Models:

IMC4310: Economy Cycle and 1 Stage HEAT
IMC4311: Economy Cycle plus 1 Stage COOL and 1 Stage HEAT
IMC4320: Economy Cycle and 2 Stage HEAT
IMC4322: Economy Cycle plus 2 Stage COOL and 2 Stage HEAT

IMC43xx

Modular Controllers

With Economy Cycle

Specifications

Power Supply

Voltage: 24VAC ±10% @ 50/60Hz OR
                                  24VDC ±10%
Power Consumption: 6VA Max

Input

Two, Two wire current loop temperature detectors -
one for indoor and one for outdoor

Outputs

Temperature Out   0.1VDC per °C
Set Point Out   0.1VDC per °C - for measurement only
0-10VDC Heating Control Output
0-10VDC Cooling Control Output
0-10VDC Economy Cycle Output
One SPDT voltage free contact per stage (2A max.)

Terminal Identification

1 & 2	Indoor Detector connection
3	Indoor Temperature Out
TAG	Set Point Measurement point
4 & 5	Economy Cycle Connections
6	0-10VDC Economy cycle output
7	0-10VDC Cool output
8	0-10VDC Heat output
9	Common / 0V supply (MUST BE EARTHED)
10	24VAC Supply or 24VDC supply

Relay Terminal Identification

A, B	N/O: N/C Stage 2 Cool
C	Common for Cool relays
D, E	N/O: N/C Stage 1 Cool
F, G	N/O: N/C Stage 1 Heat
H	Common for Heat relays
I, J	N/O: N/C Stage 2 Heat

Temperature Ratings

Storage: 0-50°C non-condensing
Operating: 0-40°C non-condensing

Enclosure:

Manufactured from an ignition resistant grade of ABS which meets
the requirements of AS2420.
Colour: Grey
Mount: DIN rail mounted

Installation

1. Mount controller is a dry and reasonably clean location free or excessive vibration.
2. Fit to DIN Rail.
3. Wire in accordance with INNOTECH connection diagrams and local bylaws or refer to your local distributor.

Wiring

1. Earth one side of the 24VAC at the transformer.
2. Connect the EARTHED side of the 24VAC to terminal 9.
3. DO NOT connect 24VAC to terminals 1 through 4 and 6 through 8.
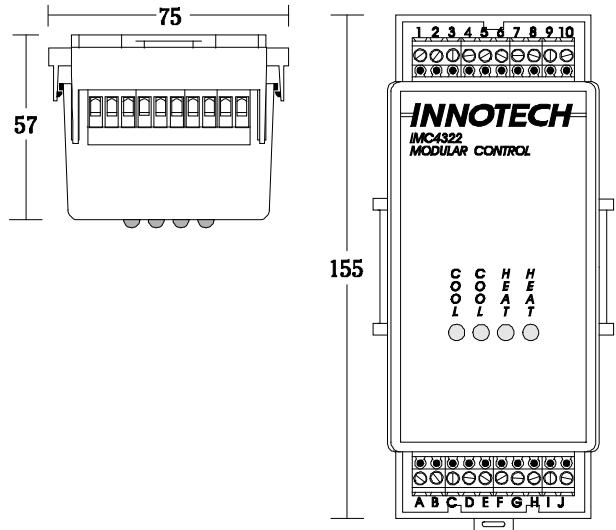
Application

The INNOTECH IMC43xx range of modular controls are designed to provide a modulating economy cycle output and regulate the stages of heating and cooling on air conditioning systems.

The economy cycle output can be enabled by an outside air sensor used to measure the difference between outside and inside temperature. Alternatively, a contact input can enable the economy output. They are suitable for use in single and multizone temperature applications. Multiple controllers can be grouped to a common enthalpy control or outside air thermostat.

ℹ️ LIMITED SET POINT ADJUSTERS CANNOT BE USED WITH THIS PRODUCT (Eg. IRA4002).

Features

- Interface to Building Automation Systems
- Time integrated proportional control action for optimum system performance
- Separate 0-10VDC outputs for heating, cooling and economy cycle
- Separate proportional band adjustment for heating and cooling
- Two detector averaging of indoor temperature is available
- Indoor detector temperature easily read at controller
- Economy cycle proportional band set to 0.5°C
- LED indication of relay status.
- Factory set for most applications resulting in reduced commissioning time
- The INNOTECH enclosure saves space and reduces installation time.
- Wide range of applications.

Approved

The IMC43xx conforms to the Australia/New Zealand requirements for standard AS/NZS1044:1995 including Amendment 1:1997 for C-Tick.

Set Point

The Set Point is adjustable via the internal Set Point pot over a range of 13°C to 32°C.

Proportional Band

The heating and cooling proportional bands (PB) are separately adjustable over a range of 0.5 to 5°C. The economy cycle has a fixed proportional band of 0.5°C.

Dead Zone

The Dead Zone is variable from 0 to 2°C by adjusting the Dead Zone pot. The Dead Zone is centred on the Set Point. A setting of 2°C gives a Dead Zone of 1°C above and below the Set Point.

Ramp

The Heat, Cool & Economy outputs are time integrated. The ramping rate is not manually adjustable, but varies with the difference between the Set Point and the measured temperature.

Detector Averaging

The IMC controllers are factory supplied set for one detector. The IMC can be modified to average the input from 2 detectors connected in parallel. The output at terminal 3 is the average of the temperatures sensed.

Output Clamp

The 0-10VDC Cool and Heat outputs are clamped to 0V until the other output is at 0V.

Output Voltage Range

The controlled range is from 0 to 10VDC.

Relay Outputs

Both the N/O and N/C contacts of all relays are available at the lower terminals. The common terminal of both cool relays is connected to terminal "C". The common terminal of both heat relays is connected to terminal "H".

Relay Span

The relay on and off voltages are spread evenly across the 0 to 10VDC of the heat and cool outputs. Example below:

Relay 1 on at 5VDC and off at 0V and
Relay 2 on at 10VDC and off at 5VDC.

The status of each relay is indicated by a red LED. The relay is energised when the LED is lit.

DIN Rail Mounted Enclosure

The INNOTECH enclosure is designed to provide tight positive locking to varying thicknesses of DIN rail. When fitting to thick DIN rail, it may be necessary to remove the packing tabs on the back of the base.

Lugs on each side of the base ensure that correct spacing is maintained between units on the same DIN rail.

Time Integrated Proportional Output

The IMC controllers are proportional controllers with their 0-10VDC Heat and Cool outputs time integrated. The time integration and ramping rate is fixed and is not adjustable.

The steady state value of the 0-10VDC Heat and Cool outputs are proportional to the difference between the measured temperature and the Set Point temperature. When a disturbance occurs in the system, time integration causes the 0-10VDC Heat or Cool outputs to change at a rate proportional to the difference between the measured temperature and Set Point temperature.

A large disturbance will cause the output voltage to change at a faster rate than a small disturbance. As the system recovers from a disturbance, the difference between the measured and Set Point temperatures will decrease and thus reduce the rate of change of the output voltage.

The reducing "rate of approach" of the output voltage as the operating temperature approaches the Set Point, reduces any tendency to overshoot and thus adds to the overall stability of the system.

Economy Cycle Operation

When enabled, the economy cycle output on terminal 6 will modulate from 0-10VDC over a fixed proportional band of 0.5°C.

A further cooling demand will cause the main cooling output to ramp from 0-10VDC according to its proportional band setting.

Economy Enable

The economy cycle can be enabled using one of the three following methods:

1. 24V ENABLE SIGNAL

Applying 24VAC or DC to terminal 5 will disable the economy output.
Removing the 24V will enable the economy output.
This method allows multiple controllers to be connected to a common economy enable device. Eg. outside air thermostat or enthalpy control.

2. VOLTAGE FREE CONTACT

A voltage free contact between terminals 4 & 5 will enable the economy output when the contact is open. Closing the contact will disable the economy output.

3. OUTSIDE AIR DETECTOR

An outside air temperature detector is connected to terminals 4 & 5.
The economy output is enabled if the outside air temperature is lower than the indoor temperature, less the setting of the "DIFF" potentiometer.
The "DIFF" potentiometer has a range of 0 to 5°C.

Relay Terminal Connections

Model	Terminal Identification							
	COOL 2		COOL 1		HEAT 1		HEAT 2 / COOL 2	
	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C
4310					H-F	H-G		
4311			C-D	C-E	H-F	H-G		
4320					H-F	H-G	H-I	H-J
4322	C-A	C-B	C-D	C-E	H-F	H-G	H-I	H-J

STANDARD CONNECTION USING OUTSIDE AIR DETECTOR FOR ECONOMY ENABLE

IMC43xx

INDOOR DETECTOR

ITD
ITW
ITI

1
2
3 — INDOOR DETECTOR TEMP. OUT
TEST PIN — SETPOINT OUT

OUTSIDE AIR DETECTOR

ITW
ITD
ITI

4
5
6 — ECONOMY OUTPUT
7 — COOL OUTPUT
8 — HEAT OUTPUT

0V SUPPLY — 9 — COMMON
24V AC SUPPLY — 10

A — STAGE 2
B — COOL
C
COOL COMMON — D — STAGE 1
E — COOL

F — STAGE 1
G — HEAT
H
HEAT COMMON — I — STAGE 2
J — HEAT
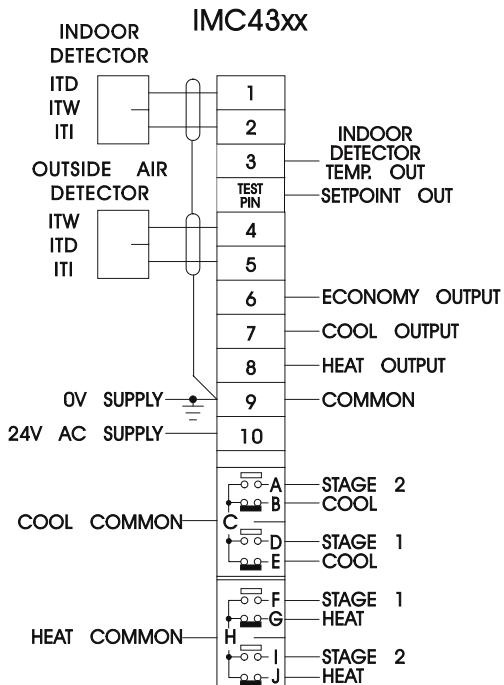
**NOTE: ADJUSTABLE DETECTORS ARE NOT SUITABLE FOR USE IN THIS APPLICATION

* DETECTOR AVERAGING

ITD
ITW
ITI

1
2
3 — INDOOR DETECTOR TEMP. OUT

ITD
ITW
ITI

9
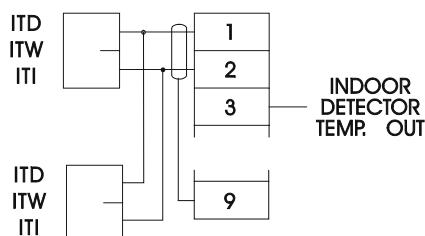
UP TO A MAXIMUM OF 2 DETECTORS
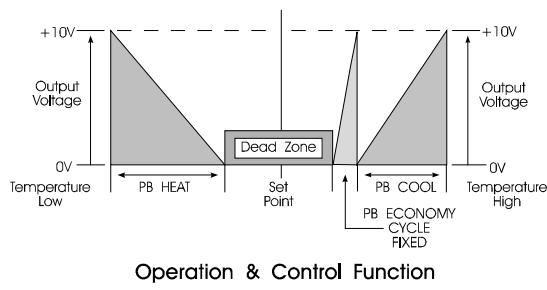
STANDARD CONNECTION USING 24VAC OR 24VDC FOR ECONOMY ENABLE

IMC43xx

ITD
ITW
ITI

1
2
3 — INDOOR DETECTOR TEMP. OUT
TEST PIN — SETPOINT OUT
4
5 — 24V AC or +24V DC #
FOR ECONOMY ENABLE
6 — ECONOMY OUTPUT
7 — COOL OUTPUT
8 — HEAT OUTPUT

0V SUPPLY — 9 — COMMON
24V AC SUPPLY — 10
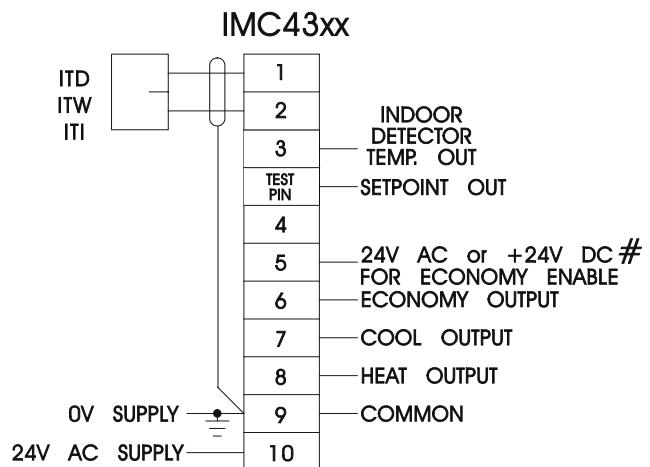
# 0V = ENABLES ECONOMY OUTPUT
24V = DISABLES ECONOMY OUTPUT

STANDARD CONNECTION USING VOLTAGE FREE RELAY FOR ECONOMY ENABLE

IMC43xx

ITD
ITW
ITI

1
2
3 — INDOOR DETECTOR TEMP. OUT
TEST PIN — SETPOINT OUT
4 — ECONOMY ENABLE
5 — OPEN=ENABLE
CLOSE=DISABLE
6 — ECONOMY OUTPUT
7 — COOL OUTPUT
8 — HEAT OUTPUT

0V SUPPLY — 9 — COMMON
24V AC SUPPLY — 10

+10V
Output Voltage
0V
Temperature Low

+10V
Output Voltage
0V
Temperature High

PB HEAT
Set Point
Dead Zone
PB COOL
PB ECONOMY CYCLE FIXED

Operation & Control Function
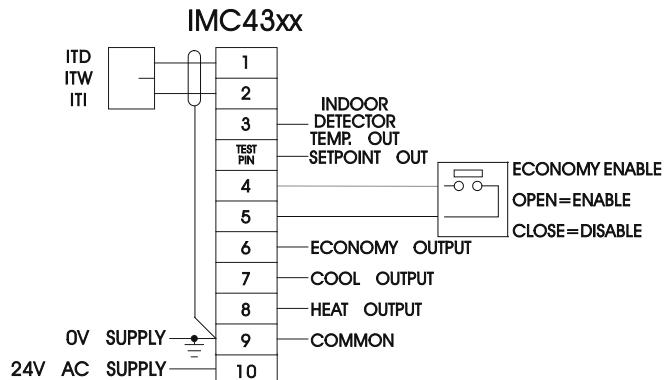
* Requires link changes before this option is used.

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