



Weatherite

MANUFACTURING LIMITED

Installation, Operation & Maintenance manual

For

WFA4.0EC and WFA4.0ECDF Fresh Air Cooling Units With Trend IQ3xcite Controller and SDU Display

Customer Site

Job Number

Unit Serial Number

Unit Serial Number

Unit Serial Number

Unit Serial Number

Unit Serial Number

Unit Serial Number



0121 665 2266 (Office Hours)



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Weatherite Manufacturing Ltd certifies that the equipment detailed in this manual conforms with the following EC Directives:

Low Voltage Directive (LVD) **73/23/EEC**

Machinery Directive (MD) **89/392/EEC in the version 98/37/EC**

Electromagnetic Compatibility Directive (EMC) **89/336/EEC**

To comply with these directives appropriate national & harmonised standards have been applied. These are listed on the Declaration of Conformity, available on request.



1. INTRODUCTION

ALL people involved in the installation and Maintenance of the Environmental Control Equipment and its ancillaries, whether directly or indirectly, MUST read this notice and this complete document prior to the commencement of ANY work.

The following information MUST also be read, fully understood and adhered to at ALL times:

1. The SAFETY of YOU and your fellow colleagues MUST be your main concern.
2. NEVER carry out a task until you fully understand what you are being asked to do and how to do it safely.
3. NEVER carry out a task that you feel could be dangerous to YOU or your colleagues.
4. DO NOT carry out any task that you are not qualified to undertake.
5. ALWAYS comply with ALL safety rules.
6. If you have any questions or concern over the safety of YOU or your colleagues, you MUST consult your supervisor prior to the commencement of any task.

***** ALWAYS THINK SAFETY *****

This manual has been designed to be a complete guide to Weatherite's WFA4.0EC and WFA4.0ECDF Fresh Air Cooling Units. It is designed to give information on operation, installation, commissioning and maintenance. Page 4 is a return form to request any manual updates, which we ask you to complete and return to us. Replacement pages/sections can be directly requested to the same address shown.

Safety Requirements

It is essential that any operatives working on the unit are suitably experienced and/or qualified to undertake the various service and maintenance tasks. This is of particular importance with any work relating to either the electrical side, where there is a danger of electric shock.

In certain software operational modes, the unit may be inactive and appear to be switched off, but can restart without warning. When working on a unit, ensure that the local isolator is in the *Off* position, even if the controller keypad has been set to *Off*, and that it cannot accidentally be switched on.

Even when switched off, fan impellers may still be revolving at considerable speed, sometimes in reverse, due to pressure differentials either side of the fan. Always ensure that the impeller is stationary before handling a fan.

The main (room) fans are plug fans with exposed impellers. Also, this section is under pressure (up to 2mbar or 4lb/ft²) when the fans are running. On no account should these doors be opened while power is switched to the unit.

Capacitors must be allowed to discharge for at least 5 minutes following powering the unit down in order to work on the associated wiring or components. This applies to the main (room) fan motor's internal capacitors.

Do not work in areas with inadequate lighting: supplement lighting with portable lamps if necessary.

Close all access doors before restoring power and restarting the unit.

Disclaimer

Products and associated publications undergo a continuous design review programme: the contents of this document are subject to change.

Weatherite Manufacturing Ltd will not be held liable for failure or damage ensuing from incorrect application or misuse of any of its products.

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UPDATING OPERATING MANUALS

Updates for manuals can be obtained by sending a copy of this sheet with the information completed as indicated below to the following address:

Contract Engineers Department
Weatherite Manufacturing Limited
Weatherite House
Credenda Road
West Bromwich
West Midlands,
B70 7JE

Please supply all relevant updates for the Operation and Maintenance manual for the following units.

Model No.	Serial No.	Date Delivered
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Name:

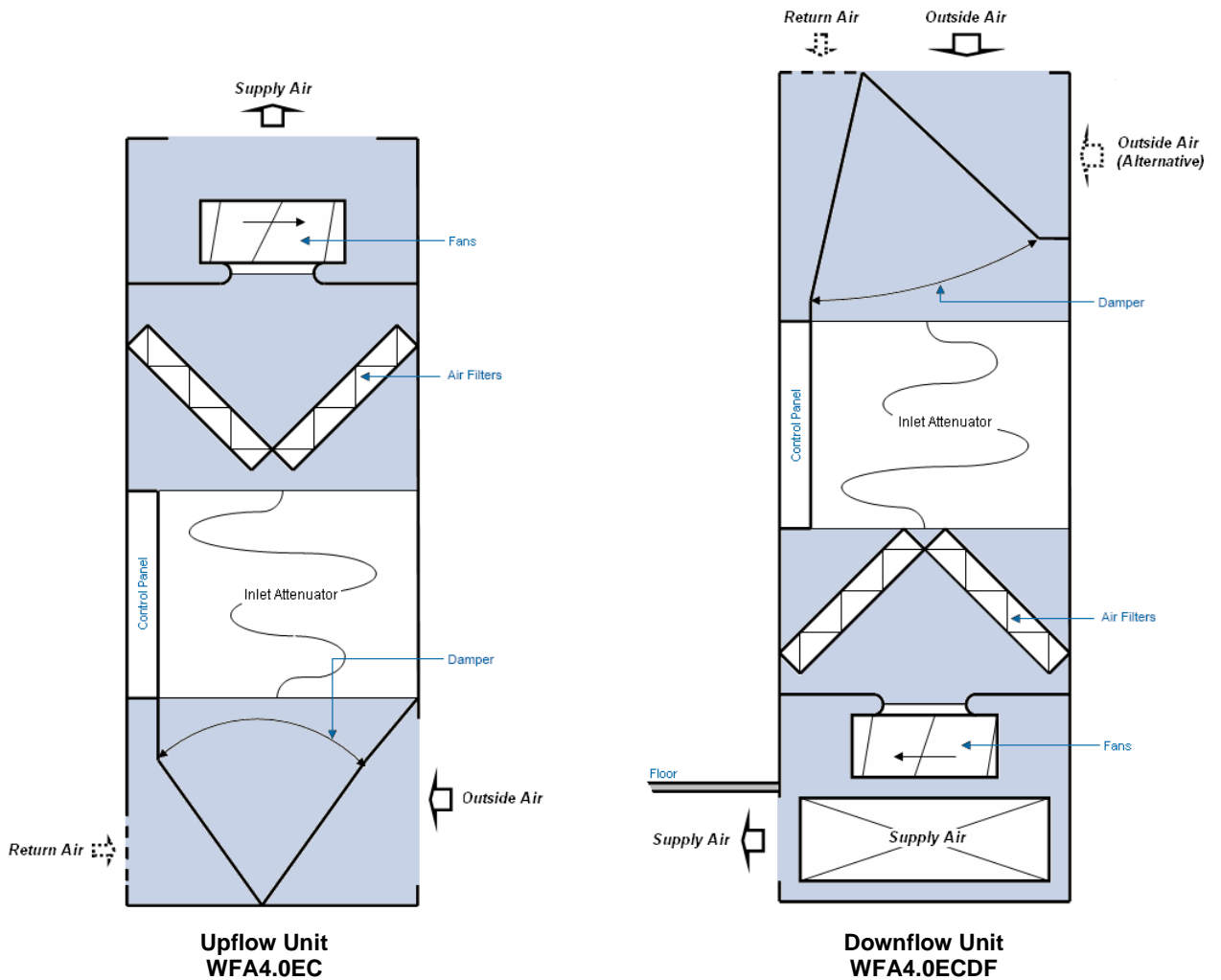
Reference No:

Address:



2. GENERAL DESCRIPTION

The WFA4.0EC and WFA4.0ECDF fresh air cooling units have been primarily developed for BT and the Telecommunications Industry, for whom the maximum use of outside air free cooling and high reliability are of paramount importance.



Schematic drawings

Standard features of the units include:



1. Twin electronically commutated direct drive backward-curved impeller fans supply air to the conditioned space. The fans can be speed controlled together to give variable cooling capacities. The characteristic of the fan is such that as the filters collect dust, the volume delivered only falls by a nominal amount thereby maintaining maximum cooling effect.
2. Each impeller inlet is correctly aligned with the fixed inlet ring as it is rigidly mounted by a "spider" frame onto a diaphragm plate carrying the ring.

- The maximum fan speed can be electronically adjusted to give the design air volume either as a free standing unit or when operating against the resistance of a short ductwork system. Main volume control dampers are therefore not required in the distribution ductwork. The fans are capable of overcoming high external resistance, which allows for reasonable amounts of ductwork and bends to be utilised. This enables existing window openings to be utilised for louvre insertion, reducing the amount of builders work required, which may be prohibited on some buildings due to pre-cast concrete construction and/or aesthetic considerations.



- On upflow units, a mechanical non-return damper is fitted to each main fan discharge opening to minimise back-draft and reverse rotation due to high system static pressures when a fan is turned off.
 - The pressure drop across the filters is monitored by a pressure differential switch which operates a Filter Blocked alarm.
 - An RJ45 socket is provided in the unit Control Panel door (or inside the panel on externally installed units) to enable local interrogation of the Trend IQ3xcite Controller. Interrogation may also be made remotely wherever a local Ethernet network is connected to the unit. In either case, the controller may be password accessed via any PC using Internet Explorer. No special engineering programme is required.
 - Attenuator splitters are fitted in the centre section of the unit to reduce internal and external noise levels.
 - A controls section is provided on the front of the unit that is out of the air stream, from which all items within the unit can be tested and monitored, making service and maintenance both easily accessible and speedy.
 - A motorised damper between the fresh air and return air inlets modulates on start-up, and during operation, to limit minimum supply air temperature to prevent thermal shock.
- On initial start-up, or in the event of a mains failure, a random start timer is adjustable on the keypad to enable the restart of several units together to be staggered.
 - The unit is completely automatic in operation, and will automatically re-start after a mains failure.
 - Hard-wired connections are available for basic alarm & remote switching functions.
 - Pressure relief devices supplied and installed by others are required to exhaust air and to maintain room pressure.

MATERIAL SPECIFICATION

The unit is constructed from 20g mild steel bonded panel construction Panels and doors have a self finished Plastisol Colourcoat, the infill insulation having both thermal and acoustic properties.

Standard filters are pleated panel type, rated EU4. The frames will accommodate the options of either 100mm or 50mm thick pleated panel filters.

Optional Extra Items

(At extra cost - to be specified when ordering)

- Downflow arrangement (WFA4.0ECDF) with top entry return air and top or rear entry outside air.
- Additional (up to four total) temperature sensors.
- Door mounted isolator.
- Spares.
- Alternative colour finish.
- External application.

WFA4.0EC and WFA4.0ECDF TECHNICAL DATA

General

The upflow WFA4.0EC unit is suitable for rear ducted air inlet and ducted supply air discharge at high level.
 The downflow WFA4.0ECDF unit is suitable for top or rear air inlet and under-floor discharge from the front and both sides.

The units are supplied in two sections for physical and electrical site re-connection by others.

Data

Supply Air Flow	Design duty*	4.0 m ³ /s at 125 Pa External Resistance
No. Of Fans		Two
Fan Type		Direct Drive Plug Type with EC motors
Fan Control		Via DC voltage signal from unit controller varying speed from 20 to 100%
Filter Type		EU4 Pleated Panels
Filters Sizes		404mm x 496mm x 100mm thick (8 off total)
Unit Width		1,600mm
Unit Depth		825mm
Unit Height	WFA4.0EC	2,400mm (Fan Section 600mm/Bottom Section 1,800mm)
	WFA4.0ECDF	2,900mm (Top Section 1,830m/Fan Section 1,070mm)
Unit Weight	WFA4.0EC	370 kg (Fan Section 150kg/Bottom Section 220kg)
	WFA4.0ECDF	410kg (Top Section 220kg/Fan Section 190kg)
Electrical Supply		400V/3~/50Hz
Typical running A		4.0A
FLA		5.5A/Phase Maximum

Notes:

- External resistance is the sum total of intake louvre, intake duct, supply duct, supply terminal devices, exhaust PRV dampers and exhaust louvres.
- *All figures in these tables are at design duty and pressure. However, the fan speed can be increased to cater for increased system resistance, or to increase the air volume. A typical maximum system duty would be 4.5 m³/s at 150 Pa External Resistance. At maximum fan speeds, the running currents may be nearer to the FLA current and noise levels may increase by up to 4 dB(A).

Fan Sound Power (SWL) per fan (2 off) at Design Duty (4.0 m³/s at 125 Pa):

Hz:	125	250	500	1000	2000	4000	8000
Main Fan dB:	84	84	75	74	72	71	63

Unit Noise Levels. Measured Sound Pressure Levels (SPL) at Design Duty (4.0 m³/s at 125 Pa):

Hz	63	125	250	500	1000	2000	4000	8000	NR	dB(A)
Internal dB At 2m from unit:	65	69	67	58	56	53	48	39	59	63
External dB At 2m from louvre:	67	63	60	52	46	41	35	25	51	55

Notes

- Internal noise levels may be affected by the proximity of outlets to the unit discharge or the point of measurement.
- External noise levels were measured with a simple wall connection with two acoustically lined square bends to simulate a typical installation.
- Lower external noise levels are possible with alternative designs of duct connection between the unit and the louvre.



CONTROLLER, KEYPAD & SOFTWARE

The IQ3xcite Controller is pre-programmed with the current version of the BT approved control software.

The controller is a fully web-enabled device that sits directly onto Ethernet network cabling via an RJ45 port on the controller itself. All software for web pages and control strategy is contained within the controller.

The SDU display unit is a 4 line, 20 character backlit display that allows local access for all setpoint adjustments without the need for a PC. Its operation is described in *Section 5* and all screens are detailed in the same section under *NAVIGATING THE DISPLAY*.

The capacity of the controller is extended by the addition of a 4DIX digital input multiplexer to give 4 additional digital inputs via just one input on the controller itself.

SAFETY DEVICES

The safety devices are wired into the IQ3xcite Controller as inputs, either directly or via one of the two 4DIX modules. When the safety device operates, the microprocessor initiates the relevant outputs to put out alarms and/or switch off motors etc. Other safety devices are programmed into the software and are automatic in operation. The table below shows a summary of the unit's safety devices.

SAFETY DEVICE	INPUT	TYPE & ROUTE	PURPOSE
Phase protection relay (non essential supply)	7	Direct Wired Digital Input	Activates when supply is lost or imbalanced. A clean contact is available to be linked to a remote alarm.
Filter dirty switch	8	Wired via 4DIX Module 1, A	Activates when filter requires changing
Fan No 1 overload		Wired via 4DIX Module 1, B	Activates when fan current high or EC fault present
Fan No 2 overload		Wired via 4DIX Module 1, C	Activates when fan current high or EC fault present
Remote Smoke Extract	9	Direct Wired Digital Input	Runs main fan only. Opens fresh air damper to purge smoke.
Remote Fire Shutdown	10	Direct Wired Digital Input	Stops unit in the event of fire. Shuts fresh air damper

Refer to *Section 6* for fault finding/action details.
 All alarms are reset from keypad Switch W7

ALARM and HEATING INTERLOCK EXTENSION RELAYS

Five alarm extension relays are provided, each with a set of clean (volt-free) changeover contacts, wired to terminals in the control panel. The alarms are:

Power Failure	Deferred Alarm with yellow lamp indicator)
Prompt Alarm (with red lamp indicator)	Heating Interlock

Any or all may be used either normally open or normally closed. Prompt (red) and Deferred (yellow) Alarm Lamps are mounted next to the Keypad.

If the alarm system is unable to accept both Power Failure and Prompt Alarm as separate alarms, these may be linked together within the panel to give a common Prompt Alarm. Normally open circuits should be wired in parallel via the normally open contacts and normally closed circuits in series via the normally closed contacts.

The contacts on the Heating Interlock relay may be used to operate a remote shut-off valve on the existing building heating system.



3. INSTALLATION AND ASSOCIATED SERVICES

Builders Work

It is preferable to re-utilise existing window(s) for the air intake, presuming this has sufficient area for the louvre. Any purpose made wall opening should be timber lined to accept the louvre.

Ductwork Services

The air velocity over the face area of the air intake louvre should be designed at a maximum of 2.5m/s to prevent moisture ingress. Care should be taken to check that any existing or future unit outlets/inlets do not interfere with unit operation. The duct connection onto the back plate or louvre should be positively sealed to prevent air leakage.

Each unit requires the air intake and any supply air distribution system to be ducted in accordance with good commercial design practices. The design should ensure that the supply duct connection does not foul the non-return damper on upflow units and that there is an access panel to service it. Rear duct connections to outside louvres should include removable panels to provide access for louvre maintenance and cleaning.

The total pressure of the system should be calculated and the limitations stated in the technical datasheet should not be exceeded unless a reduction in airflow performance is acceptable.

Additional precautions are necessary to ensure an ideal installation. All inlet ductwork should be internally lined, primarily to attenuate noise. Internal duct lining prevents noise breakout through the duct wall and also absorbs some in duct air noise.

Ductwork velocities should be kept below 5.0m/s to ensure good airflow characteristics and minimise air pressure drop. At these velocities, the pressure drop difference between bends with air turn vanes and those without is negligible. Air turns also 'bend' the noise and detract from the normally acoustic absorbing qualities of a lined bend. Weatherite therefore recommends that air turns should not be fitted.

It is recommended that supply fan sound power levels be applied on each application to determine whether additional alternatives are required to meet prevailing operating noise criteria. Weatherite offers a free design service whereby we can give recommendations on duct layout and undertake acoustic calculations to determine particular site requirements.

Exhaust Louvre and P.R.V.

The provision of an exhaust air path must be considered to avoid over-pressurising the apparatus room. Pressure relief devices must be installed in an external wall or window(s). Proprietary devices, and any associated louvres and ductwork, should be sized to cater for the full main fan air volume unless there are existing facilities elsewhere in the room. Physical sizes must be selected on each project to meet room pressurisation and external noise level requirements.

Packaging of Unit(s)

All units are protected before despatch from our works as follows:

1. A 'Clingfilm' wrap is fitted over the unit for dust and moisture protection.
2. Protective fibreboard angles are fitted to all corners and strapped in place.

Transit and Receipt

Upon receipt of the unit it is essential that the Weatherite or Contractor's site representative make an immediate inspection of the equipment in the presence of the carrier's representative in case of any damage incurred in transit. If any damage is found, a notation should be made on the delivery receipt before signing. A claim should be filed immediately against the delivering carrier. It is the carrier's responsibility to pay for any damages caused whilst in transit.

Each Weatherite unit is stringently tested before leaving the factory where every precaution is taken to ensure that the unit reaches the customer in perfect condition. It is important that the installer uses the same care in handling and unpacking to avoid damage to the unit. Check that the equipment is correct to order by comparison with the delivery specification.

Storage

If the unit is not to be installed immediately but held in store, the following must be observed:-

1. The store area must be well ventilated, warm and dry.
2. Periodic inspections must be made to check for damage to the equipment.
3. When units are stored for extended periods we recommend that fan impellers be rotated by hand every 4 months for ¼ turn to prevent flat spots occurring on bearings (i.e. Brinelling)



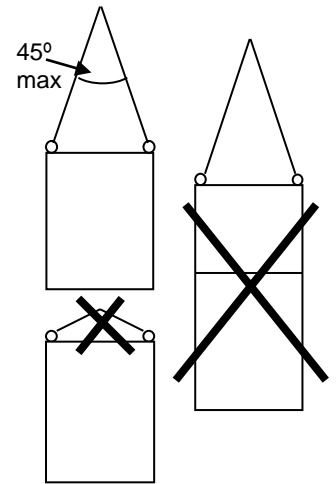
Lifting

All chains cables or other moving equipment must be placed so as to avoid damage to the unit. Always use the 4 lifting lugs provided and maintain as vertical a load as possible on the lifting points. Weatherite Manufacturing Ltd recommends that spreaders be used for all lifting operations in order to achieve this. If spreaders are not available, all chains must be of the same length, and the maximum included angle between them must not exceed 45° (see diagram).

Ensure that the hook or shackle does not twist the lifting eye, which must be in line with the chain.

Where units are supplied in sections, never attempt to lift the assembled top and bottom sections in a single lift: each section MUST be lifted separately.

Do not subject any part of the equipment to shock loads; rough handling may result in damage to the pipework or possible misalignment of the various sub assemblies. If in doubt please consult us and/or a specialist lifting contractor.



Installation

The unit must be installed on a firm level base. Whilst there are no particular special requirements installations should follow good practice for the installation of machinery.

The bottom section should be positioned prior to fitting the fan section.

The top section should be lifted onto the bottom section with the normal care and precautions respecting its weight. Fix the two sections together with the four fixings provided.

Any free blow adapter or ductwork should not be attached until the fan section has been properly secured. The unit must be thoroughly sealed to the ductwork or building opening

It is essential that the unit and P.R.V. position and resulting airflow characteristics are laid out to BT guidelines with regard to their respective positions with the racks.

External noise is also a major consideration and each site will require detail planning to ensure site requirements are met.

Electrical Services

General:

Electrical wiring must be of a size and installed to such a standard as to meet the requirements of the national or local codes pertaining to the area in which the installation is taking place.

The supply power, voltage, frequency and phase must agree with that stated under the fan electrical characteristics. Check that the incoming mains supply cables, are correctly sized.

The wiring in the fan section is supplied coiled in this section. A hole is provided in the dividing plate between the fan and main sections through which the cables can be passed to be connected to the control panel.

Wiring to remote temperature sensors (if fitted) must be carried out in screened cable and earthed to the controller earth terminals as shown on the wiring diagram. Up to 3 remote temperature sensors can be wired to the unit.

The electrical connections may enter from either side and are terminated within the unit.

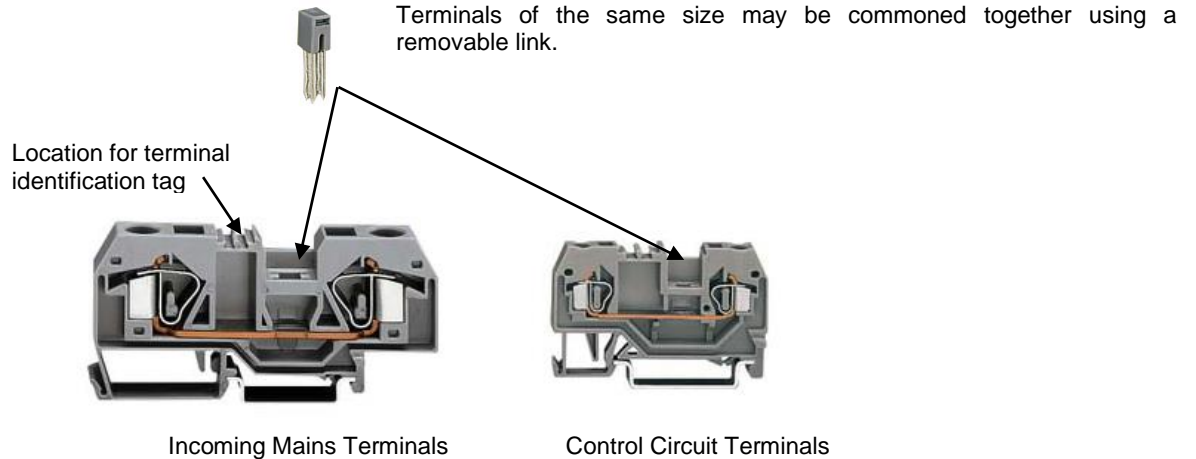
Cage Clamp Wiring Terminals:

Later units are fitted with this type of terminal for all factory and field wiring connections.

This type of cable connection is quicker, easier and more reliable, and very small cables are much more positively clamped by this system than by screwed terminals. Over-tightening of terminal clamps, which can lead to high resistance connections and subsequent over-heating of cables, is also prevented. They are also less subject to vibration and shock failure.

These terminals are used by Siemens, BT (Power) and Metro-Cammell amongst others. They have full UL, VDO, CSA, CEGB and BS approvals, and are CE certified.

Typical terminal variants used on standard BT units are shown below:



Earth terminals are similar to the above, but colour coded green/yellow and bonded to the DIN rail.

NB. No more than one cable may be inserted into any clamp.

At each cable location, there are two holes: one round and one square. The terminal clamp is opened by inserting a suitable diameter flat-bladed screwdriver into the square hole. (The square holes on some terminals will have been filled with yellow mains voltage warning tags. Remove these to gain access.) The cable may then be fully inserted into or removed from the adjacent round hole. In some locations, it may be necessary to use an offset or angled screwdriver.

Alarms:

An RJ45 port is provided on the control panel access door to enable the connection of an Ethernet cable for local PC or remote Internet Explorer unit operation and alarm monitoring. Terminals as shown above are provided to allow the following alarms to be individually extendable with volt-free contacts:-

- Power failure
- Prompt Alarm
- Deferred Alarm

The unit also has a set of volt-free contacts via which an external heating system may be overridden by the unit

4. COMMISSIONING

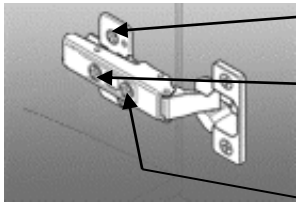
Unit Commissioning

Commissioning should only be undertaken by a suitably experienced/qualified engineer. Failure to observe this could result in the unit being damaged and the warranty being declared null and void.

CHECKS TO BE MADE BEFORE STARTING THE UNIT:

General

1. Check all field wiring for continuity and earth leakage.
2. Check that supply voltage is between 360 and 440 volts and that any imbalance does not exceed 3% between any two lines. Since an out of balance produces a dramatic rise in motor winding temperature, it is most important that imbalance between phases is at a minimum.
3. Check the tightness of all electrical connections. All interlock and external wiring should be in accordance with the electrical diagrams supplied.
4. Check the electrical operation of all cut-outs and safety devices. Note: Cut-outs are set approximately at the required ratings before leaving the factory.
5. Check alignment of access doors:



Adjust backplate fixings to raise or lower doors if required.

Slacken the rear screw to relocate hinge on backplate to adjust local door seal compression if required. Do not over-compress the door seals: a positive contact is all that is required.

Adjust hinges to square the doors to the frame and to each other. Turn the front screw clockwise to move the door towards the frame (outwards) or anticlockwise to move it away from the frame (inwards).

6. On upflow units, check operation of top section door stay. The two pivot bolts must be just slack enough to allow the stay to drop into the slot in the cam plate in the top of the unit and remain there. The door must be able to be opened with one hand and remain in position when released.
7. Check that there is no debris in the fan scroll and that the fan impellers are free to rotate.
8. Ensure that the electrical supply multi-way plug and socket to the fan section has been connected and the wiring insulation has not been damaged.
9. Ensure air tubes to the filter differential pressure switch are correctly positioned.

Unit Operation

Note that the control layout is arranged so that the ancillaries to the left hand fan (Fan1) are behind the right hand door and vice versa. This enables the individual fans' currents to be checked with the door closed

1. Check fans for correct rotation.
2. Function checks of all major components can be achieved by manual operation of the maintenance test procedure from the keypad, as described in this manual.
3. Set the main fan volume using keypad Knob K6 at the design level indicated on the commissioning sheet. The correct volume of 4.0 m³/s can be derived from the differential pressure between the tappings on the fan inlet ring and fan diaphragm plate, using a manometer, which should read 480Pa.
4. Select Mode B, (fans turn off when no load), if required, by turning Switch W 4 to Off. (Fans are continuous in Mode A.)
5. The full commissioning sheet should be completed proving satisfactory operation of safety devices and indicating all run logs of equipment.

Installation Commissioning

The complete environmental control installation including the exhaust devices and room pressure must be fully checked and commissioned before the exchange can be brought into service.



5. OPERATION

TREND IQ3xcite™ FULLY WEB-ENABLED CONTROL SYSTEM

Introduction: Web Access

The Trend IQ3xcite controller is designed to communicate via Ethernet, the low cost, speed and reliability of which has made it by far the most popular form of data network used in non-domestic buildings. This not only has financial and system performance benefits but also facilitates the integration of BMS with IT and other services.

Because it employs standard off-the-shelf components, such as hubs and routers, that are widely available at low cost, Ethernet is also easy and inexpensive to install. Costs can further be reduced if the controller(s) are arranged to share the same Ethernet infrastructure as the building's IT network. A local PC can be connected at the RJ45 port provided on the control panel door. It is also possible to read data in VT100 format via the RS232 port on the controller itself by first disconnecting the SDU-xcite display connector cable.

IQ3xcite's Ethernet connectivity has allowed the incorporation of a web server within every controller, thereby enabling control settings and monitored data to be accessed using a standard web browser. No additional gateway or interface device is required on site: all that is required is a PC running Internet Explorer wherever the remote control point may be. Day-to-day adjustment and monitoring can be carried out without having to install a proprietary supervisor package. Security is preserved by a two-part log-in and PIN-code procedure, preventing unauthorised use



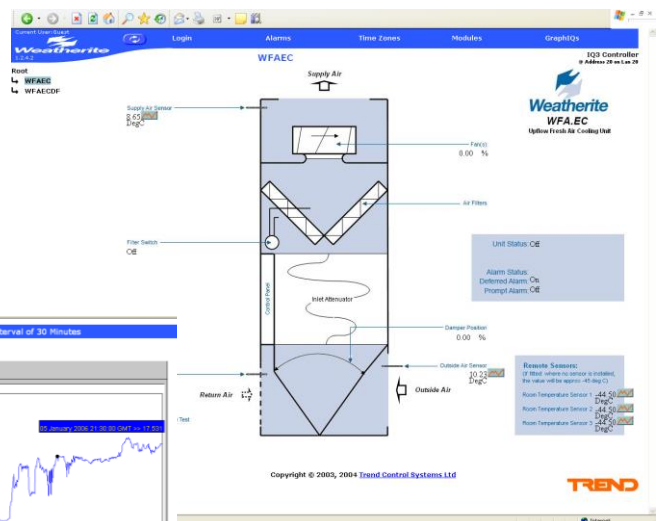
Moreover, since TCP/IP is used as the data transportation protocol, access can be gained from anywhere in the world via the Internet, using say a PDA (Personal Digital Assistant) or a web-enabled mobile phone.

When connecting to the unit via the web, the user will be logged in as *Guest*. The first screen displayed is the welcome page, seen on the left.

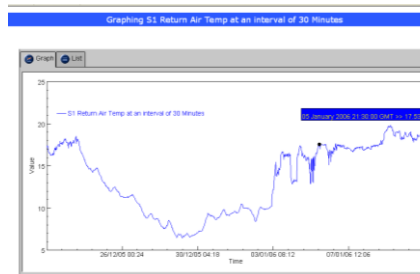
On the left hand side of the welcome page are two Weatherite arrow logo keys which will each give access to an overview screen. The overview includes a diagram of the particular unit configuration (select WFAEC) at the installation concerned.

The overview diagram example shown on the right is of a WFAEC (standard) unit.

The blue panel on the right hand side of the diagram shows the unit status: if the unit is running and the Prompt/Deferred alarms status. On the schematic drawing itself, the current status of the filter switch is shown, plus the damper position (% fresh air) and main fan speed (% of full speed).



All sensor temperature readings are displayed, including any installed remote room sensors. In addition, next to each of these is a graph icon. A mouse click on this will open a graphic record of either 30 minute or 5 minute intervals for that particular input (see smaller scale inset right).



The blue bar along the top of all of the screens is based on Trend's standard menu bar.

The menu gives access to a series of tables similar to those shown on the right, and further sub-screens in some cases. The actual number of screens accessible will be dependent on the user's name and PIN log in level. *Guest* level is read only.

Higher PIN levels can be entered via the login prompt on the menu bar to give access to more data categories and various levels of adjustment rights to the controller's Sensor, Knob and Switch, pages (these are all as listed in the Keypad operation description in Section 5).

Operators using the highest levels will also be able to adjust controller addresses and other web and LAN access variables.

Item	Label	Value	Units
K1	Fans Manual Pos'n	20.00	%
K2	Damper Manual Pos'n	0.00	%
K3	AHU Start Delay	1.00	secs
K4	Fns Min Spd Setpoint	18.00	DegC
K5	Fns Max Spd Setpoint	33.00	DegC
K6	Fans Nom. Speed	87.00	%
K7	Fans Minimum Speed	20.00	%
K8	Fan Diff in Mode B	5.00	DegC
K9	Hi Temp Alarm Setpt	45.00	DegC
K10	Damper Setpoint	0.00	DegC

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Module Ref	Module Label	Type	Value	Time	Occurred Cleared	Current State
I10	Unit Manually Off	On	1.000000	11/01/2006 15:37:53	Occurred	Sent
R1	IQ3 Controller	Restart	0.000000	11/01/2006 15:37:48	Occurred	Sent
I10	Unit Manually Off	On	1.000000	11/01/2006 15:37:48	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 17:15:24	Occurred	Sent
I10	Unit Manually Off	On	0.000000	08/12/2005 16:59:37	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 16:52:26	Occurred	Sent
I10	Unit Manually Off	On	0.000000	08/12/2005 16:10:46	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 16:04:22	Occurred	Sent
I10	Unit Manually Off	On	0.000000	08/12/2005 12:51:19	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 12:48:40	Occurred	Sent
I10	Unit Manually Off	On	0.000000	08/12/2005 12:14:24	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 12:11:54	Occurred	Sent
I10	Unit Manually Off	On	0.000000	08/12/2005 11:22:14	Cleared	Sent
I10	Unit Manually Off	On	1.000000	08/12/2005 11:19:13	Occurred	Sent

The example left shows a typical Alarm Table screen. A scroll bar on the right of the screen enables all 50 stored alarms to be read.

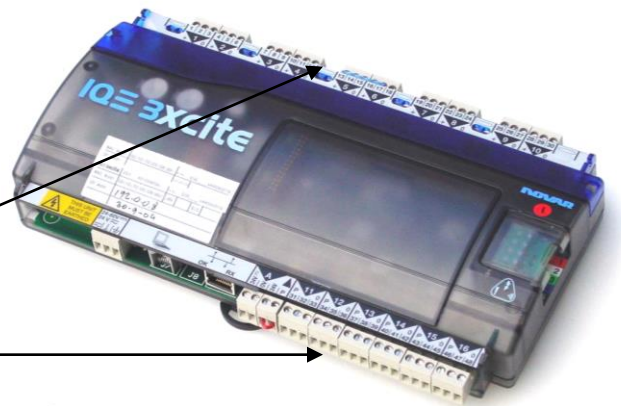
This, and similar tables, from Sensors graphic data say, can be copied and pasted into Excel files and used for analysis, extended period data storing and graphing etc.

Introduction: Hardware

The IQ3xcite controller has a base module with:

ten inputs and

six outputs.



The Controller is pre-programmed on leaving the Weatherite factory with software approved by BT, and all controllers are given the same IP address. If the controller is to be networked, the IP address of each unit will have to be unique to each unit. This can be changed locally with a PC using Internet Explorer.

The number of inputs to the controller is minimised by the use of a type 4DIX digital input multiplexer. This converts four separate digital inputs into a single input to the controller.

The controller inputs are user configurable via a set of jumper pegs on the Controller PCB. The correct jumper position for each input is shown on the wiring diagram. These are all factory pre-set and described below, but may require attention should a controller need to be replaced.

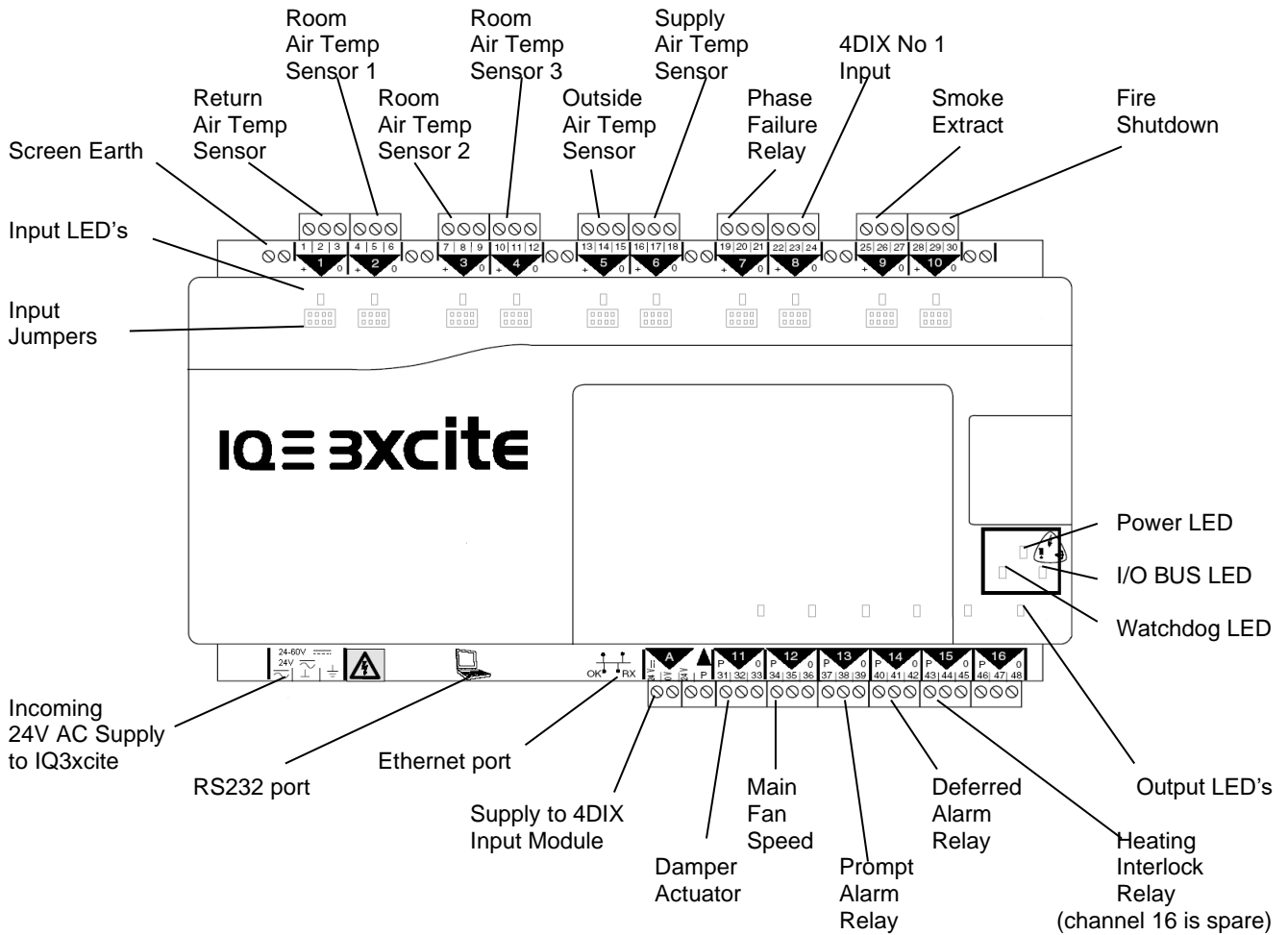
IQ3xcite

Features

The base unit has 10 universal inputs, and 6 analogue outputs and features:

RS232 local supervisor port

- Ethernet port for network cable or connection to local PC
- local display (see SDU-xcite details)
- DIN rail mounting
- Two part (plug-in) connectors to facilitate installation, testing, commissioning and fault-finding.



LED Indicators

I/O Channel LED's:

Input LEDs: (yellow). All input channels have an LED to monitor the input state when the input channel is set to a digital input. The LED will illuminate when the associated input contact is closed.

Output LEDs: (yellow) Light intensity increases with output voltage.

Core function LED's:

- Watchdog (red): On if controller has a software fault (i.e. strategy or firmware).
- Ⓜ I/O bus error (red): On if there is an I/O bus fault, (e.g. a short circuit between Data Hi or Data Lo and either of the power lines).
- ⚡ Power (green): On when supply is connected. Flashes briefly at 1 second intervals if power supply fault; return unit to supplier.

Ethernet LED's

Small LED's either side of the Ethernet cable connection socket.

OK : (green) Normally called LINK on Ethernet systems.

ON indicates a good Ethernet connection. If OFF, indicates faulty Ethernet connection.

RX: (yellow) Receiving: flashes when a packet of data is being received across the Ethernet.

Jumper Settings

The input channel jumpers are accessible via a blue polycarbonate strip which can be unclipped from the top centre using a screwdriver. (refer to the unit wiring diagram for the correct jumper settings)

Backup

The strategy configuration and data (logs, alarms) are stored in the unit in non-volatile memory (Flash). A 'supercap' is used to maintain the real time clock (time and date). In the event of power failure this will support the clock for 6 days (typically). Note that the supercap needs about 2 minutes to reach full charge after power is applied. As an optional extra, a battery board can be fitted into the unit. This will support the clock for several years during power failure. In this software, the clock is only used to time and record alarm events.

24 Vdc Combined Supply

Supplies the IQ3xcite's own input/output channels, the I/O bus, the RS232 connector (e.g. to power SDU-xcite), and the 24 Vdc auxiliary supply terminals to the 4DIX module. The combined supply is protected by a self-resetting electronic circuit breaker. Other fuses are board mounted and not replaceable.

Ethernet Connection

The controller should be connected to an Ethernet hub using Cat 5e unshielded or shielded (UTP or FTP) cable and RJ45 plugs (shielded or unshielded appropriate to the cable).

A local PC (Ethernet) using a standard Ethernet cable can be connected via the socket on the control panel door. Where external units do not include this socket, it can be connected directly to the IQ3xcite Ethernet port but this must be done in conjunction with a crossover adapter or cable.

Field Maintenance

The IQ3xcite Controller requires virtually no routine maintenance and contains no user serviceable parts. However it is recommended that, if the battery option board is fitted, the battery should be replaced every 5 years by removing the small panel let into the front cover. **The main body of the unit should not be opened.**

4DIX Module

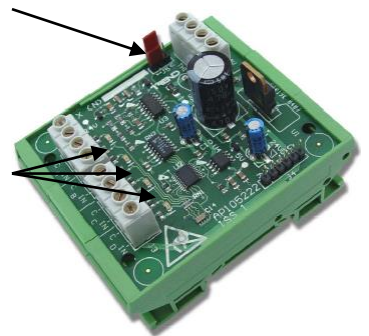
The Digital Input Expander module allows up to 4 separate volt free inputs to be monitored by a single analogue input channel although, on this system, only 3 are used.

The analogue value resultant from various combinations of inputs can be decoded by an IQ3xcite controller to produce internal digital switching for alarm monitoring etc. The 4DIX is designed to be mounted on a standard DIN rail.

Jumper Settings The jumper on the top left hand side must be set on the bottom two pins.

Features

- Input status monitoring by LED. In this system design, the three right hand LED's on the 4DIX module are lit when no alarms are present. The used LED's, A, B and C on each module, are clearly indicated on the board.
- 24 Vdc supply fed from IQ3xcite combined supply output.



Keypad

INTRODUCTION

Description

The Smart Display Unit (SDU) enables the user to view and adjust selected parameters within the controller. At the rear of the display is an RJ11 connector for connection to the controller. The SDU's power supply is carried via this connector in addition to the signal.

The SDU is a 4 line by 20 character display and is normally door mounted on the unit. On external units, the display may be mounted inside the building on a standard pattress (25m maximum cable run). The display connects directly to the controller's local supervisor port and can only access information in the connected controller. All the adjustments from the SDU are PIN protected. It has no intelligence of its own, the programme for its operation being resident in the Controller. The backlight will switch off 60 secs after the last button is pressed to preserve the life of the display.



Features

- Electroluminescent 4 x 20 character display
- 4 illuminated buttons for selection and adjustment
- Allows viewing and adjustment of plant parameters, date and time
- Allows viewing of 50 event alarm log
- Single IQ3 connection for both signal and power

USING THE DISPLAY PANEL

NB: Alarm Resetting

For new users, faced with having to clear an alarm quickly, refer to *Appendix 3* of this manual.

When the SDU is first powered up, it will illuminate all segments, then give a blank display followed by 'SDU-xcite v x.x' (where x.x is the installed firmware version).

If communications are successful, it will display the first page, in this case Sensor 1, with the cursor positioned under the S.



Line 1 is the Item Type, followed by the Item Number

Line 2 is the Item Label


Line 3 is the Item Value, followed by units

Line 4 is the Item Alarm State



The four keys are used to locate individual display pages, or text on a particular page. The first touch of any key will illuminate the backlight, the brightness level of which is fixed.

Line 1: Item type selection:

With the cursor on Line 1, use the  button to step through the list of item types.

The following list shows the item type in the order as displayed and the parameters shown. They are further described on the following pages in the same order.

Sensors label, value, units (as shown above)

Knobs label, value, units

Switches label status

Drivers label, value or status


Inputs label, status


Time zones label, start and stop times and exceptions

Alarms label of module producing alarm, alarm type as text (e.g. Sensor High), reported state (clear or alarm), date, and time of alarm


Time time, date, daylight saving change by (hours), and start and stop dates



Use (next, free, every), start and stop date, and the special day type for each time zone that is set up.


Further use of the  button after the Time item type on this list will cause it to roll round and start again from Sensors.

The  button will roll through the list in the opposite direction.

Line 2: Module selection:


Once the required item type is selected, the  button should be pressed, which will bring the cursor down to the first character on the second row.



The particular module can then be selected by using the  and  buttons.



When the user has finished with the module, the  button will return the cursor to the first character, Line 1 enabling another item type to be selected.

Line 3: Making Setpoint Adjustments

Knobs, Switches and Time modules can be adjusted.


Generally, having selected the relevant module to adjust, the  button is pressed again and the particular adjustment is highlighted.

The  and  buttons are then used for the adjustment

For a digital status, the  button sets it to ON, and the  button sets it to OFF.

For an analogue value the  button increments and the  button decrements the value.

As the value or status is changed, it is written to the controller and the display will show the value read back from the controller.



When the adjustment is completed, the  button should be pressed, and the cursor will return to the first character, second row, ready for module selection.


Line 4: PIN Protection:


Where the value is PIN protected, a valid PIN will be required to be entered before the change can be accepted by the controller as explained below.

If a write to the controller is unaccepted, either the SDU has no PIN and the controller requires one, or the previous PIN is of insufficient authority. The following page is displayed on attempting to change the settings:






The cursor will be under the first PIN digit, enabling the PIN to be entered. The digit can be changed from the default figure 5 in the range 0 to 9 by using the  or  buttons.

Once the correct digit has been displayed the next digit is selected by pressing the  button, the screen then changes to: **PIN: *5****

This is repeated for all digits. Once the PIN number is completed, the  button will enter the PIN. If the write message is unacknowledged, the value will not be changed, but if it is acknowledged, the value will change. The cursor then moves back under the value.

The PIN entry display will timeout 10 seconds after the last button press. The PIN itself will remain active for 2 minutes after the last button is pressed, after which it will expire.

Entering a PIN is easier at first if you use the left hand for the  button and the right hand for  and .

The adjustment Access Level PIN's are: -

- RO = Read Only (no PIN required) = access to view only all status and alarms pages etc
- R/W = Read/Write (4321) = (e.g. On/Off, Start Delay Time adjustment, Alarm Reset.)
- MTCE = Maintenance (7439) = (e.g. Attend Mode Timer, Fan Speed, Damper Setpoint adjustment)
- COM = Commissioning (****) = This access level is restricted to factory set up and commissioning engineers
- OEM = Weatherite Technical Department access only

NAVIGATING THE DISPLAY

The display layout is described below with Items (Line 1 on Keypad) listed in order, followed by a description and then a list of Item Labels (Line 2) and notes regarding the module function etc.

Sensors

Sensors are status indicators and are therefore not adjustable. Sensors 1 to 7 indicate the status of the inputs wired to the controller from other parts of the unit: temperature sensors, and the alarm value from the 4DIX module. Where remote room temperature sensors have not been wired to the controller, a value of -44.5 degC will be displayed. Other sensors indicate values derived from the above and other software data. These include hours run times for the fans, both overall and at various speed ranges, plus minimum, maximum and averaged temperatures. Sensors 27 to 33 are used as labels to display unique data for the unit to confirm identification when accessed remotely.








Sensor Overview				
Item	Label	Description	Units	Source
S 1	Return Air Temp	Thermistor	DegC	IQ3 input 1
S 2	Room Temp 1	Thermistor	DegC	IQ3 input 2
S 3	Room Temp 2	Thermistor	DegC	IQ3 input 3
S 4	Room Temp 3	Thermistor	DegC	IQ3 input 4
S 5	Outside Air Temp	Thermistor	DegC	IQ3 input 5
S 6	Supply Air Temp	Thermistor	DegC	IQ3 input 6
S 7	4DIX	Digital Input Extension Module 1 Status		IQ3 input 8
S 8	Fans run at 0%	Fan run time turned off (Mode B)	Hrs	Internal timer
S 9	Fans run at 1-20%	Fan run time in this speed range	Hrs	Internal timer
S 10	Fans run at 21-40%	Fan run time in this speed range	Hrs	Internal timer
S 11	Fans run at 41-60%	Fan run time in this speed range	Hrs	Internal timer
S 12	Fans run at 61-80%	Fan run time in this speed range	Hrs	Internal timer
S 13	Fans run at 81-99%	Fan run time in this speed range	Hrs	Internal timer
S 14	Fans run at 100%	Fan run time in this speed range	Hrs	Internal timer
S 15	Fans Total Hours	Fan total run time	Hrs	Internal timer
S 16	Software Version	Programme data		
S 17	Min Temp last 4 hrs	Minimum in this period	DegC	S 1 to S 4
S 18	Min Temp last 8 hrs	Minimum in this period	DegC	S 1 to S 4
S 19	Min Temp last 24 hrs	Minimum in this period	DegC	S 1 to S 4
S 20	Min Temp last 7 days	Minimum in this period	DegC	S 1 to S 4
S 21	Max Temp last 4 hrs	Maximum in this period	DegC	S 1 to S 4
S 22	Max Temp last 8 hrs	Maximum in this period	DegC	S 1 to S 4
S 23	Max Temp last 24 hrs	Maximum in this period	DegC	S 1 to S 4
S 24	Max Temp last 7 days	Maximum in this period	DegC	S 1 to S 4
S 25	Last 12 Months Aver.	Average in this period	DegC	S 1 to S 4
S 26	Mtce Test RAT value	Imposed value during test ramp-up	DegC	Internal
S 27	IQ3 Xcite	Label for Controller Type		
S 28	Unit Type	Label for unit type (WFA4.0EC or ECDF)		
S 29	Filter size	Label for size (394x495x95)		
S 30	No of Filters	Label for number (8)		
S 31	PIRM ID	Label for PIRM ID		
S 32	1141	Label for 1141 Code		
S 33	Serial No	Label for Serial No		
S 34	Internal Use		DegC	
S 35	Yesterdays Average	Average in this period	DegC	S 1 to S 4

(Continued on following page)

Sensor Overview (continued)				
Sensor No	Label	Description	Units	
S 36	Internal Use		DegC	
S 37	Last Weeks Average	Average in this period	DegC	S 1 to S 4
S 38	Internal Use		DegC	
S 39	Last Months Average	Average in this period	DegC	S 1 to S 4
S 40	January Average	Average in this period	DegC	S 1 to S 4
S 41	February Average	Average in this period	DegC	S 1 to S 4
S 42	March Average	Average in this period	DegC	S 1 to S 4
S 43	April Average	Average in this period	DegC	S 1 to S 4
S 44	May Average	Average in this period	DegC	S 1 to S 4
S 45	June Average	Average in this period	DegC	S 1 to S 4
S 46	July Average	Average in this period	DegC	S 1 to S 4
S 47	August Average	Average in this period	DegC	S 1 to S 4
S 48	September Average	Average in this period	DegC	S 1 to S 4
S 49	October Average	Average in this period	DegC	S 1 to S 4
S 50	November Average	Average in this period	DegC	S 1 to S 4
S 51	December Average	Average in this period	DegC	S 1 to S 4
S 52	Num Months Average	No of Months used to derive value In S25		
S 53	Internal Use		Hrs	
S 54 and 55	Internal Use		Days	

Knobs

Knobs are used to alter setpoint adjustable values and to set the override value of override switch positions.




The first press of the  button places the cursor under the units and the  and  buttons change the units. An additional press of the  button places the cursor under the tenths, and the  and  buttons change the tenths. A further press of the  button enables hundredths to be changed.

If a parameter is adjusted to a value that is outside the knob setting range, it will be rejected when it is sent to the controller, so the value will not change on the display. Access PIN's of various levels are required to alter the settings, as shown.

Knob Overview							
Item	Label	Description	Setting range			Units	Access Level
			Default	Min	Max		
K 1	Fans Manual Pos'n	Override position for switch W 2	20	20	100	%	COM
K 2	Damper Manual Pos'n	Override position for switch W 3	0	0	100	%	COM
K 3	AHU Start Delay	Start delay timer	1	1	300	secs	R/W
K 4	Fns Min Spd Setpoint	Temp at which fans run at K 7 speed	18	18	21	DegC	MTCE
K 5	Fns Max Spd Setpoint	Temp at which fans run at K 6 speed	33	fixed		DegC	COM
K 6	Fans Nom Speed	Commissioning speed for system air volume. % of maximum fan speed	90	60	100	%	COM
K 7	Fans Minimum Speed	Ramp-down minimum at low load	20	20	50	%	COM
K 8	Fan Diff in Mode B	Fans restart differential on K 4 value	5	1	7	DegC	MTCE
K 9	Hi Temp Alarm Setpt		45	40	50	DegC	COM
K 10	Damper Setpoint	Closes damper at low room temperatures	16	fixed		DegC	MTCE
K 11	Damper Control Diff	Modulating differential for K10 setpoint	2	1	2	DegC	COM
K 12	Low Temp Alarm Setpt		5	fixed		DegC	COM
K 13	Supply Air Low Limit	Modulates damper at low ambient temps	5	4	6	DegC	MTCE
K 14	Htg Interlk Setpoint	Operates relay to remote control device	12	fixed		DegC	MTCE
K 15	Maintenance Timeout	Timeout for Maintenance Switch W 9	60	30	120	Min	COM

Switches

Switches are used to switch between automatic and manual or override settings.

The first press of the  button places the cursor under the current switch “position” the button  sets it to ON, and the  button sets it to OFF.

Manual overrides will all time out and revert to the automatic setting after 30 minutes. The associated Knob setting will remain as adjusted. Always check the Knob setting before operating the override switch.

Critical safety devices are “carried with” each override, e.g. fans will stop in an overload condition.

Switch Overview				
Switch No	Label	Description	Default	Access Level
W 1	Unit Enable	Use to turn the unit off. Operates a controlled shut down sequence.	On	R/W
W 2	Main Fan Override	Set the override speed required at K 1	Off	COM
W 3	Damper Override	Set the damper position required at K 2	Off	COM
W 4	Select Mode A	Mode A (Default) is fans continuous. Mode B turns fans off at low room temperatures.	On	MTCE
W 5	Auto Routining	Turns off monthly auto-test	On	COM
W 6	Disable Pwr Up Delay	Overrides K 3 (start delay timer)	Off	MTCE
W 7	Alarm Reset	Resets ALL alarms when cleared	Off	R/W
W 8	Maintenance Autotest	Runs the auto-test routine manually	Off	R/W
W 9	Maintenance Switch	Disables outputs to prompt and alarm relays. Times out after 30 minutes, or as set at K 15	Off	MTCE
W 10	Twin Fan Unit	Runs twin fan unit in single fan mode should one fail.	On	OEM
W 11	Rm Tmp Snsr 1 Fitted	Switch to On if a room sensor is wired to controller input 2	Off	MTCE
W 12	Rm Tmp Snsr 2 Fitted	Switch to On if a room sensor is wired to controller input 3	Off	MTCE
W 13	Rm Tmp Snsr 3 Fitted	Switch to On if a room sensor is wired to controller input 4	Off	MTCE
W 14	Reset Hour Counters	Resets ALL counters when operated	Off	COM

Drivers

Drivers show what is being called by the controller at any time. If a component does not appear to be operating, these items will show if the software is calling for it. Drivers are status indicators (On, Off or %) and are therefore not adjustable.

Driver Overview		
Driver No	Label	Range
D 1	Damper Position	0...100% of fresh air
D 2	Main Fan % Volume	0...100% of K6 commissioned value (i.e. 0...100% of 4m ³ /s)
D 3	Prompt Alarm	0 (healthy) or I (alarm)
D 4	Deferred Alarm	0 (healthy) or I (alarm)
D 5	Heating Interlock	0 (off) or I (on)
D 6	Fan Output Signal	0...100% of fan speed range (i.e. 0% = 0V and 100% = 10V DC output from controller to fan)



Inputs

The Inputs list all software input categories. Inputs 1, 2 and 3 show the status of the controller's inputs from the digital input signal from the 4DIX module as derived from its wired inputs. Inputs 4, 5 and 6 show the smoke extract switch, fire shutdown switch and phase failure relay status, which are wired directly to controller inputs.

The other inputs are internal software inputs as derived from

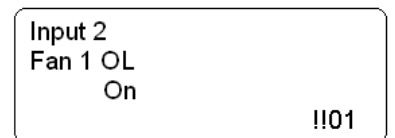
- a) any of the wired inputs above
- b) temperature sensors (e.g. high temperature alarm)
- c) Unit Manually Off switch
- d) inhibits (e.g. damper test inhibited by low outside air temperature)

Digital Input Overview			
Item	Label	Description	State
I 1	Filter Blocked IP	Wired Input: see I 8	On
I 2	Fan 1 OL IP	Wired Input	On
I 3	Fan 2 OL IP	Wired Input	On
I 4	Smoke Extract IP	Wired Input	On
I 5	Ess Pwr Fail IP	Wired Input	On
I 6	High Temp Alarm	From Return Air Sensor S 1 and/or Room Sensors S 2, 3 and 4	Off
I 7	Fire Shutdown IP	Wired Input	On
I 8	Filter Blocked Alarm	From I 1	Off
I 9	Low Temp Alarm	From Return Air Sensor S 1 and/or Room Sensors S 2, 3 and 4	Off
I 10	Unit Manually Off	From Switch 1	Off
I 11	Override Active	From either of Switches W 2 or W 3	Off
I 12	Smoke Extract Alarm	From I 4	Off
I 13	Temp Sensor Fail	From any temperature sensor	Off
I 14	Damper Failed Test	From Auto test Routine, comparing Sensors S 1, 5 and 6	Off
I 15	Fire Shutdown Alarm	From I 7	Off
I 16	Essential Fail Alarm	From I 5	Off
I 17	Fan 1 OL Alarm	From I 2	Off
I 18	Fan 2 OL Alarm	From I 3	Off
I 19	Damper Test Inhibit	On if Return Air – Outside Air differential is < 4 deg C or if outside air temperature is < 5 °C	Off
I 20	Heating Interlock On	Off if room temperature below K 14 setpoint	On

The "Normal State" shown in the Inputs table above is when there is no alarm, sensors are within normal range and switches are in their default position.

A typical input keypad page is shown on the right in an alarm state. Line 3 indicates that the alarm status is *On*.

The SDU-xcite shows the module alarm state on Line 4 if an alarm is present. This is an enumerated value showing the highest priority alarm present on the particular module. The entry *!!01* in the example indicates that the alarm type shown is from a digital input.



The alarm software categories enumerated in this way are:

Alarm	Item Type
01	Digital Input
02	High
03	Low
04	Out of Limits
05	Read

Alarm	Item Type
06	SP Deviation
07	Pv Fail
08	Maintenance
09	Readback

Digital Input Overview

IQ3 Controller
 © Address 20 on Lan 20

When viewing Inputs via Internet Explorer, as well as having the advantage over the keypad of being able to view ten Inputs at once, any Input currently in an alarmed state is clearly highlighted in red, along with a description of the type of input.

Item	Label	State	Alarm
<u>11</u>	Filter Blocked IP	On	No Alarm
<u>12</u>	Fan 1 OL IP	On	No Alarm
<u>13</u>	Fan 2 OL IP	On	No Alarm
<u>14</u>	Smoke Extract IP	On	No Alarm
<u>15</u>	Ess Pwr Fail IP	On	No Alarm
<u>16</u>	High Temp Alarm	Off	No Alarm
<u>17</u>	Fire Shutdown IP	On	No Alarm
<u>18</u>	Filter Blocked Alarm	Off	No Alarm
<u>19</u>	Low Temp Alarm	Off	No Alarm
110	Unit Manually Off	On	Digin

Time Zones

The time zone allows exceptions to be written in applicable programmes that would enable different parameters to be set up during certain times. This function is not applicable to Apparatus Room cooling with fresh air only, which operates in the selected mode at all times.

Alarms

Alarms are stored in a log which carries the most recent 50 events. An alarm condition will be listed as in the example on the right (which is the same alarm as that shown in the Input example above).

Alarm log 2
 Fan 2 OL Alarm
 On On
 21/08/03 11:29

- Line 1 indicates in this example that it is the second most recent log
- Line 2 refers to the Item label/type of alarm
- Line 3 *On On* means that there is an alarm present. When cleared, a later log will appear with this line changed to *On Off*
- Line 4 is the date and time of the incident







When viewing Alarms via Internet Explorer, all 50 will be displayed on a single page (See example in Section 5: Introduction) and each is described as either *Occurred* or *Cleared*. Active alarms can be seen in Explorer by accessing the Digital Inputs module (see above), where they will be shown highlighted in red.

Alarms are classified and extended as either Prompt or Deferred via a relay with clean changeover contacts in each case.

Alarms Overview			
Alarm Description	Classification	Normal State	Alarm Latching
Filter Blocked	Deferred	Closed	Yes
Main Fan 1 OR 2 Overload (MCB or motor internal switch)	Deferred	Closed	No
Main Fan 1 AND 2 Overload (MCBs or motor internal switches)	Prompt	Closed	No
Smoke Extract	Deferred	Closed	No
High Temperature Alarm (from highest room or return air sensor)	Prompt	Within Limits	No
Fire Shutdown	Prompt	Closed	No
Low Temperature Alarm	Deferred	Within Limits	No
Unit Manually Off (Switch W 1)	Deferred	On	No
Manual (Commissioning) Override Active	Deferred	Off	No
Power failure (phase failure relay operated)	Prompt	Closed	No
Temperature Sensor Failure	Deferred	Within Limits	No
Damper(s) Failed Routine Test	Deferred	Temp Changes	No

Time

This page enables the clock to be set as described below, using the  button to place the cursor at the appropriate value, the  and  buttons to alter the value, and the  button again to enter the new value and/or move to the next digit.

IQ Time	
+01 hours	
28/03	31/10
15/11/03	11:51

Line 1 indicates the time setting page

Line 2 enables an advance of 1 hour over GMT (or UST) to be added for summer clock time (BST). It is not strictly necessary to use this advance in this particular programme, since no function other than alarm recording is affected by time each day. (Line 4 must indicate GMT if this is used, however.)



Line 3 enables setting of the dates between which the BST advance is to take place.

Line 4 allows entry of the actual date (UK format: dd/mm/yy) and time (GMT).

Controller Accessories

SDU Cable

The cable is 6 core Cat 5, terminated with RJ11 connectors. The standard cable length is 3m overall. A 10m long cable is available to special order, for remote installation of the SDU, should this be required. Longer cable runs are permissible, up to 25m in length.

Temperature Sensor Inputs

These inputs are based on two standard Trend sensors. The sensors installed in the unit are type T/TFR4 (encapsulated) and those supplied with the unit for remote installation in the room are type TB/TS (in a ventilated pattern-mounting enclosure). Both types have the following temperature/resistance characteristics:

Temperature °C	Thermistor R Ω
-15	72980
-10	55340
-5	42340
0	32660
5	25400
10	19900
15	15710
20	12490
25	10000
30	8058
35	6532
40	5326
45	4368
50	3602
55	2986
60	2488
65	2082

Accuracy: to 2°C in the range 0 to 100°C.



BASIC CONTROL PROGRAMME

The control programme is designed to maintain the apparatus room temperature using fresh air (free cooling) and the minimum amount of fan power. To achieve this, the fan speed is ramped from 20% of the fan maximum speed when the room temperature reaches 18 degC to 100% (4.0 m³/s) at 33 degC.

The unit has an internal return air sensor, which can control the space on its own. However, up to three remote room sensors may be connected to the unit. Each room sensor input used must be activated in software from either the keypad or in Windows Explorer by turning Switch(es) 11, 12 and 13 to *On* where a sensor is present. When more than one sensor is installed, the damper, fans and HT alarm will operate in accordance with the highest signal. LT alarm will be in accordance with the lowest signal.

Mode A Operation

In Mode A, the fans run continuously. Below 18 degC, the fan speeds will be 20% of the maximum fan operating speed (this may be more than 20% of the design air volume on systems with limited airflow resistance, where knob K 6 has been set to give 4.0 m³/s at a fan output signal lower than 100%).

Mode B Operation

In Mode B, the fans will remain off and the damper closed until the room temperature reaches 18 degC. At 18 degC, the damper will open, and the fans start at 20% of maximum speed. At higher temperatures, the unit will operate as in Mode A.

In either fan Mode A or B, on restart after shut-down or power failure, the fans shall restart at 20% of maximum speed regardless of temperature to allow the spring return damper to reopen.

If one fan fails, the unit will continue in operation using the remaining fan.

ADDITIONAL CONTROL STRATEGIES

The basic control programme above may be modified under the following conditions:

Damper Operation

There is a recirculation/outside air damper at the base of the unit. During normal operation, this will be in the fully open position, with the fan speeds modulating to vary the amount of cooling as described above.

The damper will modulate during normal operation if the room or return air temperature maximum sensor reading falls below 18 degC until it is closed at 17 degC.

If the supply air temperature is low, the damper will modulate to control the supply air at between 5 and 6 degC. In a room with small heat loads, this scenario may occur in Mode A fan operation, even though the fans are at minimum speed.

Fire Shutdown and Smoke Extract

A normally closed remote fire shutdown switch may be connected to the Controller which, when operated, switches the fans off, and closes the damper to full re-circulation. Normal operation will resume if the switch is turned off.

A normally closed remote smoke extract switch (that only takes effect if the Fire Shutdown switch has already been operated) will restart the fan and open the damper to full fresh air.

Manual and Automatic Routines and Maintenance Test Facility

The unit will run a monthly automatic system check. This involves running the unit in recirculation and then fresh air (to check the damper operation by comparing the supply air/return air temperature with the outside air respectively). Keypad switch W 5 allows a maintenance engineer to activate this procedure manually.

Temperature Sensor Failure

The failure of any sensor will usually open-circuit the sensor input, causing a temperature of approximately -45 degC to be seen. Any sensor failure will generate a deferred alarm, which will disable the monthly automatic system check. On failure of the outside air sensor, the unit will continue to control otherwise normally. Failure of the return air sensor or a remote room sensor will cause the next highest sensor reading to be used for control. If no room sensors are fitted, failure of the return air sensor will close the damper and run the fans at 20% speed (Mode A) or stop (Mode B). On failure of the supply air sensor the damper will close in either Mode.



AIRFLOW

The airflow characteristics are described in *Section 2* under the heading *WFA4.0EC and WFA4.0ECDF Technical Data*.

EC Main Fans: power saving and speed control

This unit's type reference has an EC designation because the main fans have EC (Electronically Commutated) drive motors. EC drive comprises an EC motor with a matched EC controller, integral within the motor casting. The EC motor is a DC external rotor motor with permanent magnets. The EC controller is wired to the normal 3 phase AC supply. The direction and speed of rotation of the rotor is determined by the order and pulse frequency of the DC current supplied by the EC controller to the stator. The EC controller soft starts the motor so that the starting current at no time exceeds the full load current of the motor.

Commutators and brushes are replaced by electronic commutation from the EC controller, which also provides interfaces for easy control of the drive frequency and hence fan speed. Motor speed control may therefore be used to initially set the air volume during commissioning, or operate at lower speeds in accordance with a varying voltage input signal from the air conditioning unit's main controller as described elsewhere. Motor speed is independent of the AC supply frequency or the number of poles. The speed-torque curve is equal to that of a DC by-pass motor. The drives are optimised for compact design and high efficiencies over a wide torque and speed range. The EC motor efficiency is higher than that of an optimised asynchronous motor. There is reduced heat loss compared with a normal AC motor due to the elimination of slip losses and lower winding and iron losses. Contactless commutation should also result in long service life.

EC motors tested side-by-side at Weatherite Manufacturing Ltd have been shown to require between 45 and 55% the input power of the equivalent AC motor.

OTHER DEVICES

Filter Dirty Switch

This is an air pressure differential switch, which detects the air pressure drop across one set of the main filters. In the event of excessive pressure drop (indicating filter change required) the switch will activate and send out a deferred alarm. The switch automatically re-sets when new filters are installed.

Free Cooling Damper Actuator

The damper actuator operates from a modulating 0 or 10V DC signal from the Controller. 0V represents full recirculation and 10V full fresh air. The actuator is linked by a swivel-jointed linkage to the lightweight damper plate.

Do not attempt to move the damper plate without disconnecting the linkage.

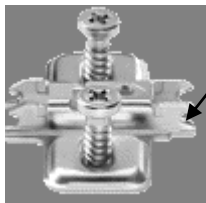
The damper position may be overridden from the software by personnel with COM access PIN using Switch W 3 and Knob K 2.

Door Hinges

The door hinges are fully adjustable for vertical trim, squareness to the unit frame and seal compression (see *Section 4: Commissioning* for instructions).

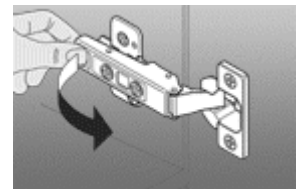
The hinges also have a useful feature that enables the door to be removed without disturbing any of the above adjustments. Each hinge has a lever situated at the rear of the main pressing which can be lifted to release it from the backplate.

Release all of the hinges to remove the door. Do not overstretch the wiring loom to the Keypad and lamps on the left hand door.



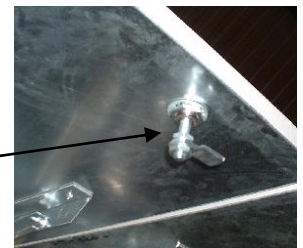
When refitting the door, be sure to engage the pin behind the hinge into the slot at the front of the hinge backplate before snapping the releasing catch back into place.

If a backplate has been removed from the casework, ensure that the arrow on the plate points forward (towards the door) when refitting.



Door Latches

The door latches are adjustable for seal compression. The locknuts each side of the latch pawl can simply be repositioned to suit the compression required.



6. MAINTENANCE

The following items indicate guidelines for the recommended routine maintenance of the units.

QUARTERLY TASKS

This sub section covers first line preventative maintenance tasks for the WFA4.0EC or WFA4.0ECDF Approved Cooling Unit and Ancillary Systems.

The following tasks should be programmed initially at QUARTERLY intervals. However, the frequency with which louvres and air filters become clogged will vary from site to site. The periodicity should be adjusted according to local conditions. The First Line Maintenance person should adjust the period in the light of experience and by arrangement with the Maintenance Control Point.

Note: Air filters do not necessarily need changing just because they are discoloured. In fact, filter efficiency improves as they become slightly dirty. They only require changing when dirt accumulation restricts airflow. Therefore all filters at a site should be changed at a frequency which just precedes a Filter Blocked Alarm.

External Louvres

The outside faces of the louvre should be checked to ensure that nothing is obstructing the air passage. Leaves and litter may be removed by hand or brush or 'pushed off' from the inside face of the louvre on high rise buildings, obtaining access via the duct access doors.

Controls

Check controller routines by operating the Maintenance Autotest Switch W 8. This will run the fans and damper over a timed test sequence enabling them to be observed and their operation and running currents to be checked.

Filters

The main filters have a pressure differential switch piped across one bank, which sends out an alarm when filters require changing. However these should be inspected at a minimum of twice a year on a routine basis. Frequency of changing may vary with conditions. It is essential that all the filters are changed together to ensure maximum airflow capabilities, particularly during the summer months.

Ancillary Systems

The full scope of maintenance requirements for ancillary equipment should be obtainable from the system supplier's documentation. However, check that ductwork damper settings and duct or ventilated bulkhead outlets are still set as commissioned.

Remote P.R.Vs.

Check for free operation etc. Test unit to ensure correct operation and room pressure.

ANNUAL TASKS

Carry out Quarterly Tasks

Electrical Terminals

Check the tightness of all terminals in the panel and junction boxes that carry load to ensure wiring has not become loose.

Damper Operation

The damper operation can be checked by operating a routine test from switch W 8. Check that the damper(s) operate freely and correctly in both directions. Alternatively, and to check the shut-down return spring, turn the unit off and back on either at switch W 1 or the incoming mains. Wait until the damper closes fully before turning back on.

Do not attempt to move the damper plate manually without disconnecting the linkage.

Fans

Inspect fans for general damage and debris inside the impeller and. Turn over by hand to check for smooth rotation. Check tightness of fixing screws and terminals in terminal box.

Sensors

Make a visual check of sensors, including any room sensors fitted, to ensure they are clean and wiring connections good.

General

The inside and outside of the unit should be cleaned with a vacuum hose and /or wiped down to prevent build up of dust and dirt. Particular attention may be needed to all areas upstream of the filters.



Troubleshooting Guide

Symptoms	Possible Cause	Action
Alarm present	See alarms list in <i>Section 5</i> . Look in <i>Alarm History</i> for most recent alarms, or in <i>(Digital) Inputs</i> for an active alarm (not in normal state as listed in <i>Section 5</i>)	<ul style="list-style-type: none"> Investigate and attend to active alarm(s)
Fan(s) not running	Fans off or running very slowly Fan Overload Fans operating in Mode B (Switch W 4 turned to Off)	<ul style="list-style-type: none"> Unit Off at keypad Switch W 1 or running slowly: see Driver D 6 for fan current speed signal See below For continuous fan operation, Switch W 4 to On
Fan Overload Alarm	High current on one or both fans Motor EC board fault	<ul style="list-style-type: none"> Check volumes; ensure fan access door is closed. Check voltage onto fan and ensure all three phases are healthy. Apparent if MCB has NOT tripped. Check items as above. Contact Weatherite or ebm papst if cause not located.
Damper not operating	Damper jammed Actuator seized Clamp slipping Linkage faulty or damaged	<ul style="list-style-type: none"> Examine (remove damper plate if necessary) and clear obstruction Check mechanical and electrical operation and change if necessary. Tighten "U" clamp Check levers and swivel bolts/nuts
Filter Dirty Switch Alarm	Pressure drop across filters too high	<ul style="list-style-type: none"> Check condition of filters and change as necessary. If filter is clean, check for excessive airflow, faulty or incorrectly adjusted switch.
Phase Failure Alarm	Phases imbalanced Faulty Phase Failure Relay	<ul style="list-style-type: none"> Check voltage on each phase to ensure all healthy. Check switch adjustment.
Room over-pressurisation	Well-sealed room causing high internal pressure when damper is at or near full fresh air position	<ul style="list-style-type: none"> Check that the pressure relief flap assembly is operating correctly and not obstructed. Check that the pressure relief louvre and flap assembly is of adequate size.
Low Temperature Alarm	Unit(s) over-cooling Damper fault Little or no heat load	<ul style="list-style-type: none"> Check damper action and ensure correct unimpeded plate travel Place unit operation into Mode B
High Temperature Alarm	Insufficient cooling	<ul style="list-style-type: none"> Check that all temperature sensor readings agree with actual conditions Check that fans are called and operating correctly Check damper action Check filter condition Check unit intakes are clear and louvres clean Check for distribution system blockages Check fan discharge non-return flaps are not jammed shut or obstructed
Faulty Keypad operation	No communication with controller or communication lock-up Push-buttons jamming in cover plate	<ul style="list-style-type: none"> Wiring fault: check interconnecting cable. Unplug cable from rear of SDU and replace it after about 20 seconds. SDU holding screws overtightened: slacken off slightly and allow backplate to regain shape.
External PC will not read from controller	No communication	<ul style="list-style-type: none"> Wiring fault: check interconnecting wiring and cable type. Incorrect controller address. Incorrect TCP/IP address in PC Control Panel Network Connections LAN settings



7. Warranty

This is a summary of the main clauses of the current warranty agreement between Weatherite and BT.

The warranty period of the equipment is entered on the label on the inside of the control cubicle door and another on the front of the unit.

The current warranty is for parts and labour. It extends for 63 months from the date of delivery of the equipment to site, or for 60 months from the date of commissioning, whichever is the sooner.

Previous warranties may differ, e.g. they may be for shorter periods and may include the Controller for the first year only.

The warranty is not an emergency response contract. Response times are normally within two working days, but may extend beyond this in certain cases. If in doubt, see BT Technical Note No 640.

The warranty is subject to initial BT fault investigation, diagnosis and attention to minor faults.

To enable them to be progressed, warranty calls must include the site name, the equipment location, type and serial number, and a detailed description of the fault.

The warranty is valid only if the equipment has been properly maintained throughout its service period.

Warranty call-outs should be made to Weatherite Manufacturing Ltd: 0121 665 2266

8. Disposal

Safety Requirements

Many of the safety requirements in *Sections 1 and 3* apply equally to the decommissioning and removal procedures prior to disposal.

This is of particular importance with any work relating to lifting the unit or the electrical side, where there is a danger of electric shock.

Air Filters

Filters fitted by Weatherite are of a synthetic media and may be disposed of by the normal means. Should filters be of another media, in particular Glass Fibre, further guidance for their safe handling and disposal should be sought, either from Weatherite or the filter manufacturers

IQ3xcite controller: base and output modules and 4DIX modules

COSHH assessment for disposal of IQ controller: The only part affected is the lithium battery (on the optional extra battery option board) which must be disposed of in a controlled way.

RECYCLING. All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

The above guidelines should be read in conjunction with any currently or subsequently produced by BT. Where conflict arises the re-recommendation of BT will take precedence.

Appendix 1

Component Removal/Replacement

Supply Fan

NB: on upflow units, where the fans are at high level, we recommend that this operation be carried out by two people.

1. Isolate all electrical supplies to air conditioning unit and lock off.
2. Note the wire numbers and disconnect from supply.
3. Take out the restraining nuts and bolts from around the fan diaphragm plate perimeter
4. Do not separate the individual components of the impeller/spider frame/inlet ring assembly.
5. Remove old fan assembly. The fan's weight is initially supported by the fan section floor on the upflow units. On the downflow version, the fan drops into a set of channels to support its weight. When working on either model, be prepared to take the fan's weight as it is drawn from the unit.
6. Replace with new / repaired model, check model numbers for suitability.
7. Re-position all restraining nuts and bolts.
8. Re-connect electrical supply as previously noted.
9. Switch on electrical supply to unit and fan.
10. Check operation of fan motor.



Damper Plate

The plate should only need to be removed to service bearings, assist in changing a faulty outside air sensor, or as an aid to louvre/rear duct access. It is a two-person operation, especially on downflow units, where the plate is at high level.

1. Disconnect the damper link arms at the centre pivot bolt joining the two arms and remove.
2. On downflow units, remove the mullion that forms the damper mounting bracket and move it, complete with the actuator, clear of the access opening, taking care not to damage the wiring loom.
3. Pull the spring-loaded spindles clear of the bearings at each end of the plate and swing the top of the plate towards the front of the unit.
4. Remove the entire plate from the unit.
5. Replace in the reverse order to that described above.



Damper Actuator

1. Note that the actuator has a return spring that will operate in one direction only. Make a note of the rotation arrow direction/location on the actuator body.
2. Isolate electrical supplies and lock off.
3. Loosen shaft clamp, remove the two restraining bolts to the mounting bracket, and remove the actuator.
4. Note all wire numbers, and connections. Identify 24V wiring and 0...10V DC wiring in the loom.
5. Disconnect wiring.
6. Replace with new actuator, ensuring that the spring rotation arrow direction is as noted on the original actuator body and re-tighten restraining bolts firmly.
7. Re-connect wiring, making sure 24V AC is not connected to the 0...10V DC connection.
8. Switch on electrical supplies and check rotation of damper and spring return (closes outside air when unit is powered down)...



Component Weights	WFA4.0EC or WFA4.0ECDF
1) Supply Fan Assembly (each)	30kg
2) Damper Plate	20kg
3) Other items listed in this section weigh less than 1 Kg	

Appendix 2

Spares For WFA4.0EC and WFA4.0ECDF With Trend IQ3xcite Controller and Keypad

Component Description	Manufacturer	Model No Part No	Weatherite Spares	Recommended Holding Per Site	Number as Originally Fitted Per Unit
Air Pressure Switch	Becks	930-83	36-361-045	1	1
Fan MCBs	Siemens	3RV10111	31-310-065	1	2
Contr Cct primary MCB	Siemens	5sy6104-8 1p4a	31-310-001	1	1
Contr Cct secondary MCB	Siemens	5sy6206-7 2p6a	31-310-010	1	1
Damper Actuator (Pre-02.11)	Belimo	AF24-SR	37-370-025	1	1
Damper Actuator	Belimo	SF24-SR	37-370-026	1	1
240V/24VAC Transformer		200VA	35-352-020	1	1
Door Key	Southco	E3-2-1	15-153-060	2	1
Door Lock	Southco	43GWNP00570	15-153-045	2	6 (10 on downflow)
Door Hinge assembly		9/01381	15-150-015	1	10 (6 on downflow)
Damper spindle			15-150-005	2	2
Controller	Trend	IQ3xcite OEM	39-391-015	1	1
Digital Input Multiplexer	Trend	4DIX	39-391-025	1	1
Keypad	Trend	SDU/xcite	39-391-030	1	1
Keypad cable, 3m	Trend	SDU/cable	39-391-035	1	1
Temperature sensor	Trend	T /TFR-4	38-382-055	1	1
Room temp sensor	Trend	TB/TS	38-382-060	1	up to 3
Fan	ebm papst	R3G560	10-105-005	1	2
Main Filters EU4	Filterite	394x495x95mm	09-090-049	One change	8
Phase Failure Relay	Broyce	M1PRT	31-314-025	1	2
Control Relay		24V AC	31-314-010	1	4
Single relay module	Trend	SRMV	31-314-005	1	3
Spares Box	Weatherite	WFA4.0	SP01BX	1	N/A



Appendix 3 Resetting Alarms (from the Keypad)

All alarms are reset from keypad *Switch 7*. For further information on the keypad and its operation, see section E below. For operatives unfamiliar with the keypad who wish to attempt to clear an alarm, the following describes the procedure:

The keypad should initially look something like the illustration below. Note where the cursor is: it is an underline beneath one letter, usually the first letter on line 1, as in the illustration.




Line 1 is the Item Type, followed by the Item No.
Line 2 is the Item Label
Line 3 is the Item Value, followed by units
Line 4 is the Item Alarm State





The four keys are used to locate individual display pages, or text on a particular page. The first touch of any key will illuminate the backlight, the brightness level of which is fixed.

Line 1:


With the cursor on Line 1, use the  button to step through the list of item types. The following list shows the item type in the order as displayed and the parameters shown

Sensors	label, value, units (as shown above)
Knobs	label, value, units
Switches	label, status
Drivers	label, value or status
Inputs	label, status
Time zones	label, start and stop times etc
Alarms	label of module producing alarm etc
Time	time, date etc

Further use of the  button after the Time item type on this list will cause it to roll round and start again from Sensors. The  button will roll through the list in the opposite direction.

TO RESET ALARMS, YOU NEED LINE 1 TO BE ON "SWITCHES". (Normally it will default to "Switch 1" initially.)


Line 2:

Once the Switch Item is selected on line 1, the  button should be pressed, which will bring the cursor down to the first character on the second line.

The required Switch can then be selected by using the  and  buttons to roll through the list.

TO RESET ALARMS, YOU NEED LINE 2 TO BE AT "SWITCH 7"

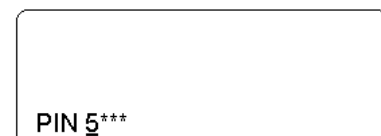
Line 3:





The  button will now bring the cursor down to the third line. Switch 7 defaults to "off" on this line.

PRESSING THE  BUTTON SWITCHES IT TO "ON", BUT YOU WILL BE ASKED FOR YOUR PIN FIRST.


Line 4: PIN Entry:




The following page is displayed on attempting to reset the alarms. You need to enter your PIN "7439" or "4321":



The cursor will be under the first PIN digit, enabling the PIN to be entered. The digit can be changed from the default figure 5 in the range 0 to 9 by using the  or  buttons. Once the correct digit has been displayed the next digit is selected by pressing the  button, the screen then changes to: **PIN: *5****
This is repeated for all digits. Once the fourth digit of the PIN number is completed, the  button will enter the PIN.



You can then press the  button again to turn the alarm reset to "On". (It will revert to "Off" on its own after a short while)

Tip: Entering a PIN is easier at first if you use your left hand for the  button and your right hand for  and .
The PIN will remain active for 2 minutes after the last button is pressed, after which it will expire.

Appendix 4 General Arrangement

Drawing No

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Issue

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Issue Date

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Drawing No

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Issue

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Issue Date

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Drawing No

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Issue

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Issue Date

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Drawing No

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Issue Date

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Appendix 5 Schematic Wiring Diagrams

Drawing No

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Issue

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Issue date

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Drawing No

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Issue

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Issue Date

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Drawing No

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Appendix 6 Commissioning Sheets

N.B. If the commissioning sheets are not enclosed in this section, please request a set from the Building Services Contractor or Weatherite Building Services Ltd.

Appendix 7

EMC - Electromagnetic Compatibility

WFAEC units have been designed and type-tested to comply with the EU Directive on Electromagnetic Compatibility 89/336/EEC.

In order to maintain compliance with the above directive, and to ensure the equipment operates without spurious interference, it is essential that the following recommendations be adopted.

1. Do not site the equipment adjacent to radio transmitters, TV transmitters, radar transmitters or any other device that radiates at radio frequencies. If in doubt, or for guidance on the acceptable proximity of such equipment, the manufacturer, installer or user of the transmitter(s) should first be consulted.
2. Ensure that all connecting electrical cables are run in accordance with current good practice and in a manner such that it will not compromise the EMC integrity of the installation.
This is of particular importance with any signal wiring to control devices or remote communication ports. In all instances, this should be run separately to mains cables, and may require specific segregation and/or shielding/earthing (grounding). This applies particularly to wiring from any remote room sensors that are connected to Inputs 2, 3 and 4 on the controller, the wiring for which must be shielded and earthed as described in this manual.

Please refer any queries to Weatherite Electrical Design Office.

Appendix 8

List of Abbreviations

The following is a list of abbreviations that may be used in the general text of this manual.

m ³ /s	Cubic metres per second (air volume)	Δt	Differential temperature
Pa	Pascals	Hz	Hertz
FLA	Full load current (amps)	dB	Decibels
HT or H.T.	High Temperature	NR	Noise rating
Nom	Nominal	PRV or PRF	Gravity pressure relief device
O/ride or OR	Override	NRF	Gravity non-return device
PF	Power Factor	LED	Light-emitting diode
PIN	Personal Identification Number	SDU	Trend Smart Display Unit
Temp	Temperature		

Appendix 9

P.R.V. Guidelines

Each unit requires a P.R.V. installed in an outside wall to prevent over pressurisation of the room and to ensure the correct operation of the cooling system. The following list gives general guidelines to selection.

1. The pressure loss through the P.R.V. and its respective louvre should not exceed BT recommendations for the maximum pressure in the room.
 2. Size and shape of any P,R,V. will vary depending on site conditions and available opening sizes.
 3. The P.R.V. opening is a source of noise escape from the room to the outside, and the acoustic requirements for the site need to be taken into account when selections are made. It is possible that acoustic louvres will be required and/or internal silencers.
 4. The positioning of the P.R.V. has an influence on air flows and BT guidelines must be followed to ensure correct air flow patterns between the supply and exhaust fittings.
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