

## ST9000 FAMILY OF TIMERS & PROGRAMMERS

### PRODUCT SPECIFICATION SHEET



The new **ST9000** family of electronic time controls is a range of market leading products that covers all applications from 1 day control of combi boilers to 7 day control of central heating and stored hot water systems, and also 2 zone time control.

All products have state-of-the-art **LoT™ Technology** with a large backlit display to make them extremely user-friendly. A factory set clock/date and automatic 1 hour summer/winter time change are designed to further enhance ease of use.

With a modern fresh look that complements any décor style, and range of valued features for Users and Installers alike, the **ST9000** family is intended to control comfort with economy in modern heating systems.

### FEATURES

- **LoT™ Display**, providing text feedback that gives user guidance and programming hints.
- **Large backlit display**, configurable to be on permanently, off or activated by a button press.
- **Factory set clock and date.**
- **Automatic Summer / Winter 1 hour time change.**
- **7 day and 1 day programme models.**
- **7 day models settable for 5/2 or 1 day operation.**
- **Up to 3 on/off periods per day.**
- **Holiday button, on 7 day models.**
- **Temporary or permanent override facilities.**
- **Extra hour facility, for up to 3 hours of boost or programme extension.**
- **Choice of 3 different built-in standard programmes.**
- **Programme indicator lights.**
- **Fits on industry standard back-plate.**
- **Plug-in replacement for ST6000 models.**
- **ST9100 Timer models suitable for mains, low voltage or potential-free switching.**
- **Models available with programmable boiler Service reminder and shut-down feature. This Service Mode is flexible, with PIN-code protection (see inside for full details).**
- **Installer configuration modes, enabling product to be customised for application and the needs of the user.**
- **2-level battery backup to maintain real-time and date in event of power failure.**
- **NVRAM storage of programmes and all setup parameters, ensuring these are never lost.**
- **Building Regulations compliant.**
- **Double-insulated, with 'Parking' terminal for external earth wiring continuity.**

### APPLICATIONS

**ST9000** models fit on the most common industry-standard back-plates, enabling them to replace most equivalent time controllers on the market. They also fit on the same wiring back-plate as ST6000, so direct replacement of ST6000 is simple and does not require re-wiring. There are 7 models in the product family, each designed to be the perfect match for a time control application.

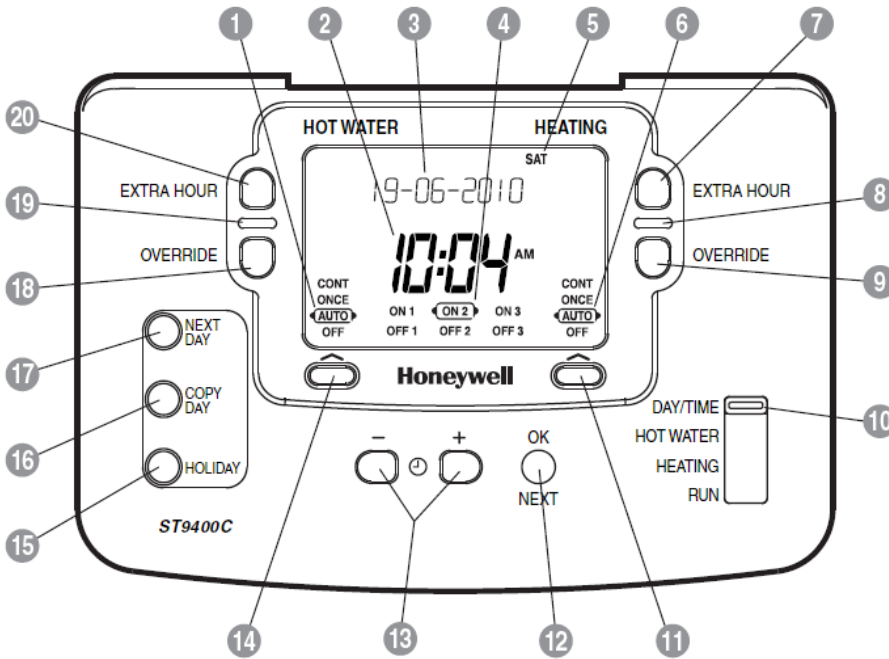
**ST9100** is a single channel Timer, designed primarily for control of the heating circuit in combi boiler applications. It is available in 3 versions: 1 day, 7 day, or Service. **ST9100** models are suitable for mains, low voltage, or potential-free switching of the heating load.

**ST9400** is a 2-channel Programmer, designed for control of both heating and stored hot water in complete systems. The heating and hot water programmes are completely independent, to allow the system to be operated in the most energy-efficient manner possible. It is available in 3 versions: 1 day, 7 day, or Service. **ST9400** can also be set as a Mini-Programmer for older gravity-circulation stored hot water systems, where there is no interlocking control-valve.

**ST9500** is a new 2-channel 7 day Programmer designed to control 2 heating zones, most probably heated by a combi boiler. Zoning a house not only helps make the heating system more energy-efficient, but can also improve comfort conditions, as each zone will only be heated when required. Building Regulations strongly recommend zoning for most houses, and mandate it for certain larger properties, so the Honeywell **ST9500** can be used as an aid to compliance.

The **ST9100S** and **ST9400S** Service Interval time controllers have additional features to help Landlords comply with the requirements of Regulation 36 of the Gas Regulations 1998. The Landlord, Installer or Service Company can configure the Service Interval, the Advance tenant notification period and how the controller will operate when the Service Interval has expired. These models look like and operate exactly as standard **ST9000** models, until the Gas Service is due, at which point the pre-programmed action takes place. The LoT™ Display can also be used to show a telephone number to help the User schedule their gas service.

## CONTROLS/ DISPLAY LAYOUT



ST9400C SHOWN

- 1 Hot Water Operating Mode Indicator
- 2 Time Display
- 3 LoT™ Technology Display
- 4 Programme Time Markers
- 5 Day of Week Indicator
- 6 Heating Operating Mode Indicator
- 7 Heating Extra Hour Button
- 8 Heating Indicator Lamp
- 9 Heating Override Button
- 10 Slider
- 11 Heating Operating Mode Button
- 12 OK/Next Button
- 13 Clock – and + Buttons
- 14 Hot Water Operating Mode Button
- 15 Holiday Button
- 16 Copy Day Button
- 17 Next Day Button
- 18 Hot Water Override Button
- 19 Hot Water Indicator Lamp
- 20 Hot Water Extra Hour Button

## SPECIFICATIONS

Power Supply	: 230 Vac (+10, -15%), single phase, 50...60Hz, 10W	Mounting	: Surface or flush switch-box. 7 x screw mounting holes are provided to suit a variety of mounting configurations.
Power Reserve	: In-built battery maintains factory-set date & time. Backup super-cap retains real-time for more than 1.5hours. All settings and parameters stored in NVRAM will be retained indefinitely.	Clearance Requirements	: Above wall-plate 110mm Below wall-plate 100mm Left/right of wall-plate 10mm
Switch Type & Rating	: <b>ST9100A/C</b> 1 x S.P.D.T. potential-free, 3(3)A max at 230Vac, 10mA at 12Vdc min. <b>ST9100S</b> 2 x S.P.S.T. potential-free, 3(3)A max at 230Vac, 10mA at 12Vdc min. <b>ST9400, ST9500</b> 2 x S.P.D.T. 3(3)A max at 230Vac	Wiring	: 6 x screw terminals, combi-head screws with captive wire-clamps. Each terminal is capable of accepting 2 x conductors up to size 2.5mm <sup>2</sup> , solid or stranded cable.
Time keeping accuracy	: Typically better than 10 minutes per year Time and date supplied factory-set.	Wiring Access	: From the rear, left of centre. Surface wiring access available from top, bottom, and both sides, using the 4 breakouts provided.
Time display	: 12 hour AM/PM or 24 hour format.	Earthing	: Double insulated. A parking terminal is supplied for external earth wiring continuity.
Time setting resolution	: Time of day - 1 minute. Programmes - 10 minute steps.	Protection Class	: IP30 (IEC144)
Programmes	: 1 day or 7 day versions. 7 day versions configurable to 5/2 day or 1 day. Up to 3 x on/off pairs per day.	Enclosure	: Flame retardant plastic housing. 4-piece construction consisting of wall-plate, rear cover, front cover and flap.
Built-in Programmes	: Choice of 3 x built-in programmes:- A = standard programme b = at home C = economy	Dimensions	: 145 x 99 x 35 mm (w x h x d) for unit 155 x 113 x 49 mm in carton
Environmental	: Operating temperature range 0 to 40°C Shipping and storage temperature range -20 to 55°C Humidity range 10 to 90% RH, non-condensing.	Weight	: 324g gross, 268g excluding packaging & literature.
		Approvals & Regulatory Compliance	: CE mark Conforms to protection requirements of Directives 2006/95EC and 89/336EC (as amended by 04/108/EC). WEEE & RoHS compliant. Building Regulations compliant.

## PRODUCT FAMILY

	Product Description	Product Replaced	Channels	Relays	Days	No On/Offs	Day & Copy Day	Holiday Mode	3-Position Slider	4-Position Slider	Service Model	Installer Setup	Service Mode	PIN Code
ST9100A1008	1 day timer	ST6100A1001	1	1	1	2			•		•			
ST9100C1006	7 day timer	ST6100C1009	1	1	7	3	•	•	•		•			
ST9100S1007	1 day service timer	ST6100S1000	1	2	1	2			•	•	•	•	•	
ST9400A1002	1 day 2 channel programmer *	ST6300A1007, ST6400A1005, ST6200A1009	2	2	1	2			•		•			
ST9400C1000	7 day 2 channel programmer *	ST6400C1003	2	2	7	3	•	•	•		•			
ST9400S1001	1 day 2 channel service programmer	ST6400S1004	2	2	1	2			•	•	•	•	•	
ST9500C1015	7 day 2-zone timer		2	2	7	3	•	•	•		•			

\* incorporates mini-programmer capability

## MAIN FEATURES

### LoT™ Technology Display

A special section of the ST9000 display is used to provide informative 'on-screen' feedback and operational assistance to the User, as and when required. This is called the LoT™ Technology Display. Text messages will guide the User through the process of programming, and if signs of hesitation are detected, simple 'hint' messages will explain how to proceed. At the end of programming sequences, if programme changes have been confirmed by pressing the OK button, the LoT™ Display will verify that the changes have been saved. If a button is pressed, or the slider moved, the LoT™ Display will generally verify what has been done, making the ST9000 family very easy to use.

### Extra-Large Display with Backlight

The ST9000 display is more than double the size of its predecessor, ensuring that it is even easier to read, and allowing more information to be displayed, when required. The display is backlit, and the backlighting can be configured to be on or off, or just to stay on for 15 seconds after a button has been pressed or the slider has been moved.

### Factory set Date & Clock

The date and clock are set at the factory and maintained correct prior to installation, so the Installer or User never need to set the clock or adjust the date.

### Automatic Summer / Winter 1 Hour Time Change

ST9000 will automatically adjust the internal clock backwards and forwards by 1 hour in line with the BST – GMT national time changes. This means the User does not have to remember the change and the Installer will not get 'nuisance' calls just to change the time.

### Override Button

The Override button allows a temporary override to the current status of any channel, which is cancelled at the next programme time.

### Mode Button & Mode Display

The Mode button allows the User to change the operating mode of each channel at a touch: OFF, AUTO, ONCE, CONT. The Mode status is shown on the display, ensuring

the User is kept informed of this permanent override.

### Extra Hour Button

The Extra Hour button switches the system on for up to 3 extra hours without altering the programme. Pressing the button once will give 1 extra hour, and further presses increase the time by 1 hour for each press, up to a maximum of 3 hours. If the system was off, pressing the button will switch it on immediately. If the system was on, pressing the Extra Hour button extends the current programmed on period.

### Holiday Button (on 7 day models)

The Holiday button allows the User to switch off their heating for a specified number of days (1-99 days) while they are away from home. Normal operation resumes on the day of their return, ensuring significant energy savings with no loss of comfort.

### Choice of 3 Different Built-in Programmes

3 different built-in startup programmes are available with ST9000. These are based on the notions of 'standard', 'at home' and 'economy', so the correct programme can be chosen to suit the User's lifestyle.

### Installer Modes

ST9000 has a range of features that can be adjusted to suit the application and the needs or lifestyle of the User. These 'Parameters' are accessed and adjusted from within special Installer Modes.

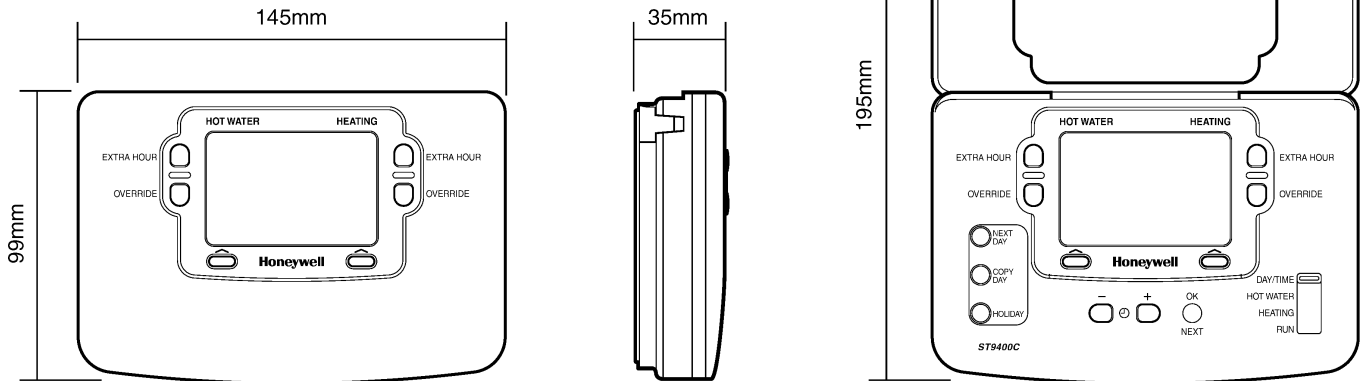
### 2 Level Battery Backup

The factory-set date and clock are maintained by a backup battery, from the time of manufacture to installation, and during any future power-cut. This is itself backed up by a super-capacitor which will maintain the real-time for more than 1.5 hours, should the battery ever fail.

### NVRAM Storage of Settings

All programmes and parameter settings are stored in a special kind of memory called NVRAM so they will be retained indefinitely even if there is no power source available, either from the mains or from a battery.

## DIMENSIONS



## INSTALLATION

### Location

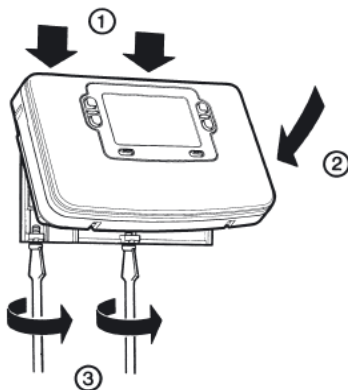
ST9000 is for use in normal domestic environments, and so should be located inside the house or building. Avoid locations with high levels of condensing moisture. As the product is an important control which can reduce energy consumption, it is strongly recommended that it is located where interaction with it is easy. ST9000 should be mounted at a level where the display can be seen clearly (1.2 to 1.5m from the floor) and the ambient temperature is within the range 0 to 40°C

### Mounting

If ST9000 is replacing an existing ST6000 product, then the existing wall-plate and wiring may usually be used, subject to any required electrical checks. ST9000 also fits on one of the main industry standard wall-plates, but is also supplied with its own wall-plate for any eventuality. To remove from unit the wall-plate, slacken the two securing screws at the bottom and hinge the unit up to separate the two halves. Ensure the mounting surface is supportive and fully covers the wiring wall-plate.

### Wiring

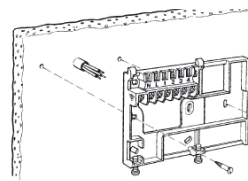
ST9000 is for fixed wiring only and must be installed in accordance with the latest I.E.E. regulations. Ensure the wiring connection to the supply is via a fuse rated at no more than 3 amps and a Class "A" switch (having contact separation of at least 3mm in all poles).



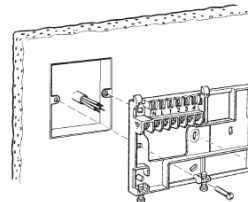
### Mounting Options

#### Recommended Clearance Distances

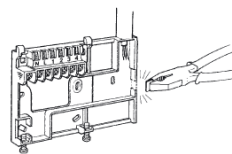
ABOVE WALLPLATE:	110mm
BELOW WALLPLATE:	100mm
LEFT/RIGHT OF WALLPLATE:	10mm



a. Surface mounting concealed wiring

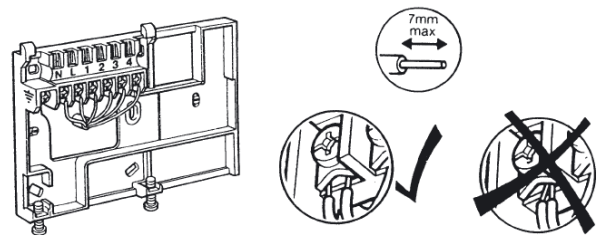


b. Flush switchbox  
Fixing holes are spaced to suit BS4662 requirements



c. Surface mounting with surface wiring in mini trunking

**CAUTION – isolate power supply and make safe before wiring the unit to prevent electric shock and equipment damage. Installation should be carried out by a qualified Electrician or competent Heating Engineer.**



### Final Assembly

Clip the unit onto the hinges on top of the wall-plate and hinge down into position. Tighten the two securing screws using a screwdriver.

## INSTALLER SETUP – ST9100A,C & ST9400A,C & ST9500C MODELS

The ST9000 has a special Installer Mode where some features can be adjusted to suit the application and the needs or lifestyle of the User. Each adjustable feature is called a **Parameter**. It is identified by a number, and has a range of values. These are shown in the table below:

INSTALLER PARAMETER	Parameter Number	LoT™ Display Description	Default Value	Range of Values	Description [LoT™ Display Description]
24hour or am/pm clock display	1	CLOCK MODE	12	12, 24	12 = am/pm display [AM PM] 24 = 24 hour display [24 HOUR]
Configure backlight operation	2	BACKLIGHT	2	0, 1, 2	0 = off, [NO B-LIGHT] 1 = on if button pressed, [B-L DELAY] 2 = on continuously [B-LIGHT]
Enable/disable auto time change	3	AUTO TIME	1	0, 1	0 = disabled, [NO CHANGE] 1 = enabled [TIME CHANGE]
* 1 day or 5/2 day or 7 day operation	4	UNIT TYPE	7	1, 5, 7	1 = 1 day operation, [1-DAY] 5 = 5/2-day operation, [5-2 DAY] 7 = 7 day operation [7-DAY]
Number of ON/OFFs per day	5	ON PERIODS	2 (for ST9400A) 3 (for ST9400C)	2, 3	2 = 2 on/off per day, [2 PER DAY] 3 = 3 on/off per day [3 PER DAY]
Select default time programme	6	DEF PROFILE	A	A, b, C	A = standard, [PROFILE A] b = at home, [PROFILE B] C = economy [PROFILE C]
** Configure Mini-Programmer	7	MINI-PROG	0	0,1	0 = standard programmer, [NO M-PROG] 1 = mini-programmer [M-PROG ON]
*** Reset all parameters	8	PROG RESET	1	0,1	0 = do not reset [RESET OFF] 1 = default parameters [RESET ON]

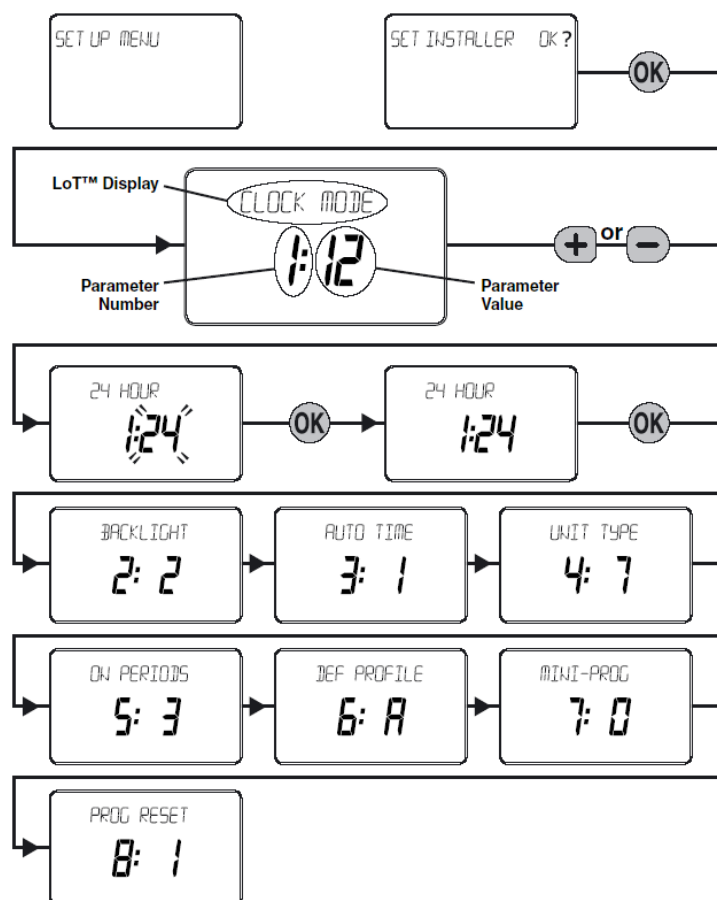
\* this parameter is NOT available on ST9100A or ST9400A, which are 1 day operation only

\*\* this feature is only available on ST9400A and ST9400C products

\*\*\* this parameter by default has a value of 1, unless any other parameter is adjusted, when it will change to 0. Set it to 1 to reset all parameters back to defaults

### To Enter Installer Setup:

- Ensure the slider is in the **RUN** position, then press and hold **OK** and **⊕** - buttons together for 8 seconds. Ignore the 'NOT VALID' that is displayed for a few seconds. The message 'SET UP MENU' will show briefly, followed by 'SET INSTALLER OK ?'
- Press the **OK** button to go into the Installer Mode Parameter Menu.
- Parameter 1 is now available to change. This is to allow a change to the clock format from 12 hour AM/PM to 24 hour. At every step, the *LoT™ Display* will indicate what the parameter means and what option has been selected. The parameter number is shown on the display separated by a colon from the parameter value.
- The parameter value can be changed by pressing the **⊕** - or **+** buttons. At this point the description in the *LoT™ Display* will change and the parameter value will flash. Pressing **OK** will stop the value flashing and will save it for use.
- Press **OK** to move to the next parameter available for editing. The parameter number will change accordingly.
- Keep pressing **OK** to step around the list of parameters, and use **⊕** - or **+** buttons to change the parameter value.
- Any parameter changes that have been confirmed with the **OK** button will be saved and used.



### To Exit Installer Setup:

Installer Setup can be exited at any time by moving the slider to the next position and then back again to **RUN**.

**Note:** Installer Mode will exit automatically after 10 minutes if the slider is not moved.



## BOILER SERVICE REMINDER / SHUT-DOWN FEATURE

### ST9100S and ST9400S Models

The ST9100S and ST9400S Service Interval timers have been developed to assist Social Housing Landlords to comply with the requirements of Regulation 36 of the Gas Safety (Installation & Use) Regulations 1998. They are intended as an aid to compliance but should not be used to replace the Landlord's existing Servicing procedures.

Both products perform like standard ST9000 products. In addition they can automatically provide a Service Reminder and can be set to Shut-down the heating / hot water system once the gas Boiler Service becomes overdue. This helps to eliminate the potential for an incident to occur after the Landlord's Safety Certificate has expired.

The operation of the Service Feature is flexible. The landlord or installer can set the following:

- The service interval, from 1 to 400 days
- An advance reminder for the tenant, by counting down the days until the service is due
- A telephone number to call to arrange the service – displayed on the LCD screen
- How the timer will operate when the service interval has expired. The options include:
  1. continued normal operation with a Reminder message
  2. total shutdown of heating and hot water
  3. "Prompt" mode – shutdown that will allow repetitive manual over-ride for one hour at a time.

The Service feature is configured from a special Installer Mode called 'SET SERVICE'. Entry into this mode is only possible by entering a unique 4 digit PIN code. The factory supplied PIN code is 0000.

Note – the products are supplied from the factory with the Service features DISABLED. They need to be enabled from the Installer Modes.

### Installer Modes

ST9100S and ST9400S have 3 Installer Modes that enable the product to be customized for the application and for the needs of the User. Each adjustable feature is called a Parameter, and is represented by a number or letter ID and a value. The Modes are:-

- **Installer Setup**  
This is the same as the Installer Setup for standard ST9000 time controls. It allows features to be adjusted to suit user lifestyles or preferences, for example; backlight operation, automatic time-change, and selection of the default time programme. It is entered by a combination of button presses.
- **Set Service**  
This is where the ST9400S Boiler Service Reminder and Shut-down Features can be set. This mode can only be entered by using a 4 digit PIN code. The factory supplied default PIN code is 0000
- **Change PIN**  
This mode allows the 4-digit PIN code to be adjusted. It is itself protected by the PIN code. When the code is changed this new code is used to enter both SET SERVICE and CHANGE PIN modes.

### What the User will See When a Service is Due

If the advance warning has been configured, the screen will flash this message every few seconds, and the User should telephone to arrange a service call before the final date when the service is due. When the boiler service is overdue the screen will keep flashing the words "SERVICE DUE" every second.



If the **NO ACTION** option has been selected, the unit will continue to operate as normal and the real time will continue to be shown



If the **SWITCH OFF** or **PROMPT** Actions have been selected, the 'SERVICE DUE' message will flash and the word "OFF" will appear on the display. The boiler has been switched off to ensure the safety of the User. A service appointment should be arranged immediately.



In **PROMPT** operation, the User can obtain limited use of the boiler by pressing any **EXTRA HOUR** button. Each button press will allow operation of the boiler for 1 hour at a time, and the screen will display the message "On1h", as shown. A service appointment should be arranged immediately.



If a contact telephone number has been programmed into the product, a message will appear on the LoT™ Display indicating the number that should be called.

### Resetting the Service Timer Function

After the boiler service has been carried out it will be necessary to reset the Service Timer function.

If the product was found to be in the OFF mode, it will be necessary to perform this reset before the gas service, in order to get the time control to operate.

From the **Set Service** Installer Mode, there are 2 possible ways to reset the function:

- If the service timer is no longer required, disable it.
- If the timer is still required, set the number of days till the next service is due

Whilst in the Set Service mode it is possible to adjust the operation of the feature in other ways, if required.

## SET SERVICE – ST9100S AND ST9400S MODELS

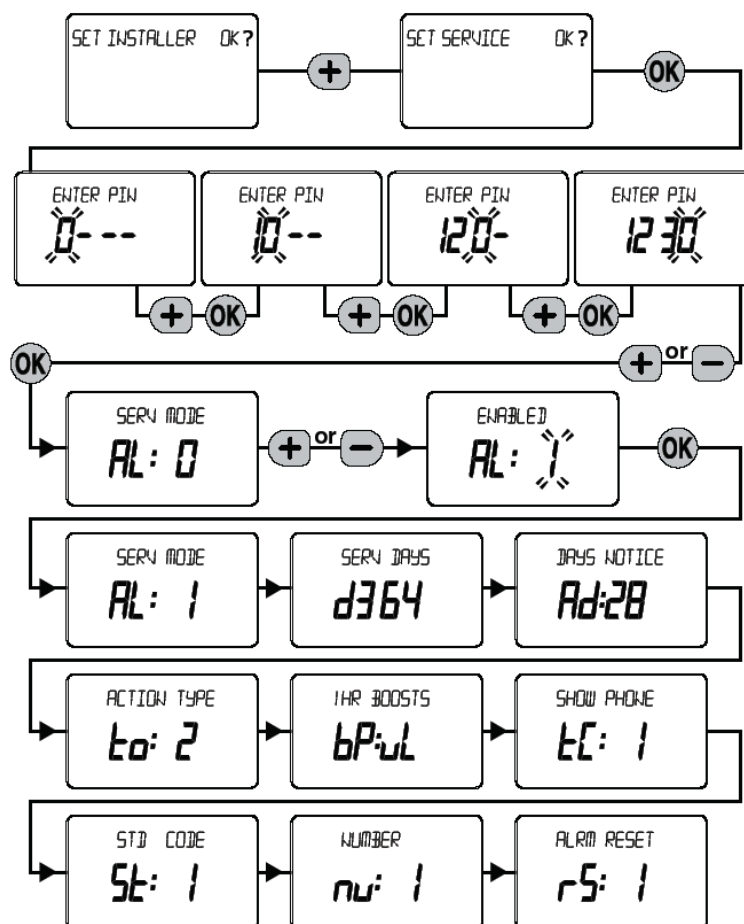
The Set Service mode is where the operation of the Boiler Service Reminder / Shut-down features is set. Each adjustable feature is called a **Parameter**. It is identified by an ID, and has a range of values. These are shown in the table below:

'SET SERVICE' PARAMETER	Parameter ID	LoT™ Display Description	Default Value	Range of Values	Description [LoT™ Display Description]
Enable or disable service alarm	AL	SERV MODE	0	0, 1	0 = disabled [DISABLED] 1 = enabled [ENABLED]
Number of days till next Service	d	SERV DAYS	364	001 to 400	001...400 [SET DAY COUNT] 000 = service is overdue
Number of days for advance warning	Ad	DAYS NOTICE	28	0 to 28	0 ...28 [SET DAYS NOTICE]
Action taken at time-out	to	ACTION TYPE	2	0, 1, 2	0 = no action, [NO ACTION] 1 = switch off, [SWITCH OFF] 2 = 'prompt' mode [PROMPT MODE]
Number of EXTRA HOUR presses in 'Prompt' mode	bP	1HR BOOSTS	uL	uL, 1 to 99	uL = unlimited number, [NUM BOOSTS] 1...99 = specified number of button presses, after which unit switches off
Enable telephone call number display	tC	SHOW PHONE	0	0, 1	0 = disabled [DISABLED] 1 = enabled [ENABLED]
Enter telephone STD code	St	STD CODE	-----	1	When a + or - button is first pressed the LoT™ Display shows a row of dashes which can be adjusted using + or - buttons, then verified using OK button.
Enter telephone number	nU	NUMBER	-----	1	When a + or - button is first pressed the LoT™ Display shows a row of dashes which can be adjusted using + or - buttons, then verified using OK button.
* Reset parameters to default values	rS	ALRM RESET	1	0,1	0 = do not reset [NO RESET] 1 = default parameters [RESET]

\*This parameter by default has a value of 1, unless any other parameter is adjusted, when it will change to 0. Set it to 1 to reset all parameters back to defaults

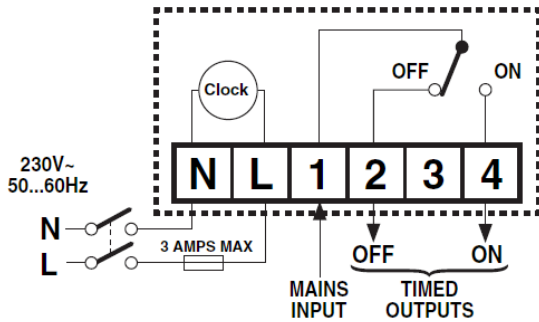
### To Enter Set Service:

- From the Setup Menu, in response to the query 'SET SERVICE OK ?' press the **OK** button to enter SET SERVICE.
- The message 'ENTER PIN' will now be displayed, along with the 4-digit entry code format 0---. The first digit will be flashing, to indicate it can be changed. Use the **+** - or **+** buttons to set the first digit, and press **OK** to confirm the digit.
- At this point the first digit will stop flashing and the second digit will proceed to flash, indicating it can be changed.
- Proceed in this way to enter the 4 digits of the PIN code. Upon confirming the last digit, if the PIN was incorrect, the message 'INVALID' will be displayed, and then the whole process will start again from step b. above.
- If the PIN was correct, the first SET SERVICE parameter AL will be available to change. This allows all the service alarm features to be enabled or disabled. At every step, the LoT™ Display will indicate what the parameter means and what option has been selected. The parameter ID is usually shown on the display separated by a colon from the parameter value.
- The parameter values can be changed by pressing the **+** - or **+** buttons. At this point the description in the LoT™ Display will change and the parameter value will flash. Pressing **OK** the stop the value flashing and will save it for use.
- Press **OK** to move to the next parameter available for editing. The parameter ID will change accordingly.
- Keep pressing **OK** to step around the list of parameters, and use **+** - or **+** buttons to change the parameter value.
- Any parameter changes that have been confirmed with **OK** will be saved and used. Some parameters will be made invalid by a previous parameter setting, and these will be skipped over in the setting process.
- Exit by moving the slider to the next position and then back again to RUN.



# WIRING CONNECTIONS – ST9100A,C

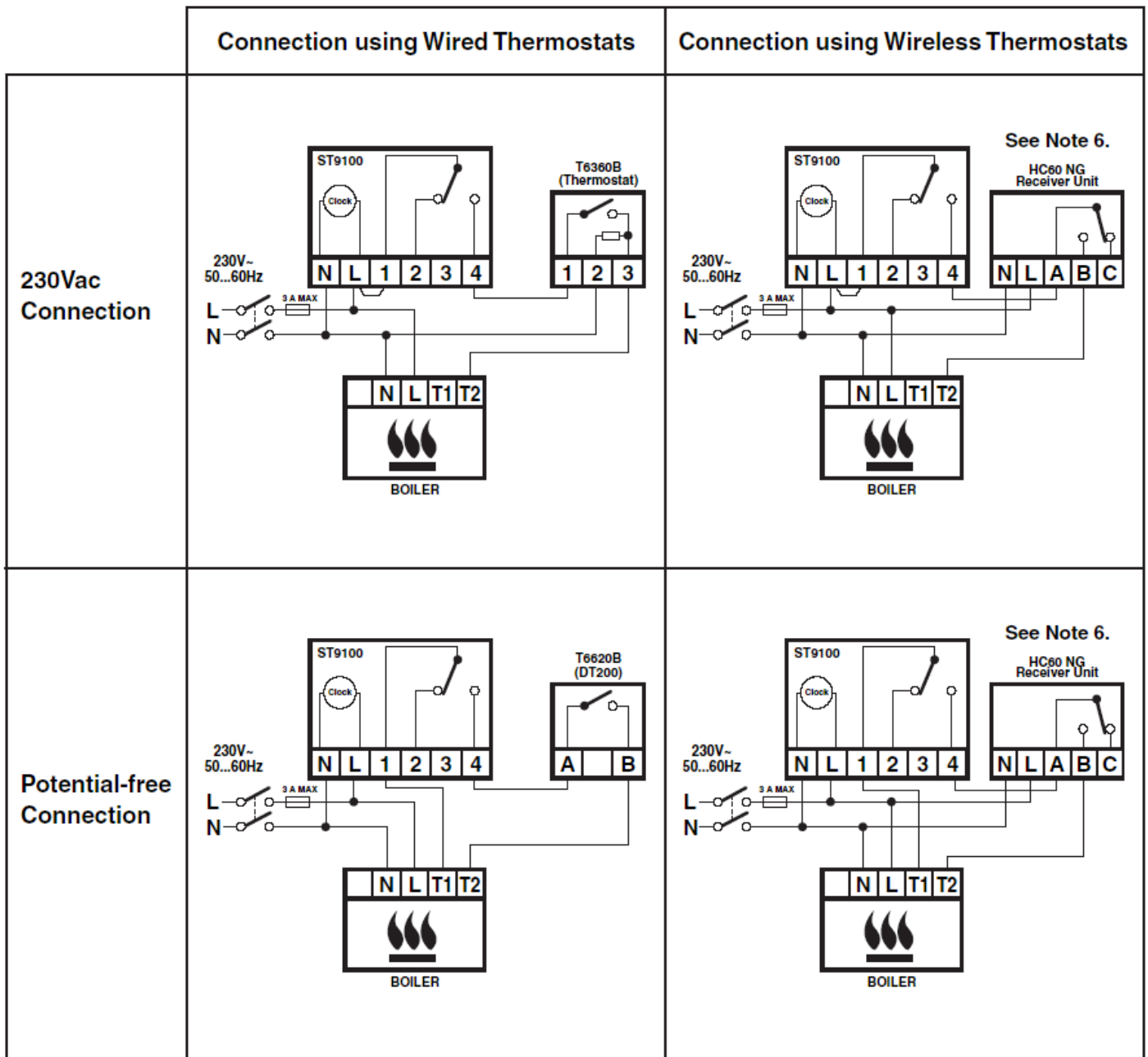
## ST9100 Internal Wiring



## Notes

1. ST9100 is suitable for contact-closure potential free or mains voltage switching.
2. If normal mains voltage is required, link terminals L and 1.
3. The ST9100 is a Class II (double-insulated) device. A parking terminal is provided for earth wiring continuity, if required.
4. Where applicable, the ST9100 may also be used to control hot water systems independently.
5. Where applicable, multiple ST9100 timers may also be used to control Heating and Hot Water systems independently.
6. When connecting to a wireless receiver unit, the receiver MUST have permanent mains power from the fused spur, to operate correctly.

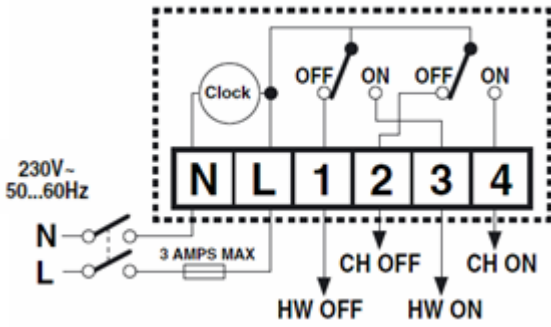
## Connections to Combi Boiler





# WIRING CONNECTIONS – ST9400A,C,S

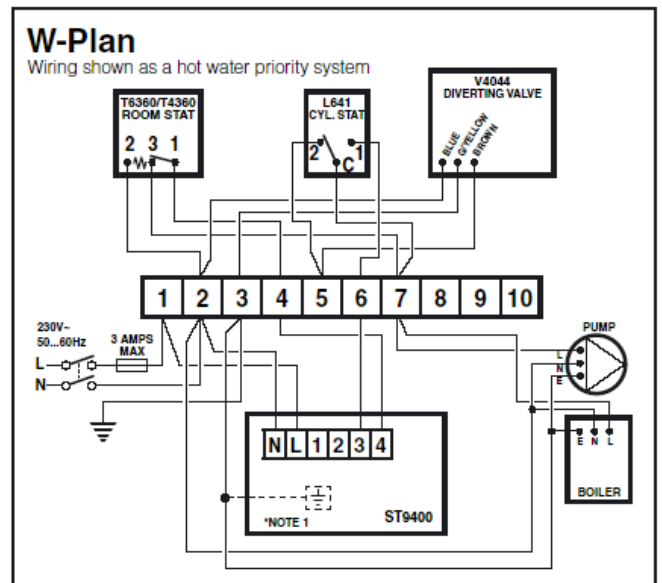
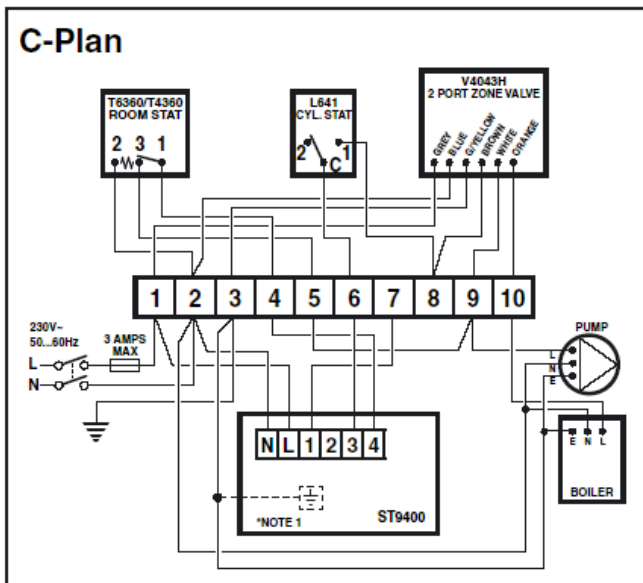
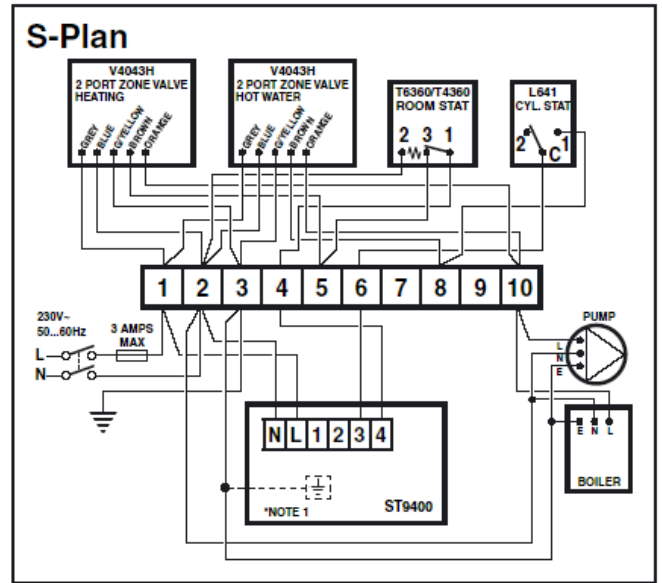
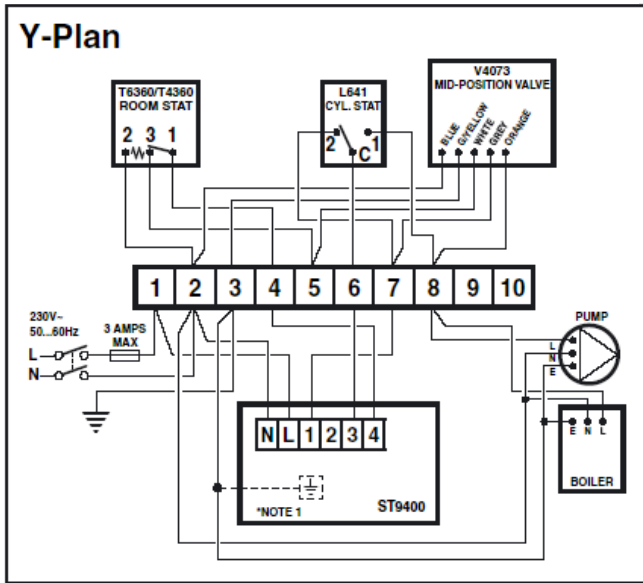
## ST9400 Internal Wiring



## Notes

1. The ST9400 is a Class II (double-insulated) device. A parking terminal is provided for earth wiring continuity, if required.
2. In the Sundial S Plan, W Plan, and Y Plan wiring diagrams, connections are shown to basic boilers only. For wiring connections to Pump over-run boilers refer to Boiler manufacturers' instructions or to Honeywell for assistance.
3. It is recommended that gravity circulation hot water systems are fitted with a suitable hot water control valve as shown in the Sundial C Plan system. For systems installed without this valve, ST9400 can be configured as a Mini Programmer. This is done within the Installer Mode. Refer to Honeywell for details of suitable wiring schematics.

## Sundial Plan Wiring Diagrams



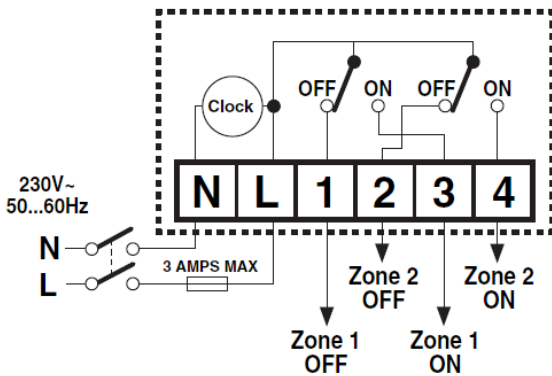
## Alternative Wiring Connections for other Honeywell Room Thermostats

Y-Plan, S-Plan, and C-Plan Systems										
10-WAY WIRING STRIP	1	2	3	4	5	6	7	8	9	10
Honeywell T6360 ROOM-STAT		2		1	3					
Honeywell ELECTRONIC THERMOSTAT (BATTERY POWERED)				A	B					
Honeywell WIRELESS THERMOSTAT (RECEIVER UNIT) *	L	N		A	B					

W-Plan System										
10-WAY WIRING STRIP	1	2	3	4	5	6	7	8	9	10
Honeywell T6360 ROOM-STAT		2		1				3		
Honeywell ELECTRONIC THERMOSTAT (BATTERY POWERED)				A				B		
Honeywell WIRELESS THERMOSTAT (RECEIVER UNIT) *	L	N		A				B		

# WIRING CONNECTIONS – ST9500C

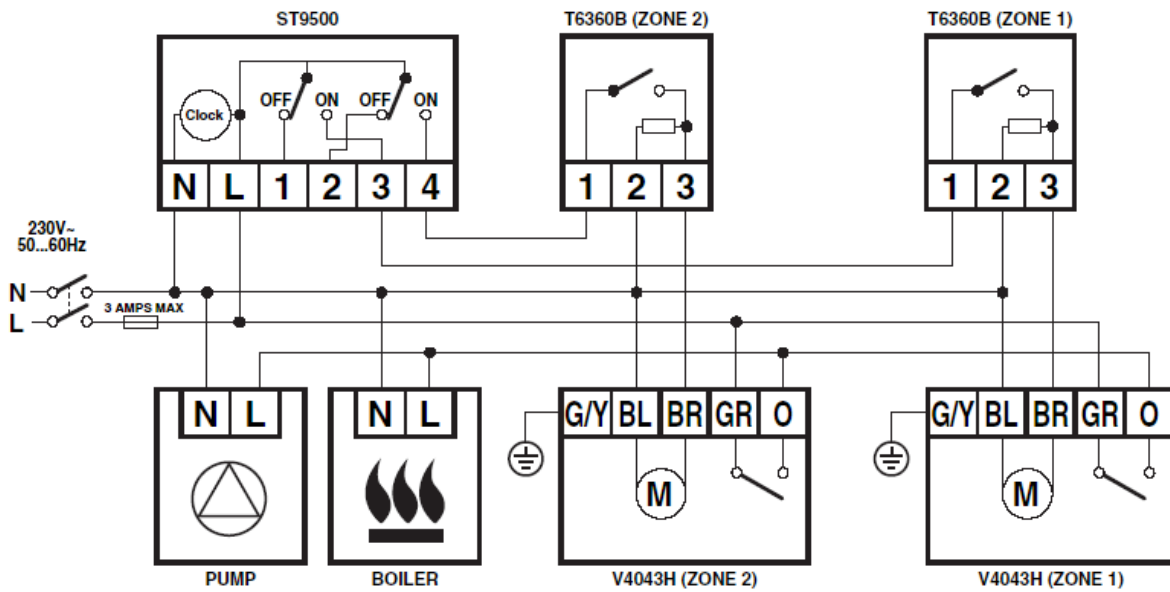
## ST9500 Internal Wiring



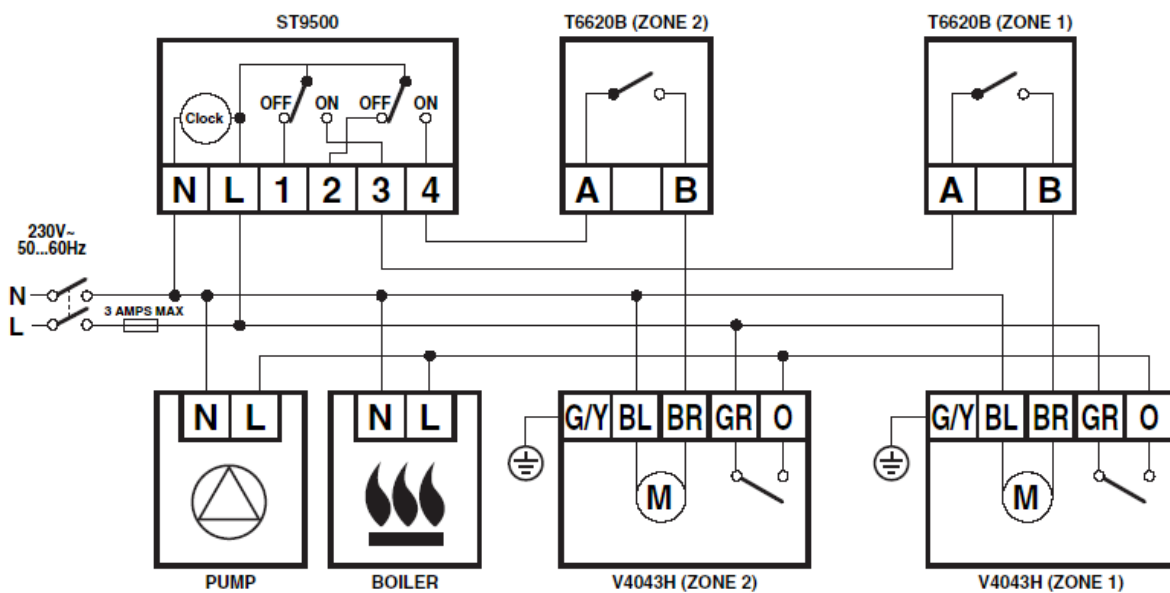
## Notes

1. The ST9500 is a Class II (double-insulated) device. A parking terminal is provided for earth wiring continuity, if required.
2. In the wiring schematics below, connections are shown to basic boilers only. For wiring connections to Pump over-run boilers refer to Boiler manufacturers' instructions or to Honeywell for assistance.
3. Wiring schematics are shown for 2 Zone control using ST9500C and 2 Zone valves. Please refer to Honeywell for other wiring and control options.

### Control using Zone-valves: Wiring to Mechanical Thermostats

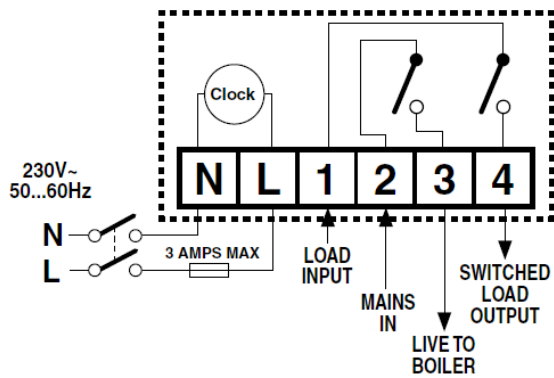


### Control using Zone-valves: Wiring to Digital Thermostats



# WIRING CONNECTIONS – ST9100S

## ST9100S Internal Wiring



## Notes

1. The ST9100S is a Class II (double-insulated) device. A parking terminal is provided for earth wiring continuity, if required.
2. The ST9100S is a single channel timer designed for combi-boiler installations, and can be wired to shut down both heating and hot water after the service period.
3. Wiring can be done all at 230Vac, or the boiler control output connections can be contact closure potential free.
4. Where applicable, the ST9100S may also be used to control hot water systems independently.
5. Where applicable, multiple ST9100S timers may also be used to control Heating and Hot Water systems independently.
6. When connecting to a wireless receiver unit, the receiver **MUST** have permanent mains power from the fused spur, to operate correctly.

		Standard Connection to Combi Boiler (with Service shut-down of heating only)	Boiler Service Connection to Combi Boiler (with Service shut-down of both heating & hot water)
230Vac connection	Wired		
	Wireless		
Potential free connection	Wired		
	Wireless		

## REPLACING OTHER HONEYWELL TIME CONTROLS

When using ST9000 models to replace other Honeywell time controls, the equivalent wiring terminations are shown in the tables below. In general, if the ST9000 product is replacing an existing Honeywell ST6000 product, then the existing wall-plate and wiring may be used, subject to any required electrical checks. (ST6000 is the family name for ST6100, ST6200, ST6300, ST6400 products.)

### Using ST9100A,C Timers

ST6100A, ST6100C	L	N	1	2	4
ST9100A, ST9100C	L	N	1	2	4

ST6100S	L	N	1		4
ST9100A, ST9100C	L	N	1		4

**Note:** ST6100S1000 should be replaced by ST9100S

If ST9100A or ST9100C are used for replacing ST6100S, refer to Honeywell for guidance. The Service timeout feature will not be available in this case, and wiring may have to change, depending on the application. The wiring shown here is for guidance only.

ST7000B	L	-	-	2	3
ST9100A, ST9100C	L	N	1 link to terminal L	2	4

**Note:** a permanent mains supply must be provided for the ST9100 timer

### Using ST9100S Timers

ST6100S	L	N	1	2	3	4
ST9100S	L	N	1	2	3	4

**Note:** If ST6100S terminals 2 and 3 do not have wires connected to them, there is no need to connect wires to ST9100S terminals 2 and 3.

ST6100A, ST6100C	L	N	1	2	4
ST9100S	L	N	1	*	4

\* **Note:** If a connection is required at terminal 2 of the product to be replaced, the TS9100S cannot be used for this application. Use ST9100A or ST9100C instead.

ST7000B	L	-	-	2	3
ST9100S	L	N	1 link to terminal L	2	4

**Note:** a permanent mains supply must be provided for the ST9100S timer

### Using ST9400 Programmers

ST6200/ST6300/ST6400	L	N	1	2	3	4		
ST9400	L	N	1	2	3	4		

ST699/ST799	L	N	3	4	5	6	7	8
ST9400	L	N	4	2	not connected	3	1	not connected

ST7100	L	N	3	4	5	6	7	8
ST9400	L	N	not connected	2	4	not connected	1	3

ST7000A	L	-	2	3	4			
ST9400A/ST9400C	L	N	1	3	4			

**Note:** A permanent mains supply must be provided for the ST9400 Programmer, and ST9400 must be configured as a Mini-Programmer

## REPLACING OTHER MANUFACTURERS' TIME CONTROLS

ST9000 products will mount directly onto many existing manufacturers' back-plates, without the need for re-wiring. However, they are also supplied complete with a wiring back-plate, should this not be the case.

Refer to Honeywell for wiring conversion diagrams.

## ST9400 MINI-PROGRAMMER OPERATION

It is recommended that gravity circulation hot water systems are fitted with a suitable hot water control valve as shown in the Sundial C-Plan system.

For systems installed without this valve, ST9400A and ST9400C models can be configured as a Mini-Programmer. This is done within the Installer Setup (see page 5 for details). Refer to Honeywell for details of suitable wiring schematics.

In a gravity circulation hot water system, whenever the boiler comes on to service the heating, there will inevitably be some circulation through the hot water storage tank, which will then heat up.

So, whenever the HEATING is ON, the HOT WATER is also ON.

It is therefore NOT possible to have *independent* programmes for heating and hot water.

### Implications of Setting ST9400 as a Mini-Programmer

1. Independent programmes for heating and hot water are not possible, so the installation is not fully compliant with the current edition of the UK Building Regulations.
2. It is only necessary to enter one time programme, and this is done by entering a programme for the **Heating**. The Hot Water timing will then follow the same programme.
3. Certain combinations of Heating Mode and Hot Water Mode are not allowed. The combinations that are allowed in the software are shown in the table below:

Heating	Hot Water
OFF	OFF
OFF	AUTO
OFF	ONCE
OFF	CONT.
AUTO	AUTO
AUTO	ONCE
AUTO	CONT.
ONCE	ONCE
ONCE	CONT.
CONT.	CONT.

## FAULT-FINDING

Troubleshooting assistance for each ST9000 model is given in the Installation Instructions supplied with the product. Some common problem symptoms are detailed below, along with suggested causes and possible remedies.

Symptom	Possible Cause	Remedy
ST9000 has a blank LCD display	No power to the heating system	Check that there is power to the heating system
	Fault in ST9000	Call Installer
ST9000 indicates that Heating and/or Hot Water are ON, but radiators are cold and/or taps are running with cold water.	Temperature controls are switched off or set too low	Check that the temperature controls in the system are set to appropriate levels
	Boiler or other system controls have malfunctioned	Call Installer
ST9000 shows the message 'INTERNAL FAULT'	Fault in ST9000	Call Installer
For ST9400, when the slider is moved to the HOT WATER position, the display says 'NOT VALID'	ST9400 has been configured as a Mini-Programmer	ST9400 may have been configured as a Mini-Programmer. Call Installer to check if this is correct for the heating system.



## ENERGY EFFICIENCY AND THE ENVIRONMENT

Home energy use is currently responsible for more than ¼ of the total UK carbon emissions which contribute to climate change. Heating and hot water systems based on boilers account for 2/3 of this figure, so it is important to understand how controls can help to maximize energy efficiency while maintaining comfort.

ST9000 time controls should be used in conjunction with appropriate temperature controls.

In order to save energy the following general points should be observed:

1. Ensure the system contains a room temperature thermostat and a hot water temperature thermostat (except for Combi-boiler systems), and that both are set to appropriate temperature levels.
2. Programme the heating and hot water to be off when the house is not occupied. If possible frost damage to any exposed pipe-work is a concern, it is advisable to fit a frost protection thermostat or system – Honeywell can advise on this.
3. It is normal to have the heating system switched off at night when heating is not required.
4. Think about how domestic hot water is used – in a storage system, it is not necessary to have this switched on all the time, even when the house is occupied.
5. Do not programme excessive heatup times for the central heating. If the occupier is out of the house, or still in bed, much of this heating would be unnecessary.
6. In the evening, when the house is up to temperature, it is often possible to switch the heating off up to an hour before going to bed, without any noticeable reduction in comfort.

## ORDERING SPECIFICATION

Description	Model	Manufacturing Location
1 day Timer	ST9100A1008	All products made in the U.K.
7 day Timer	ST9100C1006	
1 day Service Interval Timer	ST9100S1007	
1 day Programmer	ST9400A1002	
7 day Programmer	ST9400C1000	
1 day Service Interval Programmer	ST9400S1001	
7 day 2-Zone Programmer	ST9500C1015	

## TECHNICAL ASSISTANCE

Technical Help Desk: 08457 678999

[www.honeywelluk.com](http://www.honeywelluk.com)

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