



Take control with... **ecosmart**  
**adapt**



**ecosmart** Doesn't cost the Earth... **ecosmart** Doesn't cost the Earth



“**Ecosmart Adapt Control** - Ecosmart Adapt is project/site specific and can be adapted to utilise other controllers such as Siemens, Johnson’s etc. for further details contact Nuaire”.

From November 2015 Ecosmart2 will be rebranded as an Adapt option.  
The Ecosmart Adapt (with Trend) option is fitted with an IQ422/12/LAN/BAC/230 controller allowing for unitary control and full BMS integration via BACnet IP (by others).  
Controller software is basic and ready for 'project specific' program to be loaded.

**ecosmart** Doesn't cost the Earth... **ecosmart** Doesn't cost the Earth... **e**





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If you have a requirement for Ecosmart Adapt contact Nuair.



The Adapt range of controls are project specific as an example we have used the Trend IQ422/12/LAN/BAC/230 controller but Nuaire can also offer other control options. For further details contact Nuaire.

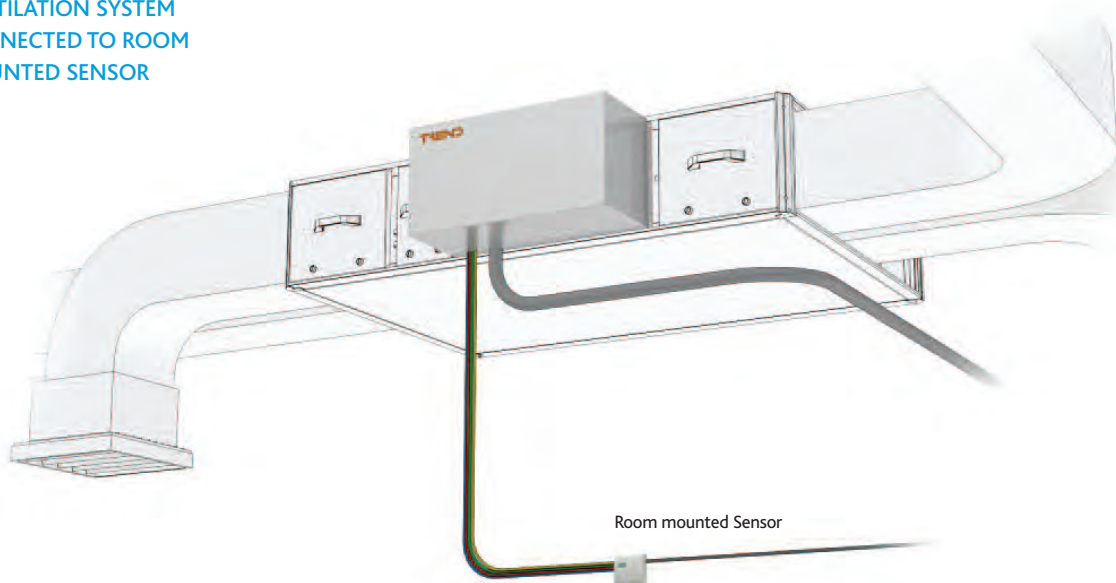
*“The management and control of modern buildings grow ever more sophisticated. A Building Energy Management system (BEMS) must be tailored to suit each customer’s specific control requirements. It must provide efficient HVAC control, coupled with the flexibility to accommodate changes in occupancy status and staff relocation at short notice; whilst simultaneously delivering improved comfort conditions. A BEMS must also provide real time management information and control, enabling customers to achieve significant energy savings”*  
(Trend).

Adapt Trend provides control of the ventilation including the heating, or cooling allowing unitary control and full BMS integration via BACnet IP. The Adapt Trend control system includes an IQ422/12/LAN/BAC/230 controller which is pre-configured and the unit and control assembly is functionally tested at Nuaire before customer delivery.

- **REDUCED INSTALLATION TIME** - The Adapt Trend IQ422/12/LAN/BAC/230 has software configurable inputs and addressing with automatic baud rate selection and IQTool compatibility. This greatly reduces engineering and commissioning time and therefore reducing the cost of the install.
- **COST EFFECTIVE MEANS OF CONTROLLING A VARIETY OF APPLICATIONS** - Provides intelligent control of a wide range of plant. Power to support advanced control applications including remote web supervision with graphical representation and control adjustments.
- **BAUD RATE** - Is automatically detected and applied to the network.
- **SOFT CONFIGURABLE UNIVERSAL INPUTS** - No need for jumper settings.
- **BARCODE ADDRESSING** - Makes for quick and easy commissioning.
- **NETWORK ADDRESSING** - Via SET, no DIP switch setting required.
- **PEACE OF MIND** - Ecosmart Adapt with Trend has a 5 year warranty.



ECOSMART ADAPT (TREND)  
SUPPLY & EXTRACT  
VENTILATION SYSTEM  
CONNECTED TO ROOM  
MOUNTED SENSOR



To help you select the appropriate control solution for your application, simply refer to one of the options below.

For the full range and technical details, please visit [www.nuaire.co.uk](http://www.nuaire.co.uk)

### THERMISTOR TEMPERATURE SENSORS

Low cost thermistor sensors comprising insertion, clamp-on, and outside air versions. The insertion sensor may be used for duct or immersion purposes. It has a 6mm diameter brass probe which is suitable for retrofit immersion applications and will fit most existing pockets (universal fitting kit option).



**Code: TB/T1/S** – For duct or immersion use. Short 150mm.

**TB/T1/L** – For duct use only. Long 400mm

#### FEATURES

- Low cost
- High quality thermistors
- Brass probes
- M20 conduit entry with M16 cable gland
- IP67 housing
- Quarter turn quick release lid
- Easy to wire
- Universal kit option for retrofit of immersion sensors
- Adjustable insertion depth flange option for duct sensors

### DUCT HUMIDITY & TEMPERATURE SENSORS

Duct mounted relative humidity and temperature sensors for HVAC applications.

The certified 2% high accuracy ( $\pm 2\%$ ) and standard 3% versions offer excellent linearity and stability over a wide humidity range (10 to 90 %RH).



**Code: HT/D** – Duct and thermistor sensor ( $\pm 3\%$ ).

#### FEATURES

- Pre-calibrated for ease of commissioning
- IP65
- Operates over 10 to 100 %RH non-condensing
- $\pm 3\%$  accuracy versions
- 2 part connectors for ease of installation
- Humidity sensor element protected by replaceable filter
- Capacitive humidity sensing element provides excellent long term stability
- Adjustable depth duct mounting flange option

### CO2 SENSORS

The CO2 duct and space sensors monitor the carbon dioxide concentration and temperature of the air.

The space sensors have additional options of humidity monitoring and a 4 digit display. The display will show the measured values in succession.

The duct sensor has a quick-release lid to facilitate installation.



**Code: CO2/T/D** – Duct sensor.

**Code: CO2/T/S** – Space carbon dioxide concentration and temperature sensor.

#### FEATURES

- Low cost, high quality thermistor temperature sensor
- Humidity monitoring option for space sensor
- Optional digital display for space sensor
- IP67 housing (duct sensor)
- Quarter turn quick release lid (duct sensor)
- Two part terminals to facilitate wiring
- 24 Vac/dc supply
- Adjustable depth duct mounting flange option

## TOUCH SCREENS



#### IQVIEW4 TOUCH SCREEN DISPLAY

(6 x 4 inch). FPK/Plate – Mounting plate.

**IQVIEW4/SM BOX** – Surface mount box for wall or panel.

**Transformer for IQVIEW4 included.**

**ACC/24V - 230/24 VAC, 36 VA**



#### IQVIEW8 TOUCH SCREEN DISPLAY

(10 x 6 inch).

**IQVIEW8/SM BOX** – Surface mount box for flat surfaces.

**Transformer for IQVIEW8 included.**

**ACC/24V - 230/24 VAC, 36 VA**



#### SDU DISPLAY

RD/SDU-IQ2COMMSCABLE/3m – RJ11 plug to RJ11 plug cable (3m) for SDU.

### GENERAL

The system incorporates a web enabled Trend IQ422/12/LAN/BAC/230 controller.

A comprehensive unit control specification - factory fitted and tested to provide guaranteed operation from a single supplier.



### THE NUAIRE UNIT CONTAINS THE FOLLOWING CONTROLLABLE ITEMS:

- Inlet Damper (if fitted).
- Exhaust Damper (if fitted).
- Heat Recovery and Bypass Damper.
- Heating Coil.
- Cooling Coil.
- Supply Fan Speed.
- Extract Fan Speed.

### ENABLE SIGNAL

The unit can be enabled via the following methods:

- Software switch (ENABLE) via SDU, IQView4, IQView8 or network.
- Switched live (230VAC) input, PIR etc.
- Low voltage contacts.
- Night cooling / summer free-cooling strategy.
- Scheduled via weekly calendar.

When the enable signal is removed, the unit will run on for a time defined by the run-on setpoint.

If an electric heater is fitted, the fans will automatically run-on for an extra 2 minutes, without heating, in order to dissipate residual heat.

### OCCUPANCY CONTROL

When a Trend occupancy sensor is selected via UI4 & 5 software module, the control will look for a Trend OCC-U sensor in the appropriate input.

An occupied signal will give an enable signal.

0V = Occupied

14V = Unoccupied

### BOOST

When the control receives a boost signal the fans will run at boost speed. Once the signal is removed the fans will run on for a time defined by the boost run-on setpoint.

### TRICKLE MODE

When trickle mode is active, the fans will run at their minimum speed even when there is no enable signal. Heating and cooling will also function in this mode if available.

### CO<sub>2</sub> CONTROL

When a CO<sub>2</sub> sensor is selected via UI4 & 5 function knobs, and an enable signal is received, ventilation will increase to reduce CO<sub>2</sub> concentration the target CO<sub>2</sub> setpoint. The target CO<sub>2</sub> sensor setpoint can be changed as one of the commissioning setpoints.

### SUPPLY TEMPERATURE CONTROL

While an enable signal is present, this mode modulates heating, cooling & heat exchanger bypass dampers with the aim of the supply air reaching the temperature setpoint. Please note that heating and cooling outputs will only function if the HeatingType or CoolingType setpoints are set to heating or cooling options.

### FROST PROTECTION

Should the internal temperature of the unit fall below a value defined in the commissioning variables, the control will override all heating/cooling logic to open the LPHW or CW control valves, if fitted. This is to allow any protective flow through the heating/cooling coils. The supply fan will also stop and the appropriate frost protection software module will enter an alarm state. This period will last for a minimum of 5 minutes by default. The fault relay will also open. Heat and cool demand relays will not operate but digital inputs "Frost Protecting LPHW" or "Frost protecting CW" will enter an alarm state. Please note that frost protection will only function if the HeatingType or CoolingType setpoints are set to LPHW or CW.

### NIGHT COOLING / SUMMER FREE COOLING

Once enabled in software, this routine uses an individual time schedule to cool the fabric of the building at night using only the external air. This mode only functions if the daytime temperature is above the setpoint, cooling is possible and if the cooling air is not too cold.

### ALARMS

#### CRITICAL ALARM (LATCHING)

Once in critical alarm state the unit will drive all heating and cooling outputs to 0V. Other functions continue as normal. The critical alarm is latched and required power cycle to clear.

Causes of critical alarm:

- Fan fail via fault circuit 1.
- Heater overtemp via fault circuit 1.



### MAINTENANCE ALARMS (NON-LATCHING)

Once in maintenance alarm state the only action taken is de-energising of the fault relay. Once the trigger is removed, the alarm will reset automatically.

#### Causes of maintenance alarm:

- Condensate pump fault via alarm circuit 2 (This bypasses the heater exchanger automatically)
- Sensor Failure
- Low supply temperature, default 8°C. (This can be set to stop fans if required)
- Frost protection routine active, default 4°C (This only runs if water valves are selected as fitted)

- Excessively high supply temperature reading (this will stop heating)  
All alarms have a hold off period set by the setpoint "Alarm Delay".

### THERMAL TRIP

In case of software failure, as a final resort, the electric heater is protected by a fail-safe thermal overload switch. This switch disables the heater controller once the temperature reaches 80°C. When this occurs, the critical alarm will latch in software.

Once the unit cools, the contactor will re-engage but the heater signal will remain at 0V until the critical fault is reset in software or by power cycle.

### SETPOINTS

All the following are user adjustable within engineered limits:

Point Name	Description	Range	Default
ENABLE	Software enable switch	Off / On	Off
RUNONTIME	Run-on timer value	0-3600 Seconds	0
TRICKLEMODE	When On, fans will trickle even with no enable signal	Off / On	Off
SETTEMP	Desired temperature setpoint	10 to 30°C	22
DEADBAND	Dead-band for temp control	0.5°K to 10°K	3
BOOST	Software boost switch	Off/On	Off
BOOSTRUNON	Boost Run On	0-3600 Seconds	0
FROSTPROTEMP	Temperature, below which, any water valves will be overridden open	-40°C to 10°C	4
MINFROSTPROTECTPERIOD	Minimum time frost protection will be enabled	0-600 Seconds	300
DAMPERDELAY	Startup delay to allow I/O dampers to open	0-300 Seconds	0
ALARMDELAY	Alarm hold-off delay	0-20 Seconds	5
HIGHAIRTEMPALARM	High supply air temp alarm temperature	30 to 70°C	50
LOWTEMPALARM	Low supply air temp alarm temperature	-40°C to 20°C	8
FORCESTOPONLOWTEMP	Stops fans upon LOWTEMPALARM	Off/On	Off
ALARMRESET	Resets any latched alarms (Resets to Off Automatically)	Off/On	Off
SUPPLYFANMAX	Individual fan maximum speed setting	20-100%	100
SUPPLYFANMIN	Individual fan minimum speed setting. (Trickle speed)	0-100%	20
EXTRACTFANMAX	Individual fan maximum speed setting	20-100%	100
EXTRACTFANMIN	Individual fan minimum speed setting. (Trickle speed)	0-100%	20
SUPPLYFANBOOST	Supply fan boost speed	20-100%	100
EXTRACTFANBOOST	Extract fan boost speed	20-100%	100
SUPPLYFANSTARTVOLTAGE	The voltage threshold of passing 0% rotational speed	0-5V	1
EXTRACTFANSTARTVOLTAGE	The voltage threshold of passing 0% rotational speed	0-5V	1
SUPPLYFANVOLTAGELIMIT	The maximum voltage to be supplied to the fan motor	6-10V	10
EXTRACTFANVOLTAGELIMIT	The maximum voltage to be supplied to the fan motor	6-10V	10
CO2TARGET	The target setpoint for CO <sub>2</sub> control	0-10000PPM	650
CO2RANGEMIN	The lower limit CO <sub>2</sub> value corresponding to the limit voltage	0-10000PPM	0
CO2VOLTAGEMIN	The lower limit voltage corresponding to the limit of range	0-10VDC	0
CO2RANGEMAX	The upper limit CO <sub>2</sub> value corresponding to the limit voltage	0-10000PPM	2000
CO2VOLTAGEMAX	The upper limit voltage corresponding to the limit of range	0-10VDC	10
CO2-LOOPGAIN	CO <sub>2</sub> Loop Gain	0 to -30	-0.5
CO2-LOOPINTEGRAL	CO <sub>2</sub> Loop Integral	0 to 30	10
CO2-LOOPDERIVATIVE	CO <sub>2</sub> Loop Derivative	0 to 30	0

### SETPOINTS (CONTINUED)

All the following are user adjustable within engineered limits:

Point Name	Description	Range	Default
SUMMERNIGHTFREECOOLACTIVE	Set night cooling mode as active	Off / On	0
SUMMERNIGHTFREECOOLMINTEMP	Night cooling lower cut-off temperature	5-30°C	10
SUMMERNIGHTFREECOOLFANSPEED	Night cool fan speed	20-100%	80
STC-COOLLOOPGAIN	Supply Temp Control - Cool Loop Gain	0 to -30	-5
STC-COOLLOOPINTEGRAL	Supply Temp Control - Cool Loop Integral	0 to 30	2
STC-COOLLOOPDERIVATIVE	Supply Temp Control - Cool Loop Derivative	0 to 30	0
STC-HEATLOOPGAIN	Supply Temp Control - Heat Loop Gain	0 to -30	-5
STC-HEATLOOPINTEGRAL	Supply Temp Control - Heat Loop Integral	0 to 30	2
STC-HEATLOOPDERIVATIVE	Supply Temp Control - Heat Loop Derivative	0 to 30	0
HEATINGTYPE	Heating Type 0=None, 1=LPHW, 2=Electric	0-2	0
COOLINGTYPE	Cooling Type 0=None, 1=CW, 2=DX	0-2	0
UI4FUNCTION	Input 4 Function, 0 = None, 1 = CO <sub>2</sub> /T/D, 2 = Trend Occ, 3=FSC	0-3	0
UI5FUNCTION	Input 5 Function, 0 = None, 1 = CO <sub>2</sub> /T/D, 2 = Trend Occ, 3=FSC	0-3	0
TACHOFITTED	Is a tacho signal monitor PCB fitted?	Off / On	Model Dependant
SOFTWAREVERSION	Shows the software number & Version	N / A	0
FANANDHEATERTEST	Factory Use Only (This resets on power cycle)	Off / On	Off
WIRINGVERIFICATION	Factory Use Only (This resets on power cycle)	Off / On	Off
FORCEOVERHEAT	Factory Use Only (This resets on power cycle)	Off / On	Off
DAMPERBYPASS	Force bypass damper into bypass mode (This resets on power cycle)	Off / On	Off
DAMPEROUTOFBYPASS	Force bypass damper out of bypass mode (Pump failure or DAMPERBYPASS switch will override this) (This resets on power cycle)	Off / On	Off
FANDAMPERTEST	Factory Use Only	Off / On	Off



### SUPPLY

The control is powered by a 240VAC supply. This must be isolated local to the unit and fitted with appropriate overcurrent and fault protection.

### ELECTRIC HEATER SUPPLY

For models with electric heating, the heating circuit is powered by a separate, higher current, 240VAC supply. This must be isolated local to the unit and fitted with appropriate overcurrent protection. The main supply is still required.

### ELECTRICAL SUPPLY DETAILS

Unit Code	Main Circuit (FLC)	Electric Heater Circuit (FLC) (Electric Models Only*)
XBC10-H-*AT	3.2 A	13 A
XBC15-H-*AT	4.5 A	13 A
XBC25-H-*AT	8 A	19 A
XBC45-H-*AT	8 A	19 A
XBC55-H-*AT	8 A	38 A
XBC65-H-*AT	8 A	38 A

\*Electric Heater models require two separate supplies, each with an appropriate overcurrent current protection device.

### VOLT FREE CONTACTS

Note that the volt free contacts are not fused. If these are used to power any external equipment, the installer must provide adequate fusing or other protections.

### CONNECTION CHART

	Description	IQ422	Expansion Module	Din Rail	DI	AI	DO	AO
		Terminal No.	Terminal No.	Terminal No.				
	Fresh Air Sensor	1 (4,5)				1		
	Supply Air Sensor	2 (6,7)				1		
	Return/Room Air Sensor	3 (8,9)		25-26		1		
	Input 4	4 (10,11)				1		
	Input 5	5 (12,13)		31-32		1		
4DIX Input	Alarm Circuit 1 (Fan, Heater)	6 (14,15)	4DIX Terminal A	27-28 (Some Models)	1			
	Alarm Circuit 2 (Pump, Filter)		4DIX Terminal B	29-30	1			
	Volt-Free Enable Input Signal		4DIX Terminal C	33-34	1			
	Volt-Free Boost Input Signal		4DIX Terminal D	35-36	1			
	Extract Fan 0-10V	7 (16,17)						1
	Supply Fan 0-10V	8 (18,19)						1
	Heat Demand 0-10V	9 (20,21)						1
	Cool Demand 0-10V	10 (22,23)						1
3RM-1 Relay Module (TRM Mode wired for binary switching)	Bypass Damper	11 (24,27)	Wired for binary switching. See 3RM Datasheet for info.					1
	Healthy signal to Relay 4						1	
	Link from IQ422 GND to AC GND	11 (25)		23				
3RM-2 Relay Module (HRM Mode)	Volt-Free Fan Run Relay	12 (26,27)	3RM-2 Relay 1					1
	Volt-Free Cool Demand Relay		3RM-2 Relay 2					1
	Volt-Free Heat Demand Relay		3RM-2 Relay 3					1
	230V Enable Input			10	1			
	230V Fan Boost Input			11	1			
	Volt-Free Healthy Relay			13-14				1

These contacts are rated at 3A resistive, 0.5A inductive.

Run connections - The relay is powered when the fan is running. (These contacts are used when an I/O damper is installed).

**Fault connections** - No fault = the relay is powered.

**Fault** - the relay is unpowered.

**Heat demand** - the relay is powered when heating is selected.

**Cool demand** - the relay is powered when cooling is selected.

### SWITCHED LIVE

Switch Live (SL) terminal - A signal of 100-230V a.c. will activate the switched live signal. Switch Live 2 (SL2) terminal - A signal of 100-230V a.c. will activate the switched live 2 (Fan Boost) signal.

Note: a signal from an isolating transformer will produce an unpredictable result and is not recommended. Volt free versions of the switched live signals are also available at terminals T33-T34 & T35-T36. Link two contacts to activate the signal.

### DAMPER CONNECTIONS

A fan start delay can be imposed to allow the damper time to open.

This is adjustable via display screens or commissioning tools. If an I/O damper is fitted, it must be wired to the fan run relay, and the relay supplied with the relevant supply voltage. See I/O Damper connection diagram for details.

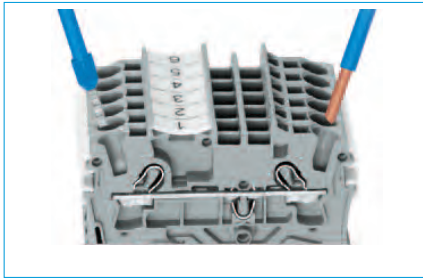
### NETWORK SETTINGS

<b>IP address is 192.168.11.12</b>
<b>Subnet mask 255.255.255.0</b>
<b>Lan 011, node 012</b>

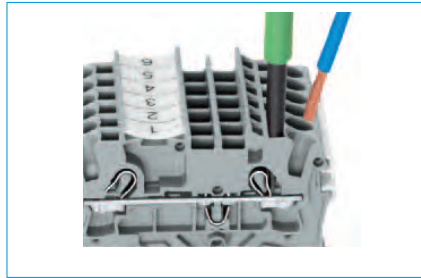
### TERMINALS - WIRE CONNECTIONS

This control unit utilises WAGO's CAGE CLAMP® S terminal blocks, allowing for quick and easy connection.

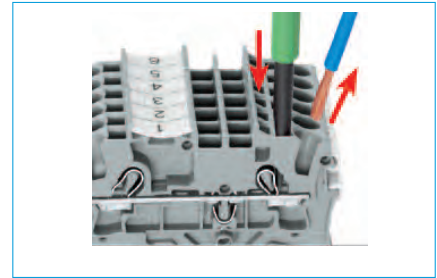
**PUSH IN TERMINATION** - Stripped solid conductors, fine-stranded conductors with ferrules, or ultrasonically "bonded" conductors are simply pushed in until they hit the backstop. No tool required.



**TERMINATION OF FINE-STRANDED CONDUCTORS** - Open the clamp by inserting an operating tool (as shown below) until it clicks into position. Then insert the conductor and remove the operating tool to complete the connection.



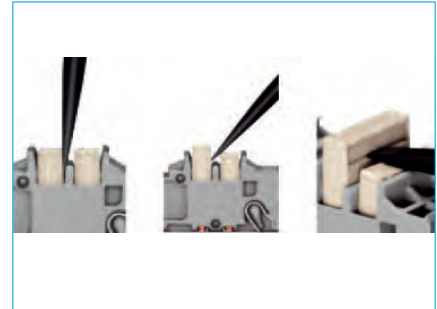
**CONDUCTOR REMOVAL** - Insert an operating tool in to the operating slot to remove the conductor, just like the original CAGE CLAMP® terminal blocks.



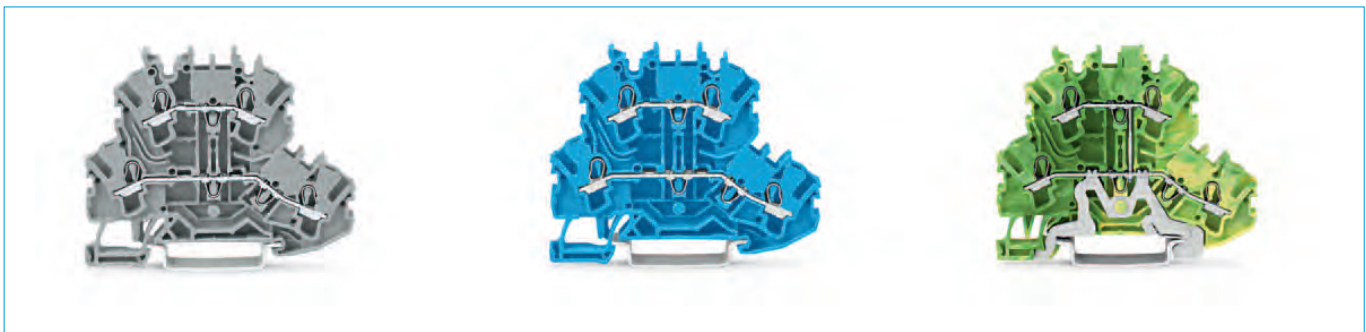
**JUMPERS** - Terminal blocks can be commoned together to increase the number of terminals at the same potential using push-in jumpers. In these cases the terminals are treated as one conductor.



**JUMPER REMOVED** - Insert the operating tool blade between the jumper and the partition wall of the dual jumper slots, then lift up the jumper.



**DOUBLE DECK TERMINAL BLOCK** - Each deck has a different potential (2-conductor), which creates a space saving on the rail. Decks can be commoned to adjacent terminal blocks and/or the top to the bottom deck.



**EARTH TERMINAL BLOCKS** - The earth terminal block (green/yellow) has a direct electrical connection to the DIN rail, with the earthing foot (earth connection only).



**FUSE TERMINALS** - Replaceable cartridge fuses are housed in quick release fuse terminals.





## CONSULTANTS SPECIFICATION

### ECOSMART ADAPT WITH TREND - ENHANCED DEMAND CONTROLLED VENTILATION

A comprehensive unit control specification - factory fitted and tested to provide guaranteed operation from a single supplier – one who will take responsibility.

The unit integrated Ecosmart Adapt system provides the facility for operational efficiency and energy saving by allowing a comprehensive range of unitary control functions and / or full BMS integration (by others) via standard BACnet IP configuration.

The system incorporates a web access enabled Trend IQ422/12/LAN/BAC/230 controller, and is augmented by application specific unit interface and diagnostic circuits. Controller software is optimised and pre-configured, and each unit / control assembly is fully functionally tested at works (Refer to technical documentation for full controller functional specification).

Units fitted with Ecosmart Adapt control have a 5 year warranty.

FOR MORE INFORMATION

[www.nuaire.co.uk](http://www.nuaire.co.uk)

COMMERCIAL

[www.nuaire.co.uk/commercial](http://www.nuaire.co.uk/commercial)

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