harvst
GROW MORE

Smart greenhouse system

This guide covers the installation and use of

Control system
Irrigation
Heating
Lighting

Solar, 3-season and **4-season** versions

SCAN ME

Visit **www.harvst.co.uk/setup** for more information, videos and photos

Welcome to Harvst

This guide is for both solar and mains powered systems.

<u>Solar</u> powered

Powered from a built-in battery which is charged using a small solar panel. Self watering via pump, or electric water valves and a garden hose connection.

3- or 4-Season <u>mains</u> powered

Powered from a waterproof 240v mains adapter, on 5 metres of cable. Able to run grow lights and heaters as well as the self watering.

Tip : before installation

We recommend you get familiar with your control system indoors *before you install it in your greenhouse*.

1. Read through the whole guide first.
2. Plug in the power.
3. Plug in any sensors.
4. Plug in the water pump.
5. Turn on the control box and either connect it to your WiFi network, or configure it for offline mode.
6. Access the control panel by clicking the black button in the app, or going directly to the control panel in offline mode.
7. Manually water for ten seconds; it's fine for the pump not to be immersed in water. The pump will run and you will get a "tank low" siren / alarm sound.

Parts list

The control system is supplied with either a solar panel or mains power supply. The two systems are not interchangeable. A pump is supplied for use with a separate water tank or water butt (tank not supplied).

Control unit	Solar panel (with brackets)	Power supply (3/4 season)	Air temp sensor	Water pump (if supplied)

Control unit / power supply mounting parts

Two **M5** bolts are used to mount the control unit to the inside of the rear panel. Two **M4** bolts are used to mount the power supply to the outside of the rear panel, for mains powered systems.

M5 x 16mm **x2**	M5 nut **x2**	M5 washer **x2**	M4 x 16m **x2**	M4 nut **x2**	M4 washer **x2**

Irrigation parts - all models

4mm hose 5m	13mm garden hose 2m, colour varies	13mm LDPE pipe

13mm elbow **x1**	Straight 13mm **x1**	13mm end plug **x1**	Inline filter **x1**

Irrigation parts - quantity per model

	S6	S10	S14	S24
4 l/h dripper	6	10	14	24
4mm tap	3	5	3	5
4mm barb	3	5	3	5
4mm tee	3	5	11	19
4mm elbow	3	5	3	5
Ground stake	6	10	14	24
Pipe clip	2	4	2	4
M5 x 16mm	2	4	2	4

The control unit

4-pin sensors

Temperature sensors

Water valves

Power in

Water pump

Lights
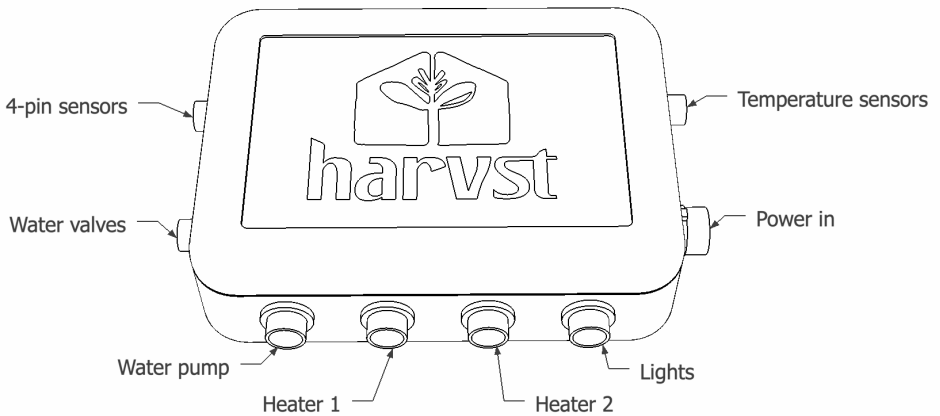
Heater 1

Heater 2

Connections are shown above. Solar powered systems do not have outputs for heaters / lights.

On / off

Wake / manual watering

4-pin sensor port

Water valves
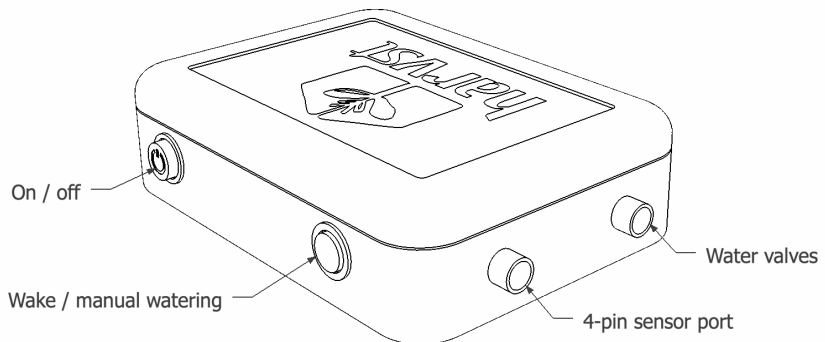
Settings are managed using a smartphone, tablet or your computer. There is a button on the box itself for overriding the watering, but all other settings are managed via your phone, tablet or computer.

Sign up for the free web app at **https://grow.harvst.co.uk**

Control unit installation
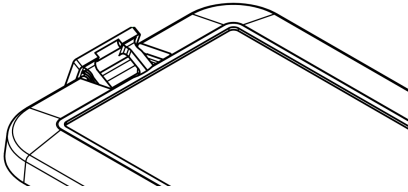
Flip the mounting hole covers up on the front of the control unit to expose the mounting holes.

Tip: Mounting the power supply will be easier with two people.

Power switch

Power cable hole

Power supply on rear

Power in

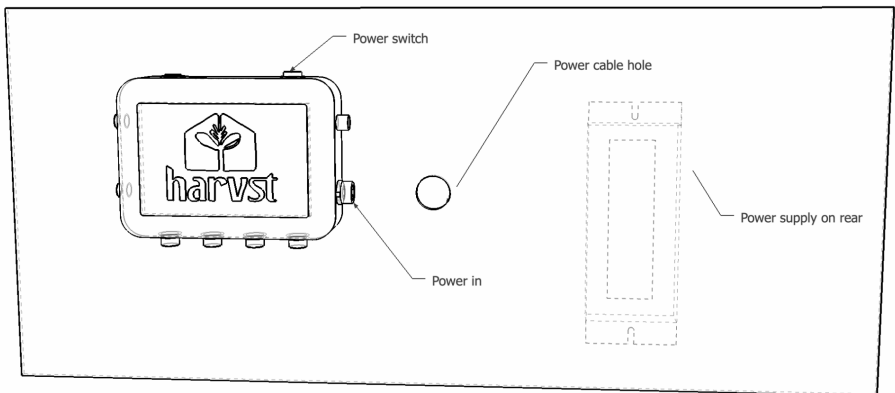| Parts	Fit the control unit to the rear panel using the 2 holes at the top left
2 x M5 x 16mm bolt	of the panel. It's easiest to hold the bolts on the allen key as you
2 x M5 washer	push them through the control unit.
2 x M5 nut	

Parts	Optional : power supply (mains version) : Fit the power supply to
2 x M4 x 16mm bolt	the rear panel using the two holes to the right of the control unit.
2 x M4 penny washer	The long mains cable goes on the right.
2 x M4 nut	Feed the power cable in through the hole in the rear panel.

Note: Some greenhouse models are supplied with a slot in the right hand side of the rear panel. For these models, mount the power supply on the **inside** of the greenhouse, with the mains cable running through the slot.

Connecting to the control unit

There are two ways the system can operate: online and offline. Both require the use of a smartphone, tablet or computer, with the ability to connect to a WiFi network.

Online mode

You have a WiFi network within range of the control unit.

The unit operates autonomously, and connects to the internet on a regular basis to send information to your Harvst cloud account, where you can view activity.

Use the **Harvst web app** to update settings, which are collected by the control unit each time it sends an update.

Email and SMS alerts can be set up for temperature, water tank and so on.

Offline mode

There is no WiFi network within range of your control unit.

The unit operates autonomously, offline. Events (such as watering, water tank running out, low battery) are stored on the system for you to check later.

Use the **system control panel** directly to update settings and view recent activity.

No alerts can be sent; there is no connection to the internet or mobile network.

Online mode   *- connect via the internet*

Every 30 minutes, the control unit wakes up, reads sensors, sends data to server, then goes to sleep.
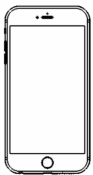
Use the **web app** and the Harvst cloud any time, from anywhere.
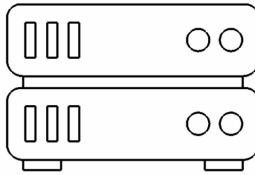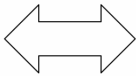
Harvst cloud servers (internet)
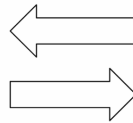
Control unit receives any changes you have made to settings, every 30 minutes.

Offline mode   *- connect directly to the control unit*

Control unit transmits its own WiFi signal. Connect to this using your phone or tablet and use the **system control panel**.
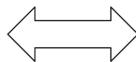
Every 30 minutes, the control unit wakes up, reads sensors, then goes to sleep.

Recent events and sensor data can be read directly via the system control panel.

The control unit needs to be woken up using the "wake" button to connect directly to it.

Online mode (WiFi network available)

All control units are shipped ready for <u>online mode</u>. For <u>offline mode</u>, skip this section.

Step 1
Turn the control box on. It will beep fast for 30 seconds or so. It will then change to a slow beep. It is now transmitting a WiFi signal for you to connect to, so that you can tell the box which network to use.

Step 2
Connect to the "harvst-wifi" network on your phone or tablet. When connected, you should be prompted to "log into Wifi network" or similar, and be automatically directed to a screen step 3 below. If you're not automatically redirected, read step 6.

Step 3
Once connected to 'harvst-wifi' you should be redirected to the first setup screen (below). Click to **Configure WiFi**. Wait while it scans for networks.

Step 4
Click the Wifi network you want your control box to use so that it appears in the SSID box, then enter the WiFi password and hit **Save**.

Step 5
Once you have saved, the control box will attempt to join the network and you'll see the screen below. When the unit connects, you'll hear a celebration beep then the fast beeping will resume for a short while, finishing with a double beep to indicate that WiFi is now connected.

If you don't get this set of beeps, it may still have registered the connection. Turn the control box off and restart the process if required. Some networks do require a couple of attempts to join.

Step 6
If you are not redirected to the WiFi setup page when you connect to "harvst-wifi" in step 3 then you will need to open an internet browser (eg Safari, Chrome) and go to http://192.168.4.1 which will be the screen in step 3 above.

Assign the control unit to your Harvst account

For online mode, you will need a Harvst web account (it's free). The control unit will send data to the Harvst cloud, and your web account will let you view the data, and let you update settings from anywhere.

First, you'll need to get the control unit device ID. This is a unique 12 character code which is printed on a sticker on the back of the unit. Alternatively, you can get the code from the device control panel, accessed via your smartphone, as follows:

No device ID sticker?
Get the device ID from the dashboard

1. Hold the watering / wake button down while you turn on the control box.
2. When it's on, you'll hear a long beep. The long beep indicates that it has booted up in offline mode.
3. The control unit is now transmitting its own WiFi signal with SSID "harvst-xxxx". The number is a unique reference for your system.
4. Using your smartphone or laptop WiFi settings, connect to this network, and wait a few seconds to be redirected to the device dashboard *
5. Once you're on the device dashboard, click the settings button at the bottom.
6. Note the device ID.
7. Disconnect from the Harvst WiFi
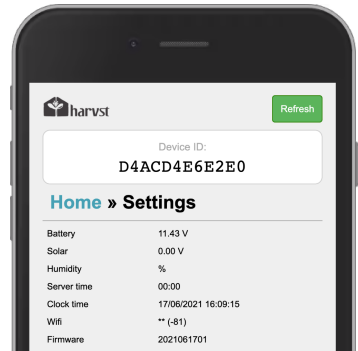
* If you are not redirected automatically, once you have connected to the network, you can open an internet browser and go to http://192.168.4.1

Sign up for a Harvst web app account

Reconnect to your usual WiFi or 4G data, and sign up for a Harvst account at https://app.harvst.co.uk. If you already have an account, log in.

Assign the control unit to your account

1. In your Harvst web app, go to "My account".
2. Click the grey button to assign a new device.
3. Input the device ID in, and give your new garden location a name and description.
4. Click on the save button.

A new garden location will be created and the control unit will be assigned to it.

Offline mode (no WiFi network available)

In offline mode, all automation functions are operational. You will need to be within a few metres of the control unit to update the settings, and the control unit will need to be awake.

To set up offline mode as the permanent mode of operation

1. Hold the watering / wake button down *while you turn on the control unit*. When it's on, you'll hear a long beep. The control unit is now transmitting its own WiFi signal with SSID "**harvst-XXXX**". The number **XXXX** is specific to your system.

2. Connect to this WiFi network using your smartphone WiFi settings. A few seconds after you have connected, you will be redirected to the device dashboard.

   If you are not redirected automatically, once you have connected to the network, you can open a web browser and go to http://192.168.4.1

3. Once you're on the system control panel, click settings, then choose "offline" for the connection mode and save the settings. Next time you turn on the system, it won't look for a WiFi connection.

If, in the future, you want to change to online mode and connect your control system to a WiFi network, change the connection mode to "WiFi" and turn the system off and on again.

Scan this QR code with your phone to view a video which shows you how to set up your control unit.

Or visit **www.harvst.co.uk/setup**

SCAN ME

Firmware updates

The firmware is the program running on the control box. If yours is running in online mode, the firmware will be updated automatically when there is a new version released by Harvst.

In offline mode, firmware is not updated automatically. You can connect in online mode from time to time to update firmware if you wish.

The Harvst web app

The **Harvst web app** runs on any smartphone, tablet or computer, in a web browser. It provides a number of features:

- Control system settings and data view
- Garden journal
- Community forums and support

1. Control system settings

If your control system is operating in online mode, you can manage and monitor it from anywhere using the web app. Any changes you make to settings in the app will be reflected on the control system within 30 minutes or so, when the box next wakes up to send an update.

Data from the control system is sent to your online account, so you can see temperature readings, when it last watered, soil moisture levels and so on. Up to 7 days of data is available to view.

http://app.harvst.co.uk
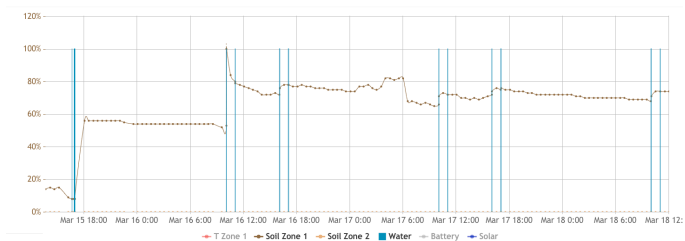
Your system will be set up as a "location" in your garden, from where you can access the dashboard for your control unit.

2. Garden journal

Browse crops, learn about growing, record plantings, thinnings, transplantings, store photos and get reminders for when to sow next.

If your control system is operating in "offline mode", you'll be updating watering settings directly using the system control panel. You can still use the web app as a garden journal.

3. Community forums

Register for the app and browse our forums to learn more about how to use Harvst products, or how to grow in a controlled environment such as a Harvst mini greenhouse.

Getting the app
It's a "web app" which means you won't find it on an app store.
Register for an account at http://grow.harvst.co.uk

Power : Solar versions

Solar powered control boxes have a built-in battery, which must be kept charged using the solar panel. The solar panel must be plugged in at all times, to keep the battery in good condition.

> As soon as you receive your control system, plug in the solar panel and put it in a sunny location so that the battery is fully charged when you come to set up and test. The battery is fitted fully charged but may have lost some charge in transit/storage.

The solar panel should be mounted outside the greenhouse or polytunnel; position it so that it catches the most sun possible. The optimum position will change throughout the year.

A fully charged battery will provide enough power for up to ten minutes of watering, and will recharge fully within a few hours on a sunny summer day; more than enough for most greenhouses and polytunnels.

In winter, the battery may run low due to lack of sun. Watering will be paused while the unit has a low battery. It will recommence when the battery is recharged sufficiently.

Power saving (sleep)

The control unit will go to sleep when it is not doing anything. It wakes up every 30 minutes to take readings, and to turn on the water pump if required.

To change settings, or override the watering, *the control box needs to be awake*.

To wake the unit up press the watering button on the top until you hear a rising tone.

If the system is operating in offline mode, you can now connect to the control system WiFi network (harvst-xxxx). In online mode, you can use the Harvst web app to control the unit directly *as long as your phone or tablet is on the same WiFi network as the system*. The control unit will still need to be woken up.

Winter commissioning

When you set up your system for the first time, you'll want to run the pump to test your pipes and fittings. This will probably run the battery down - when the battery is low, you will hear a falling tone from the control unit and the pump won't run for long, if at all.

In the winter, with overcast skies and a low sun, your battery may not recharge fully within a few days. You can either wait until you have more sun, or you can buy a top-up / trickle charger to take the place of the solar panel over winter.

Power : Mains versions

Plug the power supply into an indoor power point, or an outdoor waterproof power point. The power supply comes with 5m of cable. If this is not enough to reach your greenhouse or polytunnel you will need to get a qualified electrician to install a power point.
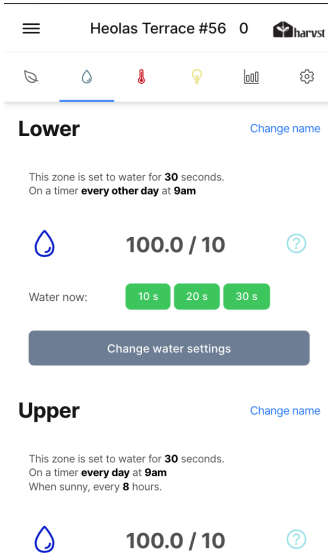
WARNING : Do not use a temporary extension cable

Connect the round plug of the power supply to the socket on the right side of the control unit and secure the collar.

Mains powered control systems will be on all the time; they do not go to sleep.

With all lights and heaters on, the system will consume no more than 150W of power.

Irrigation zones

In a dual zone system (such as our WaterMate range), two zones can be watered separately, with different timing regimes or different soil moisture triggers. You can have the two zones in different places (for different plants) or you can use the different zones for different types of watering in the same place - perhaps spraying and soil level watering.

The pump will run when either of the zones is watering, but the water is directed based on which water valve is open.

For single zone systems without water valves (our Sprout greenhouse range), you can control your watering with just one of the zones in the app, or use both zones for double the watering time options.

Water valves can be retro-fitted to single zone systems if required.

If both zones are set to water at the same time, zone 1 will water first then zone 2 will water afterwards.

Anti-syphon valve (optional, not supplied)

If you find the drippers leak continuously after the pump has stopped running, you may need to add the anti-syphon valve to prevent them dripping when the pump is off.

Insert the valve into an adapter tee at the highest point of your water inlet pipe, with the arrow on the valve pointing towards the adapter tee. The other end is in open air.

If you have water valves, they act as a tap, and when they are off, no water will syphon in or out of the pump.

Automatic watering

Automatic watering settings are changed using your phone or tablet.

Control units in **online mode**

Log into the Harvst web app (http://app.harvst.co.uk) and visit the dashboard for your control unit. Change the settings there. When the control unit next wakes up to send data, it will collect the new settings from the server.

Alternatively : via the system control panel
If you want to access the control unit directly, and change settings immediately, your phone will need to be on the same WiFi network as the control unit, and the control unit will need to be awake. When it's awake, click the black "open device control panel" button on the app dashboard, and the device control panel will open in a new tab.

Change settings there, and they will be updated in the web app when the system next sends data (every 30 minutes or so).
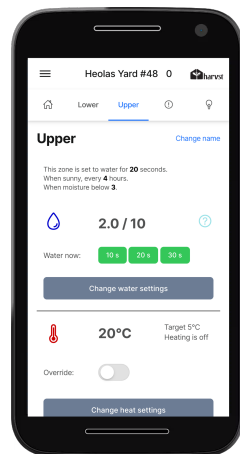
Control units in **offline mode**

Here you are accessing the device control panel directly.

1. Wake the control unit up.
2. Connect to the control unit WiFi network (harvst-xxxx) and wait to be directed to the dashboard. It might take a few seconds.
3. Change your settings there. They will take effect immediately.

If you're not automatically redirected to the control panel, you'll need to go to http://192.168.4.1 in a web browser after you have connected to the control system WiFi.

You might want to save that page/URL as a favourite in your browser, or use your phone's "add to home screen" feature.
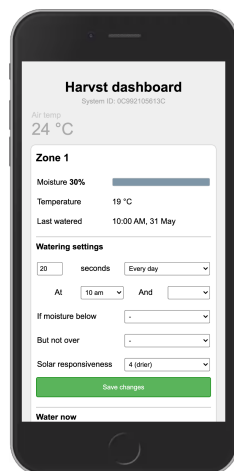
Automatic watering using a timer

The simplest approach for automatic watering is a timer system. A typical place to start is 30 seconds or so in the morning and the same in the evening - you'll see what works best for your plants with some experimentation.

Automatic watering using soil moisture (optional)

If you have purchased soil moisture sensors

See the guide included with the soil sensors, or visit **www.harvst.co.uk/setup**

Automatic watering using solar boost

Sometimes a soil sensor is in a protected space, and does not register dry soil until it's too late, especially for fragile seedlings, or smaller pots on a hot day. You can protect against this situation by using the "solar boost" feature; which gives an extra dose of water on hot, sunny days. Turn this on via the web app (online mode), or on the system control panel (offline mode).

Battery capacity

The built-in battery can provide up to 10 minutes of watering per day, assuming an average amount of summer sun.

Automatic sensor based watering is not done after 9pm, to preserve battery life and to prevent noise. You can choose timer watering for any time of the day.

If the battery is low, the system will not pump water until the battery has become sufficiently charged again. If your control unit is operating in online mode, you can request low battery alerts via email or SMS on the notifications tab of the web app.

If you hear a falling tone, the control unit has a low battery and will need to recharge before watering again.

Frost protection

The system will not pump water when the air temperature is less than 2 degrees.

Low water alerts

If the system is trying to water but there is none left in the tank, you'll hear a two-tone beeping while the pump is running. Low water is detected by the pump itself. If your system is running in online mode then you can choose to receive an alert when the system detects that there is no water left : set this up on the notifications tab in the web app.

Manual watering

With your phone / tablet via the web app (**online** mode)

Ensure your phone is connected to the same WiFi network you programmed the box with. If you have weak WiFi, you might need to turn off 4G to force your phone onto WiFi.

1. Wake the control unit up by pressing the button on top once. Wait until you hear the rising tone.
2. Using the Harvst web app on your phone or tablet, visit the dashboard for the control box.
3. Click the black button to go to "open device control panel"
4. Now that you are connected directly to the control unit, continue as below for offline mode.

With your phone / tablet and the system control panel (**offline** mode)

1. Wake the control unit up by pressing the button on top once. Wait until you hear the rising tone.

2. Log onto the control unit WiFi network (HARVST-XXXX).

3. Wait until you are directed to the control panel, and then choose a blue button on the appropriate zone.

Water now

10 sec	20 sec	30 sec	60 sec

With the manual watering button

1. Wake the control unit up by pressing the button on top once.
2. Wait until you hear the rising tone.
3. Hold the watering button down until you get a **single** beep.
   If you let go now, it will water zone 1 for 30 seconds.
   If you hold the button down for longer, until you get **two** beeps and then let go, it will water zone 2 for 30 seconds.
   If you continue to hold for **three** beeps, manual override has been cancelled and you can let go.

1 beep = water zone 1   2 beeps = water zone 2   3 beeps = cancel

Mount and connect the solar panel

If your greenhouse is solar powered, you will have received a solar power kit.

Mounting the solar panel correctly will ensure your system keeps watering throughout the year. Place it outside, where it gets the most sun. You may need to change the angle and position as the seasons change. Solar panel extension cables are available at **harvst.co.uk**

The solar panel comes complete with two brackets, each made up from two parts.

1. Attach two brackets to the solar panel using the nuts and bolts provided.
   This is easiest using an 8mm open spanner with some tape to hold the nut in place on the spanner while you thread the bolt in from the top, through the bracket.

2. Fix the other part of the brackets to a wall, fence, or other surface, a suitable distance apart to match the brackets that are attached to the solar panel.

3. Offer the solar panel up to the fixed brackets and secure it all together using two bolts in each bracket, as shown in the illustration. Adjust the solar panel to the best angle for maximum sun.
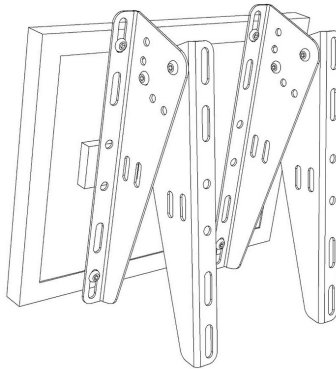
From the outside of the greenhouse, run the solar panel cable through the large hole in the rear panel, and plug it into the right hand socket of the control box (when viewed from the front).

WARNING : Your control box battery will last approximately 5 days without any solar power (less if you're doing a lot of watering), so don't forget to plug it in.

Irrigation

Your irrigation needs will depend on what you are growing, so you may wish to change it from time to time, or set your greenhouse up differently from what we describe here. This is a recommendation only. See the videos on our website for an idea of what can be done.

Water supply options

1. Pumped from a tank near the greenhouse
2. Provided directly from a garden tap

The external tank could be a water butt, an IBC, or a jerry can. It should be within 2m of the greenhouse - or use a garden hose with the supplied joiner to connect a tank from further away. The Sprout submersible pump is placed into the water tank and can remain underwater permanently.

It should not be run dry for extended periods of time. When it runs dry, your control unit will emit a siren sound, and can be set up to send you an SMS and/or email with a "low water" message.

A garden hose connection will require a tee-tap, as the water will need to be left turned on to the greenhouse at all times.

Watering capacity

The Sprout irrigation pump can power up to 20 sprayers or 30 of the 4 litre/hr drippers. For more emitters, you can add electric water valves to create a second watering zone. There is no limit to mains water powered systems (ie connected to a garden tap).

Dripper watering

Drippers are supplied for you to place into trays or pots as you wish. They are suitable for large plants where you have a stem and single root system, and can also be used to feed water into the bottom of a watering tray.

Enough drippers are supplied for one per seed tray in your greenhouse. More can be added with extra dripper kits.
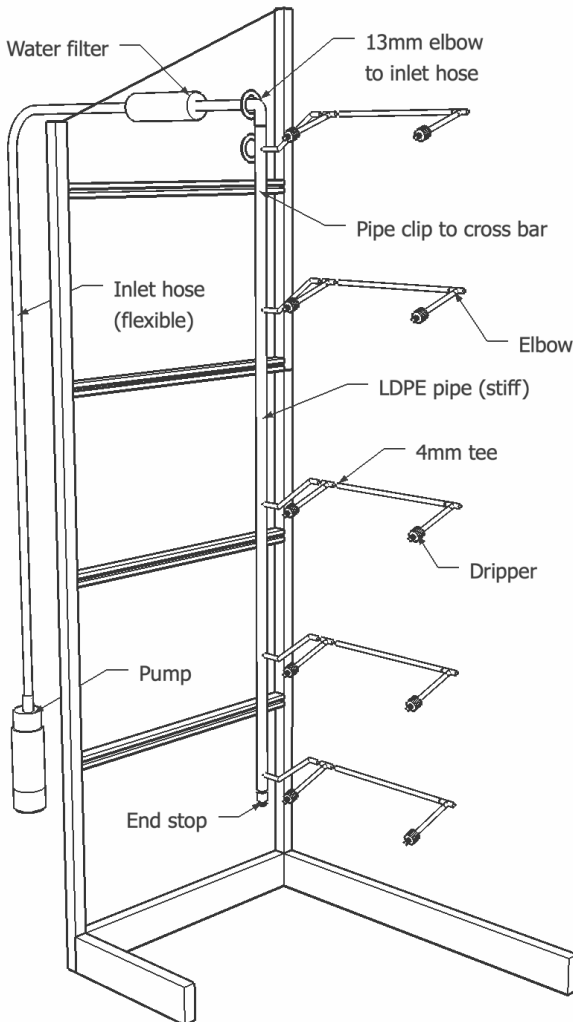
Bottom watering

Bottom watering is suitable for trays of salad, seedlings, or where you want to encourage roots to grow down to the moisture below. Water is fed into a watering tray, in which pots or trays are placed. To spread water evenly around the tray, we recommend capillary mat. To prevent overflow, add drainage holes in the tray, in or near the base.

Irrigation installation - pumped

The same principle applies for all greenhouses, with different length pipes.

> **Tip:** Warm the ends of the hoses and pipes in a cup of hot water before fitting to joints.

Water filter

13mm elbow to inlet hose

Pipe clip to cross bar

Inlet hose (flexible)

Elbow

LDPE pipe (stiff)

4mm tee

Dripper

Pump

End stop

1. Fix the white pipe clips to the side panel cross bars using M5 x 16mm bolts.

2. Fit an end stop to the bottom of the LDPE pipe.

3. Fit a 13mm elbow to the top of the LDPE pipe.

4. Fit the pipe to the pipe clips with the elbow poking through the top hole in the side panel. The other hole is for the pump wire.

5. Punch holes in the LDPE, one for each shelf.

6. Fit a 4mm hose joiner into each hole.

7. Attach a section of 4mm hose to the joiner, and fit 4mm tees, 4mm elbows and drippers as per the drawing on the left.

Tip: If you're bottom-watering using trays, you won't need drippers, just feed 4mm hose into the watering tray.

Irrigation installation - garden hose

Fit the water valves inside the greenhouse as shown. Connect your single zone watering to the **top** outlet which will be **zone 1** in the control app. You can optionally add a second watering zone with more irrigation parts (not supplied).

Note the LDPE down pipe is clipped to the side crossbars at the **front** of the greenhouse (with the pumped system it's clipped at the back).

Garden hose

Short section of garden hose

13mm elbow

13mm elbow

Short section garden hose

Water valves

Dripper

4mm elbow

4mm tee

LDPE pipe

End stop
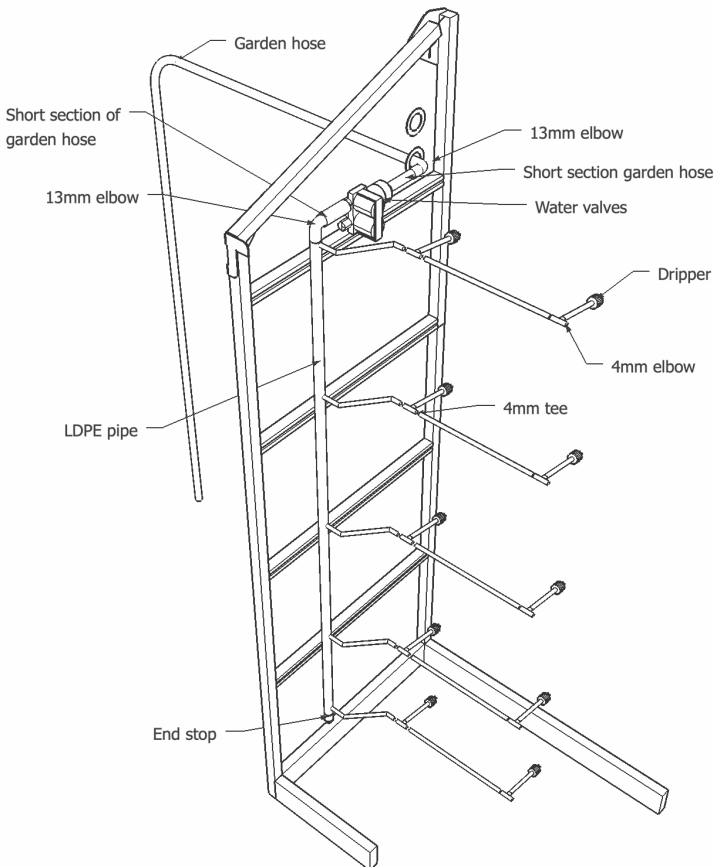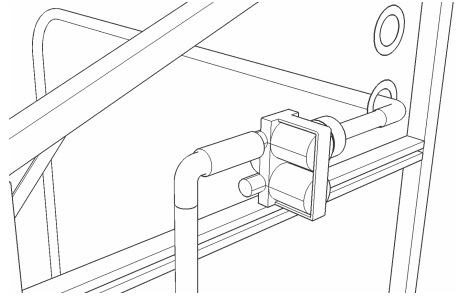
Irrigation extras

Isolating different areas

Supplied with your Sprout are 4mm water taps which can be fitted anywhere in the 4mm hose to allow you to turn off different areas of the watering.

If your water tank is not next to the greenhouse

A straight hose joiner is supplied which can be used with any regular garden hose to connect to a tank further away from the greenhouse. If the supplied pump cable is not long enough, pump extension cables are available at www.harvst.co.uk

Connecting to a garden tap

It's possible to run your Harvst Sprout off a mains water connection. You'll need to add electric water valves (available from the Harvst web shop) and remove the pump.

The electric valves should be placed just inside the greenhouse, between the flexible inlet hose and the stiff LDPE. See drawing above.

Sprayers

If you would like to try different irrigation techniques, you can use standard micro-irrigation misters or sprayers. The supplied submersible pump is not high pressure so you won't get a fine mist but a good spray is possible.

Alternative drippers

The Sprout irrigation system is provided with 4 litre per hour drippers. 2 l/h and 8 l/h drippers are also available in our web shop if you need.

Heating & lighting

If you have a 4-Season (mains powered) greenhouse, the control unit can supply power for heating and/or lighting.

Rated capacity

The power supply can provide up to 160W. Any one output can power up to 80 Watts (W).

- Harvst heated seed trays consume 15W each
- A heater cable uses 60W
- A heater pad uses 15W
- Strip lights use 10W
- Stalk lights use 25W

Controlling heaters

The outputs are turned on and off based on the settings you choose in either the web app (online mode) or the control unit dashboard (offline mode). You can choose which sensor is used to regulate the temperature for that heater output.

Heater cable

Heater cable is designed to warm the air in the greenhouse to keep it a few degrees above ambient temperature. You can also use it to warm soil in the ground, or a large grow tub.

Heater cable is best regulated using the silver air temperature sensor, positioned inside the greenhouse somewhere out of direct sunlight. Turn on the heaters when the temperature drops below 15 degrees, for example.

The heater cable can reach 60 degrees C, so don't place it directly in contact with leaves or roots.

Using LED grow lights

The Harvst 4-Season control unit supports low-voltage waterproof grow lights, to help your seedlings grow stronger, and to help plants grow better in the darker months of the year.

Lights can be used in combination with heaters, as long as you don't exceed the maximum rating of the system.

Setting the timing

You can set two time periods per day, from 1 second to 12 hours each. Using the lighting tab in your app, choose the settings and save. When the control unit next sends an update, the settings will be retrieved.

You can override the lights using the toggle button in the app. It's a permanent override, which will not turn off at the end of the next time period.

Heating from lights

Grow lights give off a fair amount of heat, which can be used to your advantage when growing outdoors in winter. When the lights are on, you may find that your mini greenhouse needs no further warmth. The strip lights, mounted on the shelves, are particularly suitable for warming the soil in a seed tray above.

We recommend using two outputs for heaters (outputs 1 and 2).

The total system rating is 160W, which is more than two heater cables (60W + 60W = 120W) and 8 lights (80W), so in order to give the most heat possible throughout a 24 hour period, we have designed the program so that :

- If lights are **on** (output 3) then *only output 1* will come on when it's cold.
- If lights are **off**, then output 1 AND output 2 can come on.

This lets you put two heater cables on outputs 1 and 2, and lights on output 3. If you don't want to use heaters, you can have more sets of lights running at any given time.

Strip light installation

Up to 8 strip lights can be connected to a single control unit output (total 80W).
Up to 16 strip lights can be connected to the control unit, if no heaters are used (total 160W).
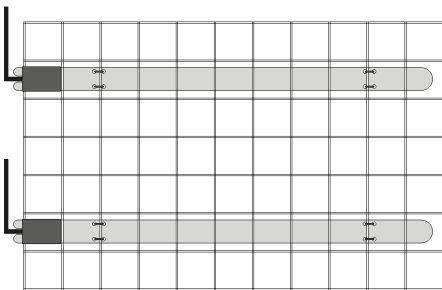
S6 and S10 mini greenhouses

Two combination light / shelf supports are provided for each shelf level.
With the light cable on the left, slot the lights into the end panel cross bars as shown below.
Secure the mesh shelves to the lights using the cable tie holes.

Cable tie holes
Cable tie slots
Integrated light / shelf
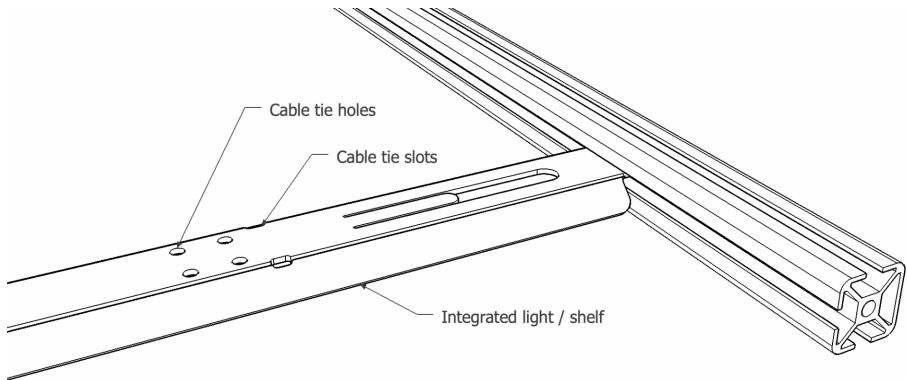
S14 and S24 mini greenhouses


Strip lights mount underneath the mesh shelves in the S14 and S24 mini greenhouses. We recommend a minimum of two strips to cover a pair of seed trays - but you can add more if you like.

With the cables on the left, fix the lights to the underside of the mesh shelves using cable ties through the small holes.

For the S24, we recommend the eight lights are fitted on the left hand side.

Light connections

Use the supplied light splitters to connect your lights as follows:
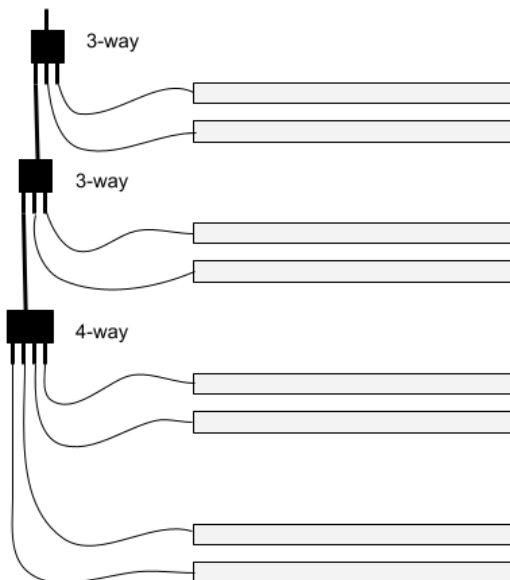
S6 model
Connect your four lights to a single 4-way splitter.

S10 model
Fit all lights under shelves as above.

S14 model
Arrange the lights on the two mesh shelves with the cables coming to the middle of the greenhouse, then to the control box.

S24 model
Run the lights down the left side of the greenhouse, leaving the right side for taller plants like tomatoes. Or use a similar layout to the S14 above and have the top two shelves with lights.

Heater cable installation

Heater cables are used to provide gentle warmth to the greenhouse space, underneath the pots and trays you have on the shelves. The cable will reach a maximum of 60 degrees C which will not damage any of the greenhouse frame or plastic.

> **Tip**: Turn the control box on and set your heaters to come on so that the cable is warmed up before you thread it around the greenhouse - it will be more flexible.

Model	**S6**	**S10**	**S14**	**S24**
	1 cable	2 cables	2 cables	2 cables

The round part of the cable remains cold and the flat part will get warm.
If you have two cables, note how the round cold section is shorter on one of the two cables.

To install the cables - S6 / S10 models

1. Plug the heater cable with the shorter cold section to the heater 1 socket on the bottom of the control unit.
2. Run the cable along the light bars, using cable ties through the cable tie slots.
3. The S10 model will have a second cable - with a longer cold section. Plug the second heater cable into the heater 2 socket on the control box and fix to the lower light bars.

To install the cables - S14 / S24 models

4. Plug the heater cable with the shorter cold section to the heater 1 socket on the bottom of the control unit.
5. Using cable ties, attach the cable underneath the mesh of the top shelves, to provide a heated platform on which you place your growing containers.
6. Plug the second heater cable (with the longer cold section) into the heater 2 socket on the control box and run the cable back and forth under the bottom shelves.

See our website for videos with more detail.

Environmental sensors

Air temperature sensor (included)

A silver temperature-only sensor is plugged into the socket on the left of the row of sockets on the bottom of the control box. You can use this to monitor any temperature; typically it's used for inside air temperature, and will show as "air temp" on the app. Place it inside or outside the greenhouse, depending on what you want to measure. The sensor is fully waterproof.

Humidity / temperature sensor

A combination temperature/humidity sensor is available as an optional extra to replace the temperature only sensor. It must be placed in a location which does not get wet as it's not waterproof.

See the separate guide for using a humidity sensor

Soil moisture and temperature sensors

Dual-purpose soil sensors are available as an optional extra, which will measure soil moisture as well as soil temperature. These are best placed in an area where the temperature and moisture doesn't change too fast; such as a large container of soil, or the ground. It's best placed horizontally, just under the surface.

The soil sensors plug into the 4-pin connector on the control unit, via a Y-splitter.

To measure the soil *moisture*, place the sensor so that the bottom half is completely under the soil. In shallow soil (such as a seed tray), you'll need to place the sensor on its side under the soil.

The *temperature* is measured by a device halfway up the body of the sensor; again, if you have shallow soil and want to measure the temperature of the soil itself, this will need to be below the surface.

Read more about soil moisture sensors in the manual provided with the sensors, or download it from **www.harvst.co.uk/setup**

See the separate guide for using soil moisture sensors