of above controls, plus sensors.