Smartzone LCD

TOUCHPAD USER GUIDE

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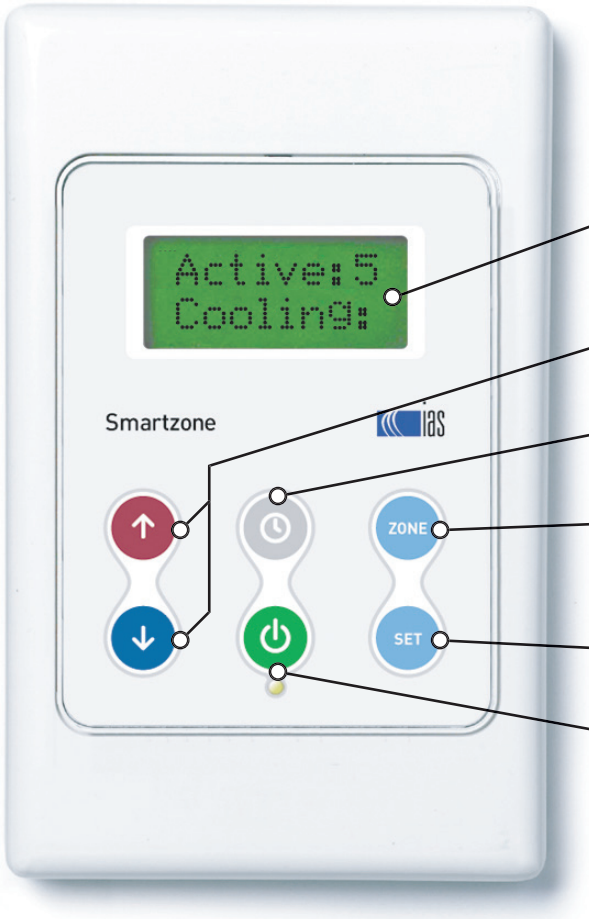
SMARTZONE LCD
TOUCHPAD USER GUIDE

Touchpad and Display Layout



Dual Line Back lit LCD Display
With scrolling zone summary

Change variable values
Cycles both directions through zones

Timeclock Access
Optional clock module required

Change displayed zone
Cycles through all zones and back to the zone summary screen

Change temperature of the selected zone
Hold in for 10 seconds to name the selected zone

Turns zones On/Off
Green LED below indicates status

RC-SZ-PLUS-LCD-IC-EA

Overview

The Smartzone Zoning System, when installed with the optional Smartzone Bridge module and a compatible IAS unit controller (thermostat), communicates with the thermostat to automatically control the thermostat's mode selection and setpoint adjustment.

Without these modules it is necessary to set the operating mode (heating or cooling) and the setpoint from the thermostat that was supplied with the A/C unit as follows (refer to the instructions for the thermostat for details).

If the majority of zones require cooling, set the operating mode of the thermostat to cooling and make the setpoint of the thermostat 0.5°C less than the lowest zone setpoint.

If the majority of zones require heating, set the operating mode of the thermostat to heating and make the setpoint of the thermostat 0.5°C more than the highest zone setpoint.

This additional 0.5°C ensures that the unit continues to run until all zones reach setpoint.

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Selecting a Zone

1. Press ZONE or ↑ and ↓ to cycle from the zone summary screen, through each of the individual zone status screens.
   The zone summary screen is depicted in the image on page 2.

Activating / Deactivating Zones

1. Press ZONE or ↑ and ↓ to select the zone to be activated / deactivated. The current status of the selected zone is displayed on the second line of the LCD read-out.
2. Press ⏻ to turn the zone ON or OFF as required. The green LED below the button indicates the zones on/off status.

Alternatively, all zones can be activated / deactivated simultaneously by the selecting the zone summary screen then pressing ⏻.

Setting a Zone Temperature

1. Press ZONE or ↑ and ↓ to select the target zone.
2. Press SET.
3. Use ↑ or ↓ to adjust the set point to the desired level.
4. Press SET to save and exit.

Naming Zones

Zone names must be eight characters in length. A blank character must be used to fill spaces where no letters are required.

1. Press (ZONE) or (↑) and (↓) to select the zone to be named.
2. Press and hold (SET) for approximately ten seconds, until the display reads `Z1 Name:` .
3. Use (↑) and (↓) to view all of the preset zone names.
4. Press (SET) on your choice (e.g. `Lounge`, `Games` or `Custom`). See tip below.
5. Use (↑) or (↓) to change the first character of the zone name if required. Press and hold (↑) or (↓) to scroll quickly through the available characters.
6. Press (SET) to move to the next character. Press (ZONE) to return to the previous character to correct a mistake.
7. Repeat steps 5 & 6 for all eight character spaces.
8. Pressing (SET) to accept the final character will save the zone name and the controller will return to the standard display.

Tip: To accept one of the preset zone names, press (SET) repeatedly to accept each character including any blanks until the controller reverts to the standard display.

Setting the Clock

(Optional Clock Module Required)

1. Press (ZONE) or (↑) and (↓) to select the zone summary screen.
2. Press (🕒) to display the current time and date.
3. Use (↑) or (↓) to alter the highlighted hours value then press (SET).
4. Repeat Step 3 for the minutes and day values. Pressing (SET) after the day value will return you to the zone summary screen.

Setting the Individual Zone Clock Programs

(Optional Clock Module Required)

1. Press (ZONE) or (↑) and (↓) to select the required zone.
2. Press (🕒) to display the current program days for that zone.
3. A CAPITAL letter indicates that the On/Off times will apply to that zone on that day. Use (↑) or (↓) to alter each day to the correct value then press (SET) to move to the next day.
4. Repeat Step 3 for each day. Press (SET) after the final day value to enter the Start time screen.
   (Note: If no days have been selected the configuration routine will exit at this point)
5. Use (↑) or (↓) to alter the start time to the correct value (in 10 minute intervals) then press (SET) to proceed to the Stop time screen.
   PM is indicated by a "p" after the time.
6. Repeat Step 5 for the Stop time then press (SET) to complete setting the program for that zone and return to normal operation.
7. Repeat Steps 1 to 6 for each zone as required.

Commissioning Instructions - For Initial Setup

CAUTION: Making adjustments to systems setting may adversley affect system operation.

INSTALLER TIP: Make up a short cable and perform steps 1 to 8 with the touchpad in the ceiling space next to the main modules

1. Before applying power to the system.

- Ensure that all core modules are firmly connected together via the DB9 connector and that the modules are fixed in place so they cannot come apart.
  THESE MODULES MAY BE DAMAGED IF THEY ARE SEPARATED WHILE POWER IS APPLIED TO THE SYSTEM.
- Ensure that all touchpads, sensors and motors are connected as per the connection diagram supplied.
  DO NOT CONNECT SENSORS TO MOTOR OUTPUTS. SENSORS MAY BE DAMAGED IF POWER IS APPLIED IN THIS CASE.
- Ensure the air conditioning system is OFF.

2. Spill Zone Configuration

- If there is no dedicated bypass damper installed, a spill zone(s) may be designated by turning on one or more of the spill DIP switches on the Main Processor Module.

3. Initial Power Check

When power is applied to the system, the startup routine will drive all zone damper motors to the fully open position, the dedicated bypass damper (if installed) will drive to the fully closed position, then all dampers will drive to the appropriate position as dictated by the zone status, and, if the zone is on, the system conditions.

- Connect the 24V power supply to the Smartzone system.
- Check the main modules for fault LEDs (any red LED indicates an excess current fault on the output - generally a cable short)

4. System Configuration - Set Motor Time (Low Profile Model Only)

Smartzone utilises a time proportional damper positioning algorithm.
IAS offers 2 motors with different drive speeds for use with Smartzone:
The DM4-IC requires the motor drive time to be set to 17 seconds (default).
The DM4C-IC requires the motor drive time to be set to 100 seconds.

For backward compatibility the times listed below should be used with the following superceeded motors.
The DM2-IC motor with manual clutch requires a drive time of 170 seconds.
The DM2-IC motor without a clutch requires the drive time to be 20 seconds.

NOTE: All motors connected to a single system must be the same type.

- Press (ZONE) to select the zone summary screen. The display should read `Active:x` (where x is the number of zones currently on).
- Press and hold both (↑) and (↓) for 10 seconds until the LCD display reads `Mot Time` on the top line. The default drive time is 17 seconds.
- Use (↑) and (↓) to alter the motor drive time to the correct value, then press (SET) to proceed to the next step.

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5. System Configuration - Set Spill Air Setpoint

The Spill Air Setpoint value can be determined by one of the methods described in Appendix A on page 15.

- The display should now read `SpillSet` on the top line.
- Use ↑ and ↓ to alter the spill air setpoint, then press SET to proceed to the next step.

6. System Configuration - Set Minimum Ventilation Parameters

The Smartzone can be programmed to allow a minimum airflow to all zones that are ON. This is adjustable from 0 to 30 % open and defaults to zero. This value effects all ON zones equally.

The zone motors will close fully when the zone is turn turned OFF.

- The display should now read `Min Vent` on the top line.
- Use ↑ and ↓ to alter the minimum ventilation setting and press SET to proceed to the next stage.

7. System Configuration - Set Supply Air Safety Setpoints

The supply air safety minimum & maximum set points reduce the risk of damage to the system due to over cooling or heating. When these points are reached, all dampers open to maximise airflow across the coil.

Refer to the unit manufacturers documentation to ascertain the minimum and maximum air off coil temperature.

- The display should now read `LoSA=xx` (where xx is the current supply air safety minimum temperature. Default = 8°C. Below this is the current supply air temperature in brackets).

- Use ↑ or ↓ to change the minimum supply air safety set point and then press SET to proceed to the next step.
- The display should now read `HiSA=xx` (where xx is the default supply air safety maximum temperature. Default = 65°C).
- Use ↑ or ↓ to change the maximum supply air safety set point and then press SET to save and exit system configuration.

8. Zone Configuration - Set Zone Weights (Low Profile Model Only)

Each zone on the Smartzone is assigned a virtual zone weight. The default value for all zones is 5. Adjusting the zone weights enables the system to compensate for differences in zone size. Changing the zone weight for a zone effects the balance of the spill algorithm.

For more information on zone weighting refer to Appendix B on page 18.

- Press ZONE to select the target zone.
- Press and hold both ↑ and ↓ for 10 seconds until the LCD display reads `zWeight=` on the top line.
- Use ↑ and ↓ to adjust the zone weight value, then press SET to save and exit.
- Repeat for each zone as required.

9. Sensor Check

Verify each sensor is sending accurate temperature data.

An open circuit sensor will not be displayed when cycling through the zones.

An extreme temperature reading (over 60°C) indicates a short circuit on the cable, plugs or sockets connecting the sensor.

- Position an accurate temperature probe adjacent to the relevant sensor.
- Press (ZONE) to select the zone, then press (SET) to check the sensor reading (displayed on the bottom line).
- Use (↑) or (↓) to make each zone's setpoint 15°C, then press (SET) to save and exit.
- Repeat for each zone.

10. Damper Motor Check

TIP: The zone dampers to each zone will not open until the supply air temperature is less than the actual zone temperature when the system is in cooling mode.

- Select the zone summary screen and press (⏻) to turn all zones on.
- Turn on the A/C system and set the thermostat to maximum cooling.
- Ensure there is air flow to each zone in the ON state.
- Turn off one zone at a time starting with the spill zone(s).
- Ensure there is no airflow to zones in the OFF state.
- Verify and record the address of each zone in the Zone Address Table provided on page 14 to ensure accurate labelling (e.g. Zone 1 = Bed 1, Zone 2 = Living, etc.).

11. Spill Check

- Turn all zones OFF one at a time.
- Verify the spill/bypass zone(s) activates when the spill setpoint is reached.

12. Name the zones

Refer to page 6 for instructions regarding naming zones.

13. Touchpad Configuration

If more than one LCD touchpad has been installed, each touchpad can be configured to restrict access to a subset of the total number of zones.

- Set the touchpad DIP switches on the back of the touchpad to allow access to the required zones as per Table 1.

LCD Touchpad Zone Selection Configuration

SWITCH 1	SWITCH 2	SWITCH 3	SWITCH 4	TOUCHPAD WILL ACCESS ZONE(S)
OFF	OFF	OFF	OFF	All Zones (default)
ON	OFF	OFF	OFF	1 only
OFF	ON	OFF	OFF	2 only
ON	ON	OFF	OFF	3 only
OFF	OFF	ON	OFF	4 only
ON	OFF	ON	OFF	5 only
OFF	ON	ON	OFF	6 only
ON	ON	ON	OFF	7 only
OFF	OFF	OFF	ON	8 only
ON	OFF	OFF	ON	1 & 2 only
OFF	ON	OFF	ON	3 & 4 only
ON	ON	OFF	ON	5 & 6 only
OFF	OFF	ON	ON	7 & 8 only
ON	OFF	ON	ON	1, 2, 3 & 4 only
OFF	ON	ON	ON	5, 6, 7 & 8 only
ON	ON	ON	ON	1, 2 & 3 only

Table 1.

14. Final Check

Verify all zones are approaching set point.

Complete the table below to ensure an accurate record of the physical zone layout is available.

ZONE ADDRESS TABLE		
Zone Number	**Zone Name** (e.g. Living, Bed 1 etc.)	**Zone Weight**
1		
2		
3		
4		
5		
6		
7		
8		
Spill Zone(s) =		

Appendix A - Spill/Bypass Setpoint

Overview

The Smartzone's ingenious **bypass** system is the key to how it cycles the main plant without the need for complex wiring. The Smartzone constantly monitors the position of the dampers via the time proportional damper positioning (TPDP) system. When the predetermined **spill** set point is reached, the Smartzone begins to open the **spill/bypass** damper and stimulates the main plant controllers return air sensor with conditioned air (supply air).

If the main plant controller is operating in heating mode the introduction of warm supply air stimulates the thermostat's return air sensor, causing the A/C unit to cycle off as the Smartzone is cycling the zones off.

If the main plant controller is operating in cooling mode the introduction of cool supply air to the return air system achieves the same result.

The **spill/bypass** damper can be connected in one of two ways.

Option 1 - Bypass Damper

A duct is installed connecting the supply air duct to the return air duct via the **bypass** damper. The Smartzone's main processor module provides an output dedicated to this function. This then leaves all other motor outputs free to control up to eight zones. The plant controllers return air sensor must be placed in a position between the bypass inlet to the return air duct and the A/C plant.

NOTE: If the main plant controller cycles the indoor fan off between calls for heating, any sensor positioned in the return air duct will be isolated from the room condition when the air flow is halted. OPTION 2 MUST BE USED IN THIS SITUATION.

Option 2 - Spill Zone

One or more **spill** dampers can be used to control the temperature of zones immediately adjacent the return air grille. Under normal operation the **spill** damper(s) will operate as normal zones, but when the **spill** set point is reached the **spill** zone(s) open to relieve duct pressure and cycle the main plant off.

NOTE: When Option 2 is used, the spill zone(s) immediately adjacent the return air grille may experience temperature variations, of between 0.5 °C and 1 °C, either side of set point. Therefore it is necessary to set the temperature of the spill zone higher than the main plant controller set point in cooling mode and lower than the main plant controller set point in heating mode.

Methods for Calculating Spill/Bypass Setpoint

The spill air set point can be determined by utilising one or all of the following methods:

a. **Air Quantity**
b. **Supply Air Temperature**
c. **Diffuser Noise**

The factory default spill setpoint is 33% of total zones open. Refer to page 8 for details on how to adjust the spill setpoint.

The following proceedures should be carried out when the system is set for maximum conditioning.

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Appendix A

Air Quantity

Contact the unit manufacturer and ascertain the minimum approved air quantity for the system.

Place an anemometer and hood at the return air grille and commence turning off zones one at a time.

When the minimum approved air quantity is reached, calculate the number of open dampers as a percentage of the total number of zones. This is your spill air set point.

E.G. $\frac{\text{No. of Dampers Open}}{\text{Total No. of Dampers}} \times 100$

Supply Air Temperature

Contact the unit manufacturer and ascertain the minimum approved air off coil temperature.

Place an accurate digital thermometer in the supply air stream as close to the coil as possible and commence turning off zones one at a time.

When the minimum approved air off coil temperature is reached, calculate the number of open dampers as a percentage of the total number of zones. This is your spill air set point.

E.G. $\frac{\text{No. of Dampers Open}}{\text{Total No. of Dampers}} \times 100$

Diffuser Noise

Commence turning off zones one at a time and check each zone for excessive diffuser noise.

When diffuser noise is on the verge of being excessive, calculate the number of open dampers as a percentage of the total number of zones. This is your spill air set point.

E.G. $\frac{\text{No. of Dampers Open}}{\text{Total No. of Dampers}} \times 100$

For best results, test all three methods above and use the highest value.

Appendix B - Zone Weights (Low Profile Model Only)

Overview

Making adjustments to the zone weight factor for each zone enables the Smartzone's spill/bypass algorithm to compensate for variations in zone size when calculating when to begin opening the spill/bypass damper.
The default zone weight for each zone is 5, and by default, all zones are treated equally when calculating the total percentage of open zones.

Consider the following simple example:

A Smartzone system is made up of two zones of equal size, with the same zone weight. One zone is fully closed and one zone is fully open. This is equal to the total system being 50% open.

If one of the zones is larger (one is twice the size of the other), but both zones still have the same zone weight, the system would treat the large zone being fully open and the small zone fully closed (**Actual open = 67%**), exactly the same as the small zone being fully open and the large zone fully closed (**Actual open = 33%**).
Evidently this disparity will have a dramatic effect on the operation of the spill/bypass system.

By adjusting the zone weight for each zone, the system can be tuned to ensure effective operation of the spill/bypass system.
In the example the following settings will have the desired effect.
Large zone weight = 10
Small zone weight = 5

Methods for Calculating Zone Weight

Zone weights can be determined by utilising one or all of the following methods:

a. **Heat Load**
b. **Zone Area**

The factory default zone weight for all zones is 5. Refer to page 10 for details on how to adjust the zone weight for each zone.

Heat Load

Record the heat load (calculated at system design/unit selection stage) for each zone in the table below.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8
Zone Heat Load (ZHL)								
Zone Weight (ZW)								
Zone weight factor (ZWF)								

Now calculate the zone weight factor (ZWF) for the system by dividing 10 by the highest zone heat load (ZHLmax).

E.G. ZWF = 10 ÷ ZHLmax

To determine the zone weight for each zone, multiply the heat load of each zone by the zone weight factor and round to the nearest whole number.

E.G. ZW = ZHL x ZWF

Record the zone weight for each zone in the space provided.

Zone Area

Calculate the area for each zone and record in the table below.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8
Zone Area (ZA)								
Zone Weight (ZW)								
Zone weight factor ( )								

Now calculate the zone weight factor (ZWF) for the system by dividing 10 by the largest zone area (ZAmax).

E.G. ZWF = 10 ÷ ZAmax

To determine the zone weight for each zone multiply the zone area of each zone by the zone weight factor and round to the nearest whole number.

E.G. ZW = ZA x ZWF

Record the zone weight for each zone in the space provided.

Appendix C - Troubleshooting Guide

PROBLEM	POSSIBLE CAUSES / SUGGESTED ACTION
LCD touchpad is blank.	Check the cable to touchpad. Check the 24VAC power supply from the transformer (If failed see next).
Transformer has failed	Prior to connecting the new transformer, verify the new transformer is capable of supplying 24V @ 48VA. Measure the current draw of the system at startup. If the current draw exceeds 48VA, disconnect immediately to prevent damage to the new transformer. Disconnect all touchpads and zone sensors. Re-apply power and measure the current draw of the transformer as the touchpad and sensors are re-connected one at a time to identify the problem connection (usually a cable fault). Re-terminate cable and repeat test to verify the problem has been rectified.
Incorrect number of zones on the touchpad and the touchpad DIPswitches are set correctly.	Zone sensor/cable fault - open circuit. Check sensor cables for a bad connection. If room sensors are being used instead of room controllers, check the sensor box jumper, this should be in the “normal” position.
LCD touchpad displays Active:0 and I cannot turn it on. There is at least 1 good sensor connected & cabled correctly	Test the zone sensor inputs by plugging the supply air sensor into Zone 1 sensor input. If Zone 1 now appears on the display the problem is as per above. Check DIPswitch settings on the back of the touchpad as per Table 1 on page 13. If the fault persists with all DIPswitches OFF, check the connection between MPM and 1234 modules.

Continued next page ...

PROBLEM	POSSIBLE CAUSES / SUGGESTED ACTION
68 degrees displayed as a zone sensor reading	Room controller or Room sensor cable/crimp short circuit. Locate and correct
Dampers not driving.	Check the fault indicator LEDs at the motor output sockets (see next issue). Check the appropriate zone is turned ON. Check zone sensor reading is correct. Check the supply air temperature (refer to page 9-10 to access SA temp) Check cable connections and ensure crimp is correct. Check mechanical connection to actuator and damper. Check after a power outage to the MPM, all zone motors drive fully open, then drive to the correct regulating position. (Spill-bypass motor drives fully closed first)
The red fault LED is on at the zone motor output socket.	There is a short somewhere in that zone motors cable, plugs or sockets (usually a cable fault). Check that the plugs are crimped correctly with no tiny shorts between the conductors.
Damper driving at the wrong time or temperature.	2 sensors cables are crossed over or 2 motor cables are crossed over. Locate and correct.
Incorrect zone operating as spill zone.	Check main processor module dipswitch settings. Turning any dipswitch on will make that zone become a spill zone. e.g. 6 on=zone 6. Check that the bypass socket is not in fault mode if being used.

Continued next page ...

PROBLEM	POSSIBLE CAUSES / SUGGESTED ACTION
Zone motors drive open all the time, power has been applied for more than 3 continuous minutes & at least 1 zone is turned off.	Supply air sensor/plug fault, or, supply air maximum or minimum temperature exceeded. If this sensor drops below 8 degrees or above 65 degrees (default), all zone motors drive open (extreme coil temp detected) and the optional bypass motor will drive closed.
Zone 5 and above do not operate correctly.	Disconnect 24VAC power supply and check that the 1234 module is plugged into the 5678 module. There are no cables between the modules, they plug from one module to the next directly. Are all modules screwed down to prevent separation?
58 degrees displayed as a zone sensor reading	Incompatible Room controller or Room sensor. Replace with compatible unit.

System Installed by:

_____

_____

_____

Date Installed:

_____

_____

For service, faults and difficulties please contact:

_____

_____

_____

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