



# Smart Cylinder Users Guide



# Table of Contents

---

Introduction ..... 3

Home Screen ..... 4

Set Time and Date ..... 5

Set Hot Water Profile ..... 5

Savings Screen..... 9

Datalogging..... 6

7 Day Data..... 10

System (or Tech) Screen ..... 10

Trouble Shooting..... 11

For technical help contact your installer or maintenance technician.

**Installer Details:**



### INTRODUCTION


Congratulations on having a Smart Cylinder installed in your home. Welcome to a new way of managing your hot water heating

There are three parts to a Smart Cylinder system

1. The Cylinder; where the water is heated
2. The Controller; that controls the heating, measures the temperature and such
  - Usually located close to the hot water cylinder
3. The Display;  
your interface to the Smart Cylinder
  - The Display can be mounted away from the cylinder
  - We recommend a hallway or similar as it can be important to regularly see the volume of hot water used and stored

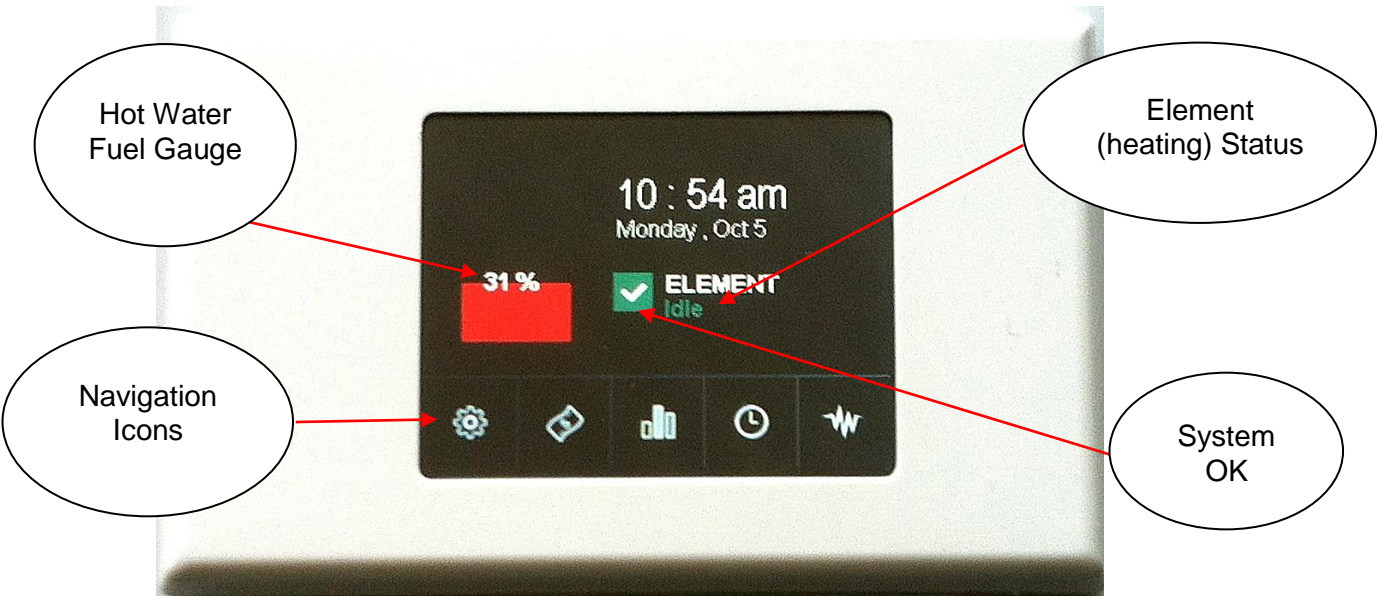


The Colour Touch Display enables you to easily set the optimum efficiency for your ever-changing hot water needs throughout the day, allowing you to create a tailor-made balance between reserved hot water and power usage. Further it opens a window so you can see and understand how your system is functioning and why.



The DisplaySmart Plus is user friendly with multiple information screens. We recommend that you read of all the information screens, accessed via the  icon to gain familiarity with the product.



# HOME SCREEN



The Home screen is generally where most people would leave their display. It gives an overview of the whole system. From here you can navigate to all the other available screens.

The  indicates that everything is OK. If there is an error a  will replace the green tick and the text beside will inform the user on what the error is.

## Element Status

Will be in one of the following five states;

- Idle : The element is off
- Topping Up : The controller has decided the tank needs heating to maintain the user profile using an electric element (might be upper or lower in the case of a dual element tank).
- Sterilisation : The hot water in the cylinder needs precautionary sterilisation. The element is heating to keep you safe. This is Senztek's BioSafe<sup>®</sup> function
- One off Boost : User has pressed the "one off boost" button on the display. The tank will now heat to the Boost temperature using the electric element
- Holiday : User has pressed the "holiday button. The element will not come on except for sterilisation (typically once per week)

## Hot Water Fuel Gauge

This is an estimation of useful hot water stored in your hot water cylinder. Make sure you constitutently keep looking at the gauge before and after your hot water use. This visual feedback that will help you save hot water, even if you only glance at it. As unlikely as this sounds this does make a difference for many people as to how much hot water they use\*

## Screen Brightness;

This will dim after 2 minutes of no activity and become bright again when the screen is touched. This is to ensure the Display is not distracting within your home especially at night but is still illuminated enough to be seen at a glance.

**Note:** On first power-up the waters safety is unknown so a BioSafe<sup>®</sup> cycle is initiated. Once complete standard operation will resume. Once heated to 60°C this will last 1 hour at most.



## SET TIME AND DATE



- From the Home screen touch the Clock icon



- Set the Time and Date by touching the field that you want to update until it starts flashing and then using the Up/down arrow keys to adjust the value.
- Press the Home icon when finished
- Your new Date and Time will be displayed on the home screen.
- The controller will maintain time keeping for 3 weeks with no power.

## SET HOT WATER PROFILE



This is where you set the 'roadmap' for it to follow.

It is best to set this on the high side of what you might expect as the 'savings' control will only **reduce** this profile, not increase.

There are 4 time bands each of which starts at the times in each column. E.g. the first time is 0700 (7:00 am) so the first time band runs from 7:00am to 8:59am

The different expected levels of hot water needed in each time band will create a daily profile. In the above example (yours may vary from this);

- There will be an expected high use of hot water around 8:00a.m – 9:00 am. To allow for heating up time this is set to start at 7:00am
- Then low usage until after 3:00pm. Then it is expected there will be a medium requirement probably for dinner preparation and activity as people arrive home.
- Late at night there is no tank heating at all until the morning.

**Note:** Min (blank), LOW and MED will tend to maintain hot water the upper ½ of the cylinder while High (and MAX) will tend to maintain hot water in the entire cylinder.





**If you are not sure then set them all at HIGH (not MAX )**

### Setting;

- A box will be flashing around the first time setting indicating that you can change it using the up/down arrow keys.
- Now set the hot water level in that band by touching the area directly above the time box. Each time you touch the value will change from Blank through to MAX.  
**Note:** This will be the maximum usage you are expecting. The Savings control can only decrease this value.

**Blank** (Clear Bar): Very low hot water usage expected.

(Might partially heat if the entire tank is very cold)

**LOW :** Low hot water usage expected

**MED :** Moderate Hot Water usage expected

**HIGH :** High Hot Water usage expected

**MAX :** Element always heating to max (no change with Savings control)

- To adjust the next time band touch on the time displayed for that band. The white box will now move to that time and it can be adjusted as above. Repeat the above steps for all four time bands.  
The profile times must always start from earliest to latest left to right (as demonstrated) If this is not the case the controller might incorrectly execute heating times
- This screen will probably rarely be altered once set up

There are many ways the profiles can be set up depending on what you are trying to achieve (and why the Smart Cylinder is so powerful). Here are some suggestions;

### 1. Low Volume Hot Water Users

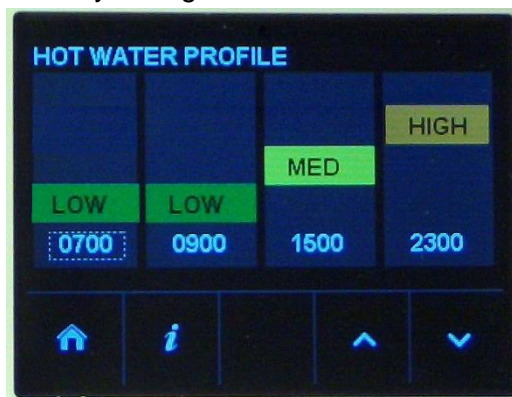
- a. We are aiming to minimise lost heat from the walls of the cylinder in this application (standing losses)
- b. Set the profiles during the day to match you hot water use (not desired savings but actual use!)
- c. The example on the left is a common profile for many families
- d. Once your own profile is set start with Savings at 0% for while (see savings control in next section)
- e. If you consistently have a hot water fuel gauge reading surplus hot water after your peak hot water times, then start to increase the savings settings until the fuel gauge readings stay low and yet you don't run out of hot water.





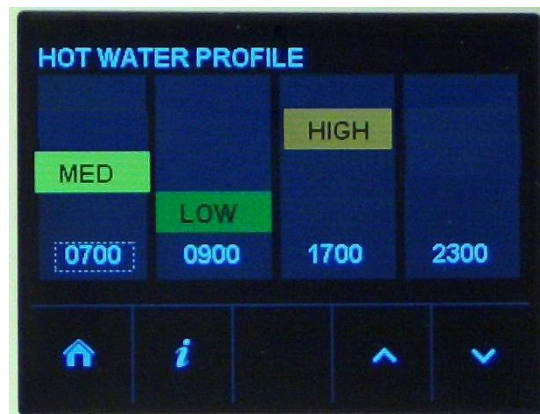
### 2. High Volume Hot Water Users

- This is where lower priced power for water heating is of great value. It is not uncommon for ½ price power to be available off-peak
- This usually means using the POWER at an off-peak time and using the HOT WATER at a more convenient time.
- Traditionally 'Night Rate' power (power is only available to the hot water element for a few hours late at night) has not been popular because if you run out of hot water, there is no more until the next day. But with a Smart Cylinder you can still save with Night Rate and yet have the luxury of a system that will ensure you don't run out of hot water. Night Rate requires a dual element cylinder to work with a Smart Cylinder control.
- A new and increasing popular alternative is called 'Time of Use Tariff' and utilises a smart electricity meters ability to charge at different rates during different times of the day, however, power is never removed, just charged at different rates. **Note:** these are always at the same time/s of the day.
  - Set the profile for high use during the low cost tariff times. Do not use MAX setting as this cannot be turned down by the Savings control. This is important as it is still possible you might need much less than a full cylinder of hot water even it was heated at the low tariff
  - Set a medium to low setting for higher cost tariff times depending on you habits. Remember the Savings control can only turn the profile value down, so a slightly higher value can easily be turned down with the Savings control.
  - Once your own profile is set start with Savings at 0% for while (see savings control in next section)
  - If you consistently have a hot water fuel gauge reading surplus hot water after your peak hot water times, then start to increase the savings settings until the fuel gauge readings stay low and yet you don't run out of hot water.



### 3. Solar Hot Water

- Set profiles lower during daylight hours to minimize electric boost heating and give solar best chance to heat the cylinder. At 5:00pm it checks if there has been enough solar gain until the next morning. If not it intervenes to heat. Remember these levels are maximums and increasing the savings setting will reduce them.





**4. Wetback Hot Water**

- a. Set profile lower during night hours (or whenever it is most likely the fire is burning) to minimize electric boost heating and give the fire the best chance of heating the cylinder.
- b. It is assumed the fire will be heating around 5:00 pm



**5. Solar Electric (PV) installed, no diverter**

- a. Set profile high during daylight hours to maximize PV electric heating to give solar best chance to heat the cylinder. At 5:00pm it checks if there has been enough solar gain until the next morning. If not it intervenes to heat. Remember these levels are maximums and increasing the savings setting will reduce them.
- b. It might be worth changing 10:00 am slot from HIGH to MAX if the element kWh is smaller than the Array kWh



**6. Solar Electric installed, with diverter on bottom element, Smart Control on top element**

- a. Set profile low during daylight hours to maximize PV electric heating with the diverter to give solar the best chance to heat the cylinder. At 5:00pm it checks if there has been enough solar gain until the next morning. If not it intervenes to heat. Remember these levels are maximums and increasing the savings setting will reduce them.
- b. Controller set to 'Mid Element'



**Note:** Mid Element operation must be set by the installer (using installer settings password) or at the factory.







## SAVINGS SCREEN



If your preset Hot Water Profile 'roadmap' matches your actual hot water usage profile, then you might not even need to adjust the savings control at all from 0%

By observing your hot water fuel gauge especially before and just after high usage times like morning showers, then you should be able to see if you have too much or too little reserved hot water. A useful tool to assist with this is the 7 Day Data screen that shows minimum and maximum stored hot water over the last 7 days (see next page).


- To reserve less hot water, increase the Savings control by pressing the 
- To reserve more hot water, decrease the Savings control by pressing the 
- You will see the Hot Water Profile bars change in height as you change the Savings setting. This indicates how your profile is being changed.

Initially it might be best to set the savings at 0%. If you find you regularly have spare hot water as indicated on the home screen 'fuel gauge' then try increasing the Savings control in say 10% increments until you find the best setting to suit you. This might take days to establish the best setting.

This way you should find a balance between reserved hot water and hot water needs.

**Note:** Only **after** being sure you cannot adjust the savings setting to suit your hot water needs should you consider adjusting the (preset) profile. A profile change is a big step

**Note:** We use the % for the savings control as a useful scale; it is not necessarily tied to the hot water fuel gauge %

Touch  to take you into the special element functions.


- **Boost:** This is a one off heat up of the tank to maximum. It will reset once at the target temperature. Typically 65°C. Might be used for a special occasion such as visitors coming.
- **Holiday:** Turns off the element/s until pressed again to reset.  
Note: BioSafe Legionella protection will override this and keep the tank safe (usually once a week at most)



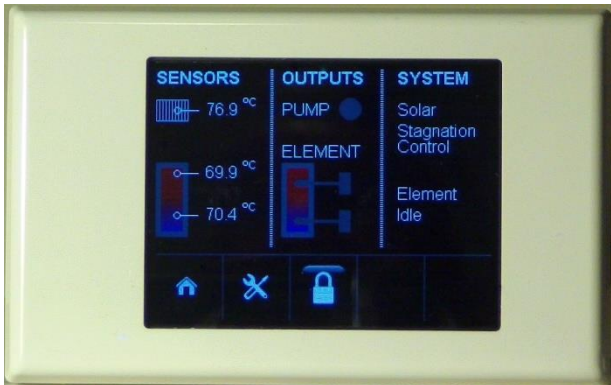
7 DAY DATA



You can step through the last week's recorded data for the various parameters.

To step between screens use  

SYSTEM



This screen is a more detailed diagnostic display.

1. Set a Home Owner Password (optional)



If you do not want anyone except authorised individuals to change your hot water settings you can set up a password protection by following these instructions:

- From the Home screen use the “Diagnostics” Icon followed by the “Lock” icon as pictured above
- Press the “Set User Password” button
- Enter a four digit code for your password

You can disable the password from here on by pressing the “Clear User Password” that will now be visible instead of the “Set User Password” button.

*If you forget your password you can clear the password with this Master Clear Password that will always work “5106”.*

Note: The icon  is for the system setup and qualified personnel only. It is code protected.



## TROUBLE SHOOTING

### Ripple Control (load shedding by power utility).

**Symptom:** No display, no lights on the controller

**Possible reason:** If the controller uses the same power as the hot water cylinder element then it is possible the power has been removed by ripple control.

Only when power is restored can the Smart Controller and display start working again.

Ripple control in New Zealand is usually mainly used in winter and for only a few hours at most. However in times of power shortage this might be longer and /or more frequent

If your ripple control has removed power for an extended time, especially for 12 hours or even 24 hours then it is possible the ripple has failed to re-energize (a known issue). Contact your power provider to enquire if ripple control is still active.

**Note:** It is possible to have the Smart Controller wired so the controller uses non-interruptible power (so you can still see and use the display) while the hot water element separately uses ripple controlled power. Talk to your Smart Controller representative if you would like this option installed.

Another option is to have the ripple control removed; however this might increase your power costs. Your power utility will be able to help with information on this option.

Symptoms	Possible Causes	Actions
No Display and No lights on Controller	<ul style="list-style-type: none"><li>• No power to controller</li><li>• Faulty controller (rare event)</li></ul>	<ul style="list-style-type: none"><li>• Check if circuit breakers tripped</li><li>• Check with power utility if load shedding (ripple control is active)</li><li>• Check if hot water power has been switched off at the wall. Or changeover range/hot water switch has not been returned to 'hot water'</li></ul>
No Display But lights on Controller	<ul style="list-style-type: none"><li>• Cable to Display from controller cut (white cable)</li><li>• Faulty Display</li></ul>	<ul style="list-style-type: none"><li>• Call authorised service agent for repair</li></ul>
'Sterilising' stays on main screen for more than a few hours.	<ul style="list-style-type: none"><li>• Unable to heat entire cylinder to 60°C</li></ul>	<ul style="list-style-type: none"><li>• Check if there is a hot water leak somewhere.</li><li>• Call authorised service agent for repair</li></ul>
Water frequently cold	<ul style="list-style-type: none"><li>• Ripple control interrupting power</li><li>• Savings control too high or wrong profile</li></ul>	<ul style="list-style-type: none"><li>• Use manual boosting in the short term if ripple events seasonal.</li><li>• Adjust savings control down</li><li>• Adjust profile as a last resort</li></ul>



- Only qualified persons should directly check mains wiring, voltages or currents.
- If replacing a wired fuse (as distinct from a circuit breaker) beware this could explode on insertion with a live circuit if there is a short circuit. Make sure the power to the hot water cylinder is turned off at the switch leading to hot water cylinder and the power is switched off at the switch board before insertion. Use safety glasses. It is best to call an electrician to be safe

