

SAT-2.1 Controller Kit (24V)

for ISD 298–950K & OPA 205–960RKT and UC7 Controller Systems

Installation Instructions

GENERAL

The **temperzone** SAT-2 is a microprocessor air conditioning temperature controller.

This SAT-2.1 Control Box Kit (Item no. 525-001-016) is designed for use with the following **temperzone** 24V control units:

- ISD 298–950K
- OPA 205–960RKT
- OSA/OPA units supplied with UC7 Controllers

The SAT-2 Wall Control sends instructions to the SAT-2 Controller board which is mounted, either:

- inside the electrical box of a ISD, or
- on the electrical board for an OPA.

In the event of a power failure a battery backup will maintain the real time clock and the integrity of the control data.

Note:

- The wiring schematic in this document should be viewed as a generic example. Terminals and exact wiring will in most cases be identical or similar. If in doubt contact **temperzone** Engineering.
- For units installed with UC7 controllers refer also to Client Wiring supplied with each unit or available on www.temperzone.biz.
- Parts for the SAT-2 are not interchangeable with the previous model SAT-1.
- We recommend you fit the SAT-2 indoor coil sensor before connecting any refrigeration pipework.

SAT-2.1 CONTROLLER KIT

Components:

- SAT-2.1 Controller board.
- SAT-2.1 Wall Control plaque, including wall mounting plate.
- 10 m interface lead (plaque-to-Controller).
- Indoor Coil Sensor on lead; 1.7 m (x2).
- Mounting screws (x8).
- Heat transfer paste.
- Cable ties (x8).
- Insulation tape 120 mm long
- High temperature sleeving 150 mm long
- Electrical filter.
- Transformer.
- Wiring loom.
- Wiring diagram label.
- User's Operating Instructions* booklet.
- SAT-2 Installation Instructions.

Optional

- Remote return air sensor (in box).
- Remote return air temperature sensor lead; 1.5, 6, 12 or 25 m.
- 20 m extended interface lead (electrical box-to-plaque).
- SAT-2 Zone Control PCB.
- Zone Control 24V transformer.
- Additional SAT-2 Wall Control plaque.
- Infra red remote control.

Check that all items of the kitset are supplied and no damage has occurred to the items.

INSTALLATION

- Isolate the air conditioner from the power supply, then remove electrical box cover.
- Mount SAT-2 Controller board in position (refer fig. 3) using plastic clips supplied.
- Screw down the transformer (supplied) and connect to the SAT-2 Controller board – refer wiring schematic.
- Secure the electrical filter and connect to SAT-2 Controller board – refer wiring schematic.
- Use the wiring loom supplied to connect the SAT-2 Controller board to the unit's connections as per Table 1 and the wiring diagram.

Indoor Coil Sensor/s

- Find the sensor pocket brazed on one of the coil's copper return bends nearest the electrical box.
- Apply heat transfer paste (supplied) to the indoor coil sensor and the pocket entrance.
- Insert the indoor coil sensor into the pocket (System 1) and use the cable tie supplied to secure the sensor wire to the return bend so the sensor can not slip out.
- Wrap the sensor pocket and tube using the supplied insulation tape, as shown in the figure 2.
- A second indoor coil sensor is supplied for use on two stage systems (refer DIP switch 6); repeat the above procedure.
- Remove the Wall Control's interface lead from its box and connect the bare wired end of the interface lead to the colour coded terminal block on the SAT-2 Controller board. Trace the remaining length of the lead to the wall thermostat's intended location.
- Ensure all interface and sensor wires are run separately and away from main power supply wires.
- Ensure all SAT-2 Controller board DIP switches are set to the desired settings – refer wiring diagrams.
- Attach the supplied wiring label to the unit's electrical box.
- Replace the unit's electrical box cover.

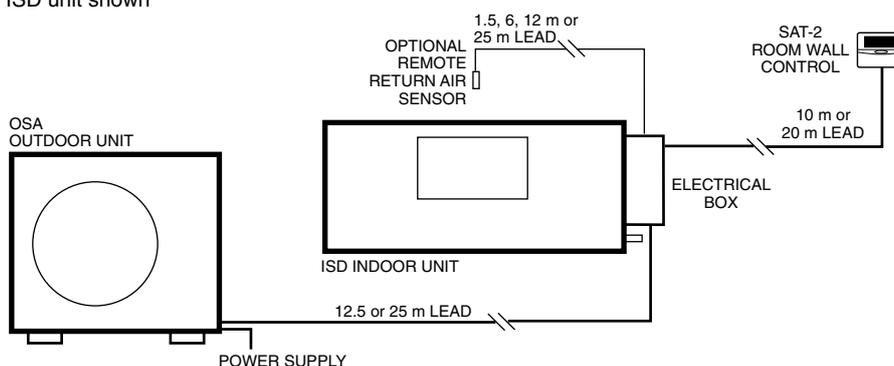
SAT-2 WALL CONTROL

- Isolate the unit from power supply, then remove electrical box cover.
- Remove the Wall Control's backing plate by using a small screw driver to remove the single screw at the bottom edge of the plaque.
- Install the Lithium battery, supplied loose, positive (+) side up in the Wall Control's battery holder.
- Check the wall where the Wall Control plaque is to be located is flat before fastening the wall mounting plate.

Fig. 1 SAT-2 Control Wiring (Split System)

Note: Communication and sensor wires must be run separately and away from main power supply wires.

ISD unit shown



Alternatively, the mounting plate can be screwed to a standard wall socket mounted horizontally.

Note: Use low profile (mush) headed screws to prevent contact with the PCB board. Fixing the plate to a distorted surface may damage the control.

5. Drill hole in wall to allow cable entry.
6. Connect the interface lead's lugs to the Wall Control board as per the wiring diagram overleaf.
7. Ensure the interface lead is run separately and away from main power supply wires, including the interconnecting cable. When installing cabling, trim any excess length to suit your location.
8. Fill around the interface lead with foam or cover hole with PVC tape to prevent draft from wall cavity affecting control operation. Do not use aluminium duct tape.
9. Secure the Wall Control body to the mounting plate by replacing the locking screw removed earlier.
10. Replace the ISD/OPA electrical box cover.

Remote Air Temperature Sensor/s (option)

The air temperature sensor is by default located in the Wall plaque. Optional remote air temperature sensors are available so that the measurement of the room temperature can be taken away from the wall plaque, eg. elsewhere in the room or in the return air duct.

Remote sensor's can be plugged directly into the Controller board (PCB). This board accepts up to four sensors which are designated as 'zones' one to four. The first return air sensor will automatically replace the Wall Control sensor and should be located in the same room as the Wall Control. The Controller will always use the average of the zones selected. Refer to the separate installation instructions supplied with the PCB for further details.

Ensure all remote sensor wires are run separately and away from main power supply wires, including the interconnecting cable. accepts up to four sensors which are designated as 'zones' two to five. The first zone will always be the Wall Control itself. The Controller will always use the average of the zones selected. Refer to the separate installation instructions supplied with the PCB for further details.

COMMISSIONING

Refer to Outdoor Unit and Indoor Unit Installation Instructions in order to complete the start-up and commissioning procedure for the complete air conditioning system.

Check that the wall control is correctly wired and set at the desired temperature.

Demonstrate the SAT-2 Wall Control to the owner/user, after having first thoroughly familiarised yourself with the User's Operating Instructions. This booklet is to remain with the owner/user.

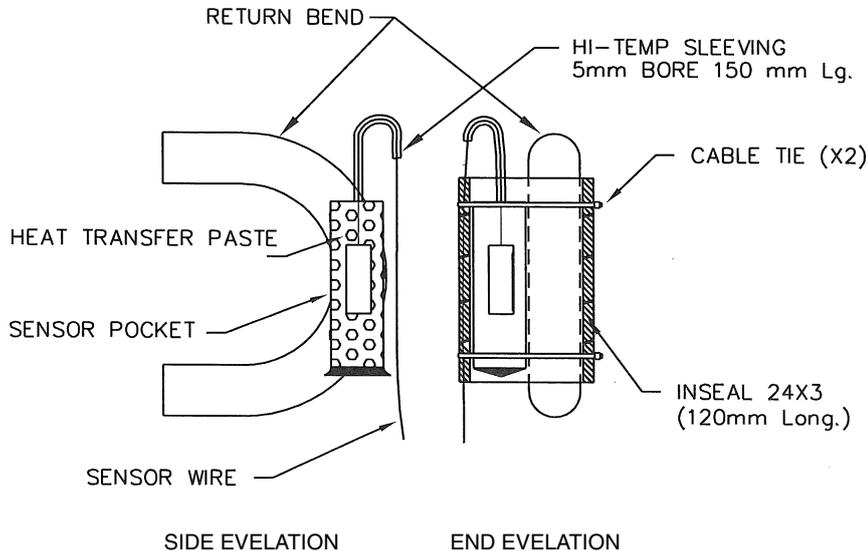
NOTE

The manufacturer reserves the right to change specifications at any time without notice or obligation.

This pamphlet replaces the previous issue no. 3682 dated 09/11. UC7 compatibility, indoor coil sensor detail fig.2

Fig.2 Indoor Coil Sensor Installation

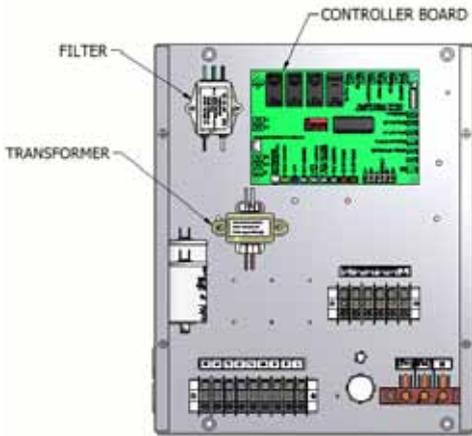
Note: A second indoor coil sensor is supplied for use on two stage systems.



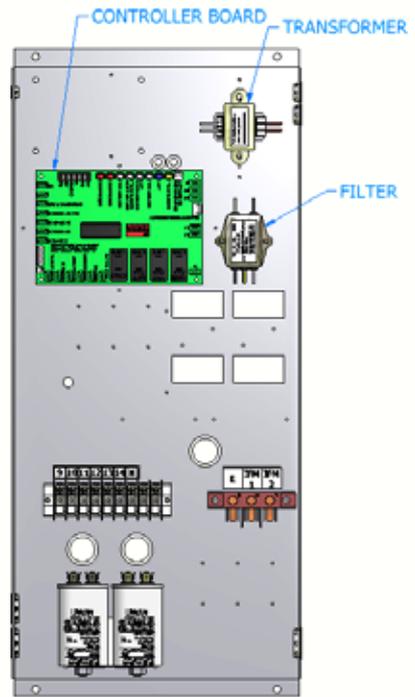
SAT-2 Controller Board Location

Ref. 525-004-025

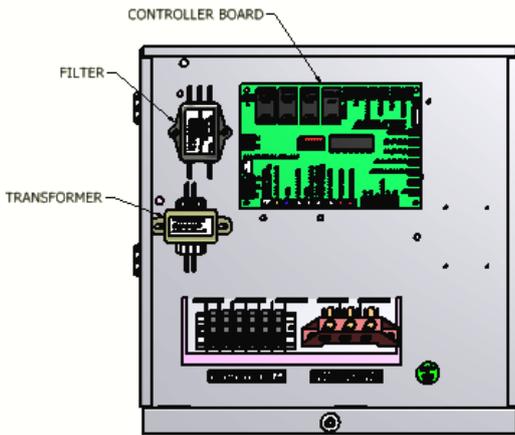
ISD 298K



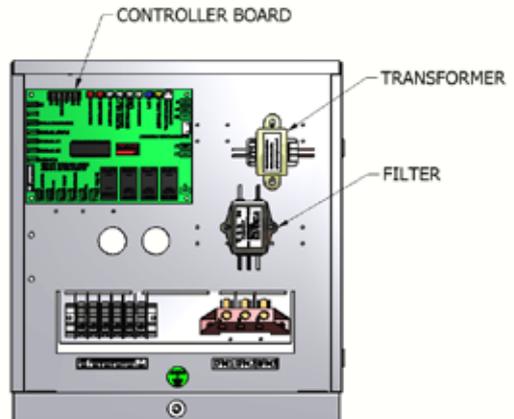
ISD 330K



ISD 290K, 331K

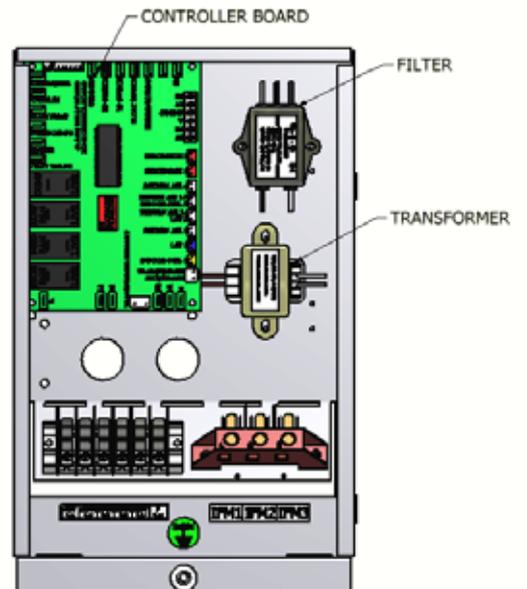
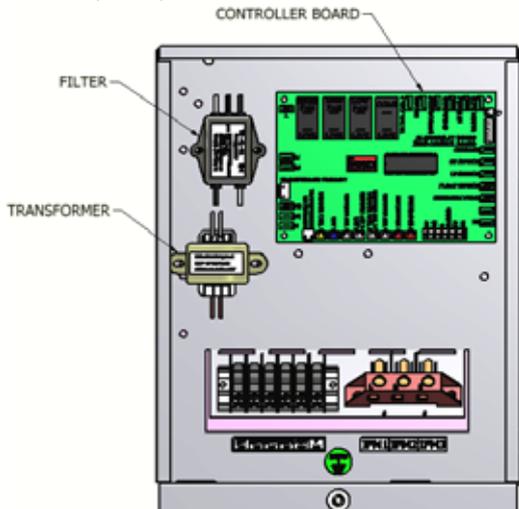


ISD 685K, 840K, 950K



ISD 520K, 630K

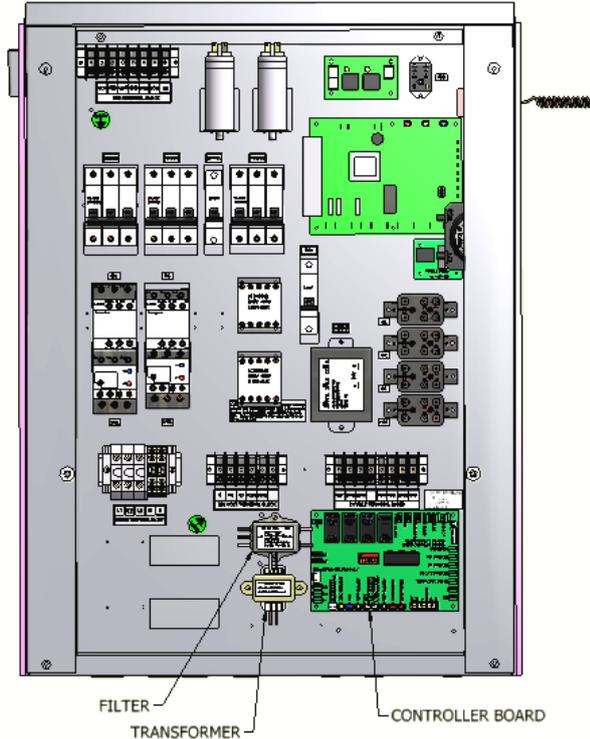
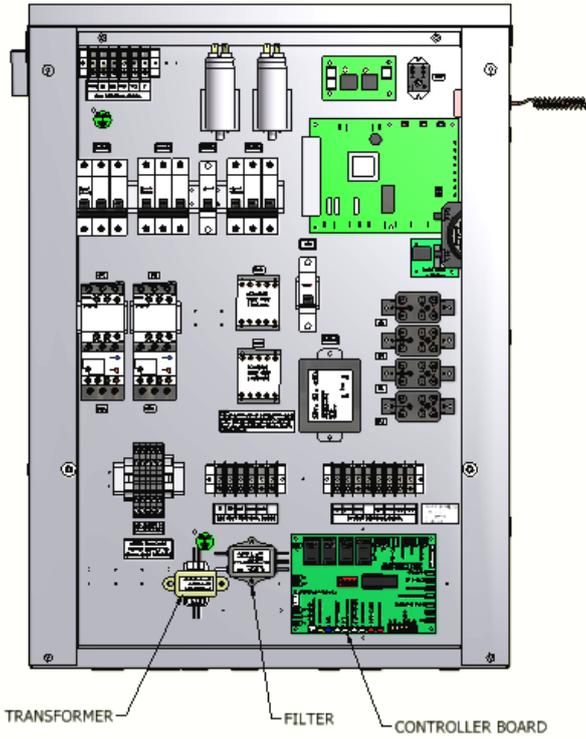
ISD 406K, 430K, 461K



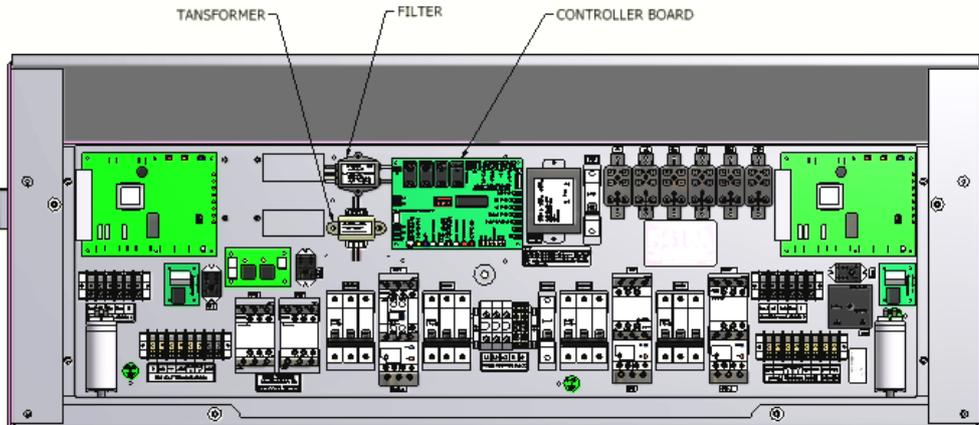
SAT-2 Controller Board Location

OPA 205, 225 & 270 RK

OPA 280RK

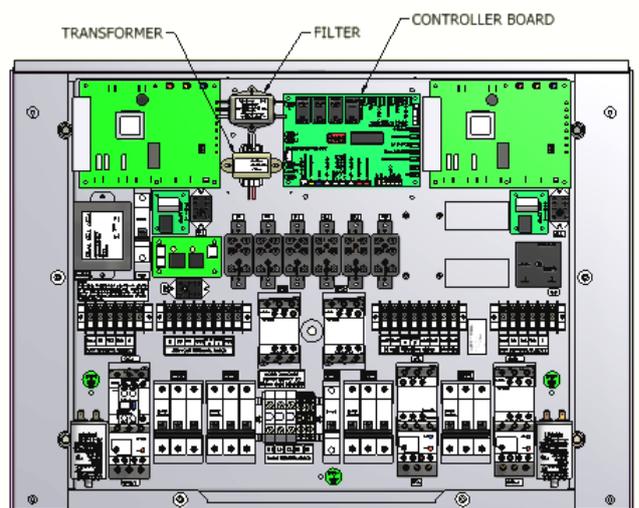
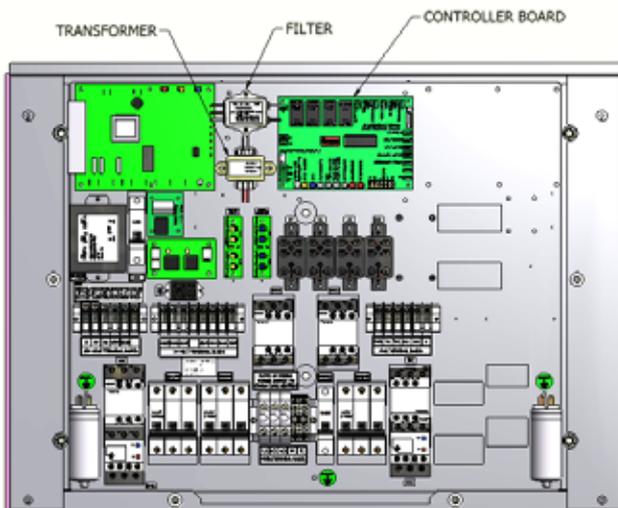


OPA 285RK



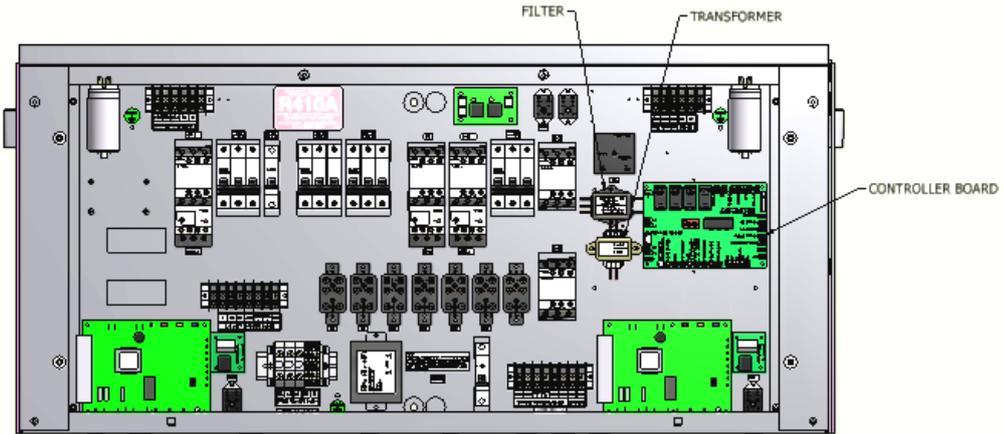
OPA 333RK

OPA 385RK

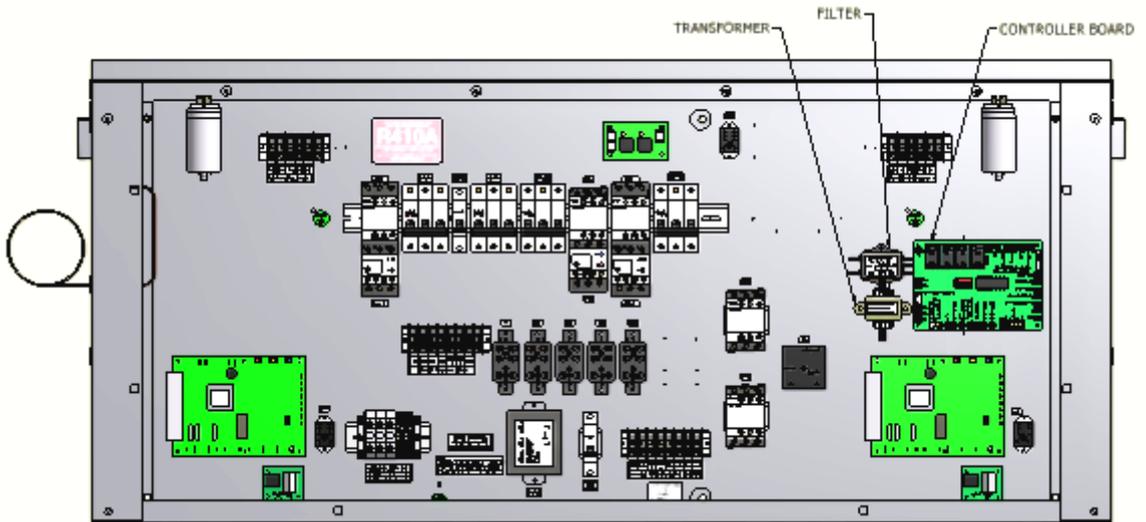


SAT-2 Controller Board Location

OPA 440RK



OPA 530/595/650 RK



OPA 850/950 RK

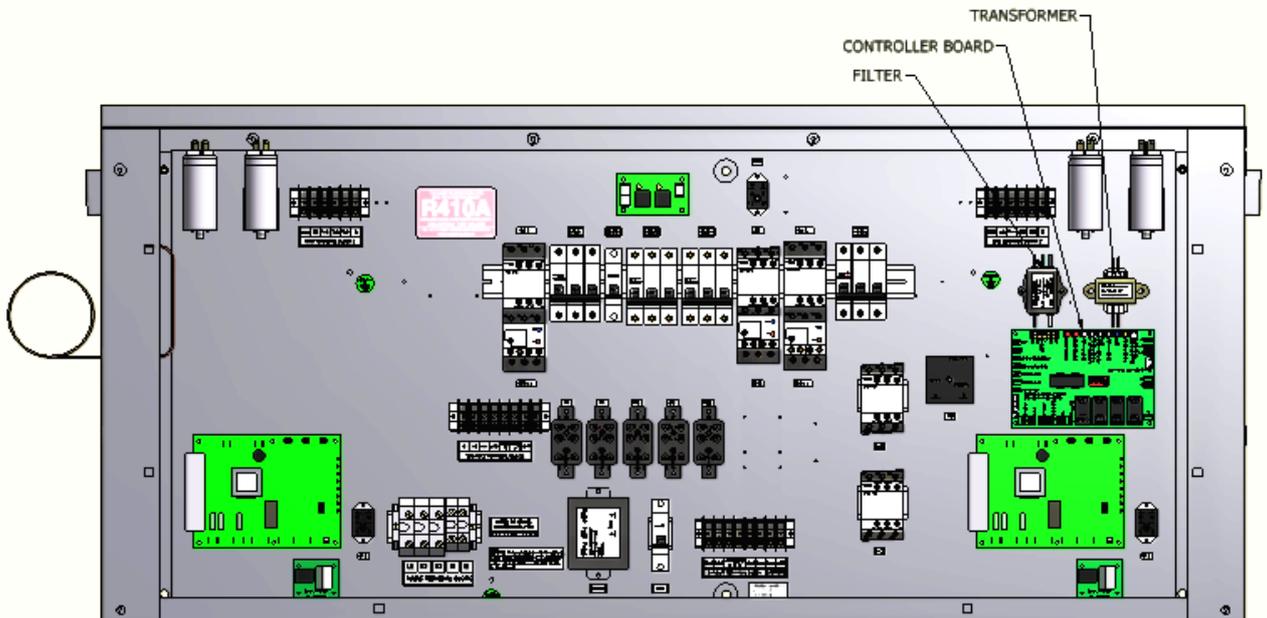


Table 1. Wiring Loom

Item	Length (mm)	Colour	From	To
1	720	BLUE	ISD terminal: 'COOL1/COMP1/COMP1' 24V OPA terminal: 'COMP/COMP1' 24V	SAT-2 relay 'COMP'
*2	720	WHITE	ISD terminal: 'COOL2/COMP2' 24V OPA terminal: 'COMP2' 24V	SAT-2 relay 'SWING/COMP2'
3	720	ORANGE	'HEAT' 24V	SAT-2 terminal '4 WAY VALVE'
4	720	WHITE	'F' 24V	SAT-2 relay 'LOW'
5	720	RED	'F' 24V	SAT-2 relay 'MED'
6	720	BROWN	'F' 24V	SAT-2 relay 'HIGH'
*7	720	BROWN	OPA terminal: 'HST'	SAT-2 terminal 'HEATER'
8	720	BLUE	'COMMON' 24V	SAT-2 terminal 'N'
*9	720	BLUE	OPA terminal: 'F' 24V	SAT-2 terminal 'ZONE MOTOR'
10	720	RED	ISD terminal: '24VAC/HOT' 24V OPA terminal: '24VAC'	SAT-2 terminal 'L'
11	150	RED	SAT-2 terminal 'L'	SAT-2 terminal 'HIGH LIVE'
12	120	RED	SAT-2 terminal 'HIGH LIVE'	SAT-2 terminal 'MED LIVE'
13	120	RED	SAT-2 terminal 'MED LIVE'	SAT-2 terminal 'LOW LIVE'
14	120	RED	SAT-2 terminal 'LOW LIVE'	SAT-2 terminal 'COMP LIVE'
15	120	BLUE	SAT-2 terminal 'COMMON'	SAT-2 terminal 'HP SWITCH'
16	120	BLUE	SAT-2 terminal 'HP SWITCH'	SAT-2 terminal 'LP SWITCH'
17	120	BLUE	SAT-2 terminal 'LP SWITCH'	SAT-2 terminal 'FLOAT'
18	120	BLUE	SAT-2 terminal 'FLOAT'	SAT-2 terminal 'HYDRONIC PUMP'
19	120	BLUE	SAT-2 terminal 'HYDRON. PUMP'	SAT-2 terminal 'SD'

Important: For OPA units, remove the link wire from 'FAN' terminal to any fan speed.

Notes:

*2 – Only for ISD 298/299/430/460/461/520/630/685/840/950, not ISD 330/331/405/406

Only for OPA 285/333/385/440/530/595/650/850/960, not OPA 225/270/280

Discard Item 2 if not applicable to your model.

*7 – For OPA units, if heaters are fitted with LAT, remove LAT (if fitted). Discard Item 7 if no heaters are fitted.

*9 – For OPA units, if heaters are fitted. Discard Item 9 if no heaters are fitted.

Table 2. Error Codes

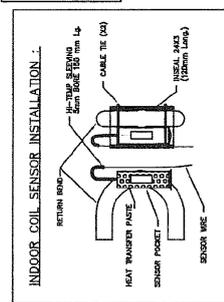
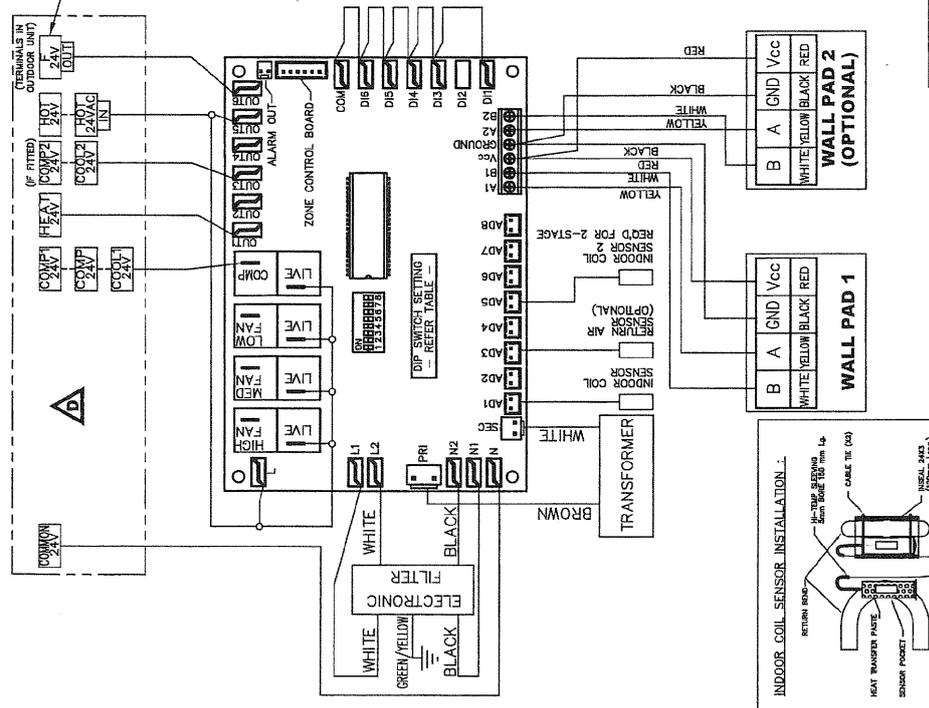
Should a fault develop, the relevant error code will be displayed on the Wall Plaque display.

If there are multiple faults happening at the same time, the error codes will display one after another.

Code	Fault	Remarks
1	Room sensor #1 failure	Main board AD3
2	Room sensor #2/LST sensor #2 failure	Main board AD4
3	Room sensor #3/Indoor coil sensor #2 failure	Main board AD5
4	Room sensor #4/Discharge sensor #1	Main board AD6
5	#1 indoor coil sensor failure	Main board AD1
6	#1 LST sensor failure	Main board AD2
7	#1 insufficient refrigerant	
8	#1 compressor overload	
9	Low pressure failure	
10	High pressure failure	
11	Room sensor #5 failure	At wall plaque B
12	Room sensor #6 failure	At wall plaque A
13	All room sensor failure	
14	Float switch failure	
15	#1 Low safety thermostat failure	
16	Communication failure	
17	Hydronic pump switch failure	
18	#2 insufficient refrigerant	
19	#2 compressor overload	
20	#2 low safety thermostat failure	
21	Discharge sensor 1 failure	
22	Discharge sensor 2 failure	
23	Discharge temp 1 failure	
24	Discharge temp 2 failure	

USE THIS CONNECTION DIAGRAM FOR ISD 298 TO 950 UNITS

IF PRESENT:
(NOT ALL OSA UNITS HAVE A
'F24V' TERMINAL)



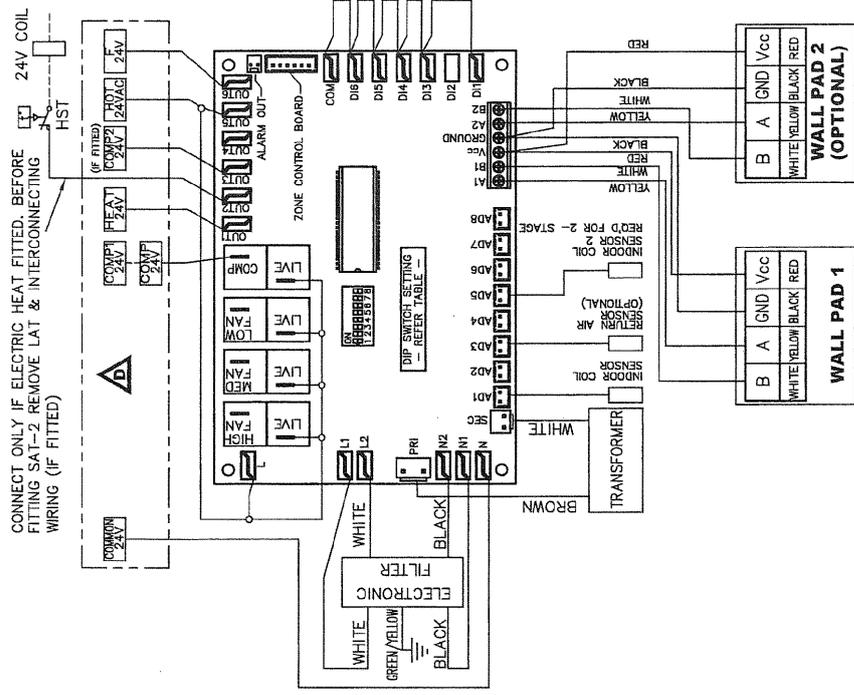
NOTE: PLEASE SELECT CORRECT POSITION WITH OR WITHOUT HEATERS IN ASSY

DIP SWITCH SETTINGS

STANDARD SETTING	ON	OFF
1	COOL ONLY	HEAT PUMP
2	NO ELECTRIC HEATERS	ELECTRIC HEATERS FITTED
3	1-5% DIFFERENTIAL CONTROL	1-0% DIFFERENTIAL CONTROL
4	FAN ON COOL CYCLE	FAN OFF IN DEAD BAND
5	AIR COOLED	HYDRONIC
6	TWO STAGE	SINGLE STAGE
7	ALARM RELAY TURNS ON UPON COMPLETE LOCKOUT OF SYSTEM FAULT.	ALARM RELAY TURNS ON WHENEVER THERE IS SYSTEM FAULT.
8	FAN AND HEAT PUMP OFF ON HEAT PUMP HEAD BAND FOR IN-BUILT SENSORS	FAN AND HEAT PUMP OFF ON HEAT PUMP HEAD BAND

SAT 2 BOARD DEFINITIONS	
OUT1	4-WAY VALVE
OUT2	ELECTRIC HEATER
OUT3	SWING/COMP2 TWO STAGE
OUT4	DRAIN/PUMP
OUT5	POWER IN
OUT6	ZONE MOTOR/FAN
ALARM OUT	FAULT RELAY
RELAY1	ZONE CONTROL BOARD
COM	COMMON
DI6	HP SWITCH
DI5	LP SWITCH
DI4	FLOAT SWITCH
DI3	HYDRONIC PUMP
DI2	NO FUNCTION
DI1	SD-REMOTE SHUT DOWN
ADB	DISCHARGE 2-HYDRONIC
AD7	DISCHARGE 1-HYDRONIC
AD6	RETURN AIR 4
AD5	RETURN AIR 3/INDOOR COIL 2 TWO STAGE
AD4	RETURN AIR 2/LST HYDRONIC
AD3	RETURN AIR 1
AD2	LST 1-HYDRONIC
AD1	INDOOR COIL 1
SEC	TRANSFORMER SECONDARY
PRI	TRANSFORMER PRIMARY

USE THIS CONNECTION DIAGRAM FOR OPA 205 TO 960 UNITS



ISSUE	MODIFICATION	EC/N	DATE	APRVD
D	OUTDOOR/INDOOR UNIT 24V DETAILS REMOVED	N2858	19-08-11	ROD
C	205 TO 960, WAS 225 TO 960	N2819	10-08-11	ROD
B	INDOOR COIL SENSOR 2 (OPTIONAL) ADDED	N2817	10-05-11	ROD
A	UPDATE SAT-2.1 WIRE DIAGRAMS	N2589	13-08-10	ROD

Programmed by

PLOTTED
19-08-11

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2004

Title SAT-2 THERMOSTAT KIT (24V) ISD 298 TO 950 & OPA 205 TO 960 - WIRING SCHEMATIC



Drawn D.A.B Date 30-03-10
Scale 1:1
Revision 525-004-004
D

