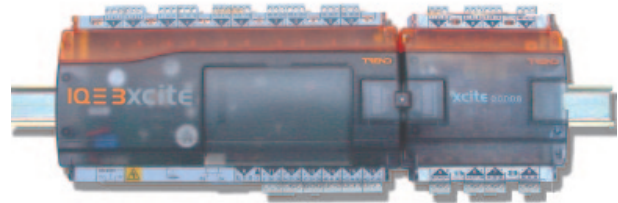**TREND**

IQ3 Controller

BACnet (ASHRAE)

BACnet™ is a trademark of ASHRAE.

Description

The IQ®3 controller has 10 universal inputs and 6 analogue voltage outputs and is expandable up to 128 points (depending on the controller variant) by adding I/O modules. This flexibility makes it suitable for a broad range of applications.

The IQ3 controller uses Ethernet and TCP/IP networking technologies with an embedded XML option. It is fully compatible with other Trend IQ controllers. BACnet over IP and Trend communications over a current loop LAN are available as options. A local PC or display (e.g. IQView4) can be connected to the RS232 port.

Features

- 16 onboard I/O channels - 10 inputs and 6 outputs
- I/O bus supports up to a total of 128 I/O points (depending on the controller variant) using additional I/O modules
- Ethernet 10 Mbps main network with TCP/IP protocol
- Trend current loop LAN option
- Embedded XML Web Services option
- BACnet over IP option (certified as a BACnet Application Specific Controller)
- RS232 local supervisor port
- DIN rail mounting
- 230 Vac or 24 Vac input power supply options
- Battery backup, or serial auxiliary board options

Physical

Diagram shows IQ3XCITE/96 or /128 (other versions may have less I/O connectors)
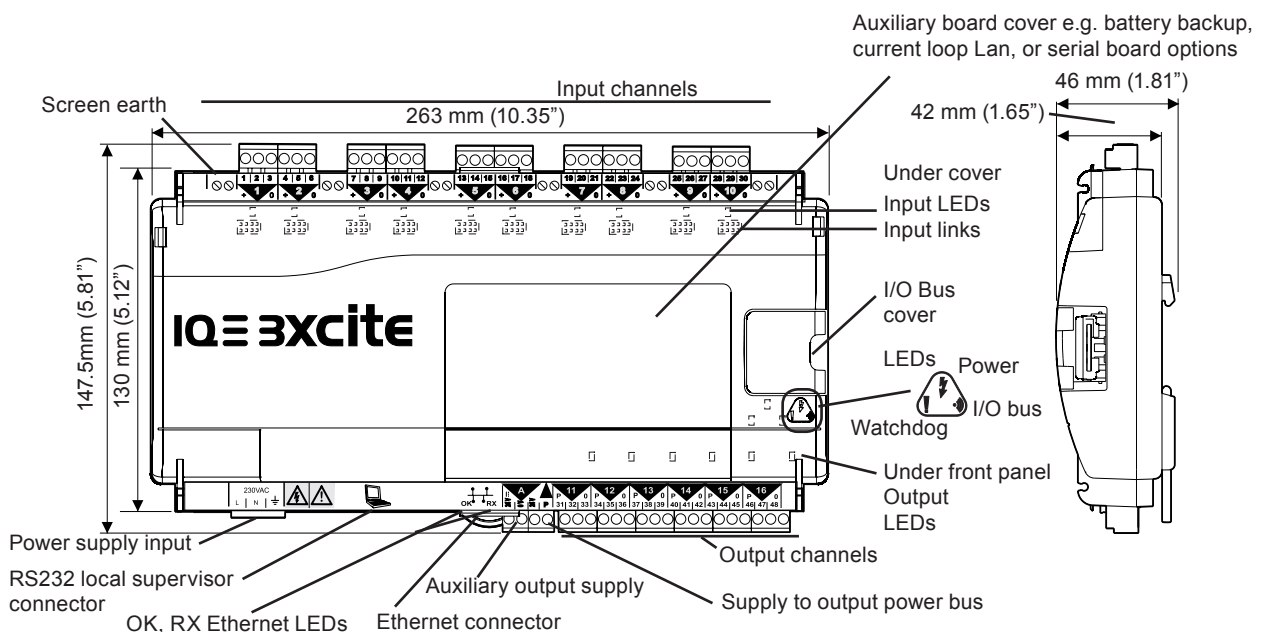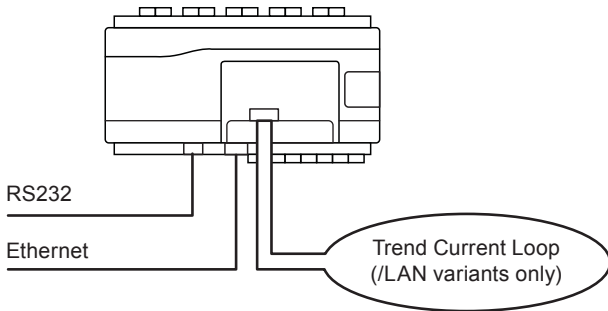
FUNCTIONALITY

The IQ3's functionality can be divided into four sections: System, Hardware, Firmware, and Strategy.

SYSTEM

The IQ3 has communication ports for Ethernet, and RS232 (Local Supervisor) and Wallbus. In addition, units with the current loop LAN auxiliary board fitted, have a Trend current loop:

Ethernet

On units that do not have the current loop option (or on /LAN variants that have the current loop disabled) the IQ3 can form a Trend LAN with other devices over the Ethernet network.
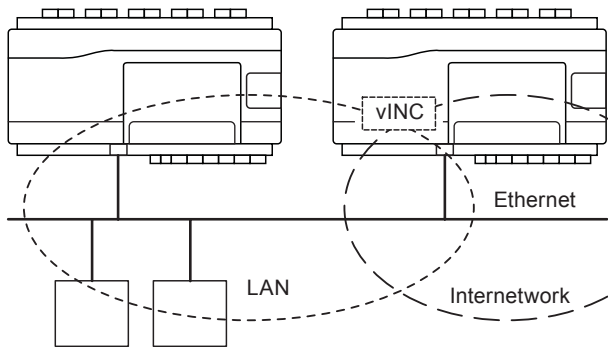
In addition, the IQ3 has the ability to join an internetwork using its virtual INC (see "Networking" on page 3 for further details).

Other devices connected to the Ethernet network can communicate with the IQ3 using IP addressing. Remote PCs can communicate through standard IT networks using IP, enabling communication from anywhere in the world.

Note: Communication with the Trend network by a supervisor, tool or display will require the use of a virtual CNC (vCNC) in the IQ3 or another CNC on the network (see "Networking" on page 3 for further details).

An integral web interface is also accessible over an Ethernet/IP connection (see "Web Pages" on page 7).

The IQ3 supports either static or dynamic (DHCP) IP addressing. DHCP is enabled by default.

Each IQ3 has a unique MAC (Media Access Control) address allocated to its Ethernet node. This can be used to help identify the IQ3 during configuration.

Current Loop (../LAN variants only)

On units that have the optional current loop LAN auxiliary board fitted, the IQ3 will form a Trend LAN with other devices on the current loop.
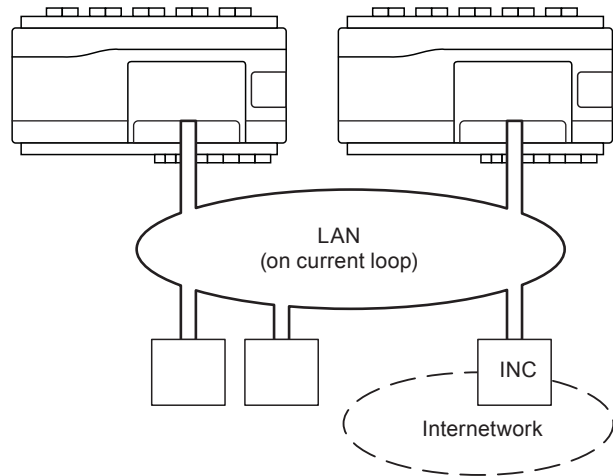
Note: In this configuration the IQ3 cannot join a Trend LAN on Ethernet. However, access by IP is still possible.

In order to join an internetwork, an INC (e.g. IQ4NC) type device will be required elsewhere on the current loop LAN.

The current loop may be wired in either a 2-wire or 4-wire configuration.

Network Bypass Relay: If the IQ3 loses power a set of bypass relays will close to maintain the integrity of the current loop network. If the relays close it will be recognised by a downstream device, and reported as a LAN Changed alarm.

Baud Rate: The IQ3's baud rate is set using the address switch.

RS232 (Local Supervisor Port)

An RS232 port is provided for the optional connection of local display devices, sensors or supervisory tools. Only one device may be connected at one time.

The connected device can be restricted to communicate only with the IQ3 or (if supported by the device) with the entire Trend network (see "Networking" on page 3).

BACnet Communications (/BAC variants only)

The IQ3 is designed to be a BACnet Application Specific Controller. BACnet is an open protocol that enables the products of a number of different manufacturers of building automation and control equipment to communicate with each other. It supports communication using BACnet over IP (Ethernet) including:

▪ Access to IQ3 parameters over BACnet,
▪ Alarm delivery,
▪ IC comms to a BACnet device.

A full specification of the objects, properties, and BIBBS (BACnet Interoperability Building Blocks) supported by the IQ3 are given in the IQ3 Protocol Implementation Conformance Statement (TP201002). The mapping of the BACnet properties to the Trend parameters is covered in the IQ3 Configuration Manual (TE200768).

XML Web Services

The IQ3 has an option for XML web services. XML is a general purpose specification for creating custom markup languages. It helps developers create web pages and also provides a basic syntax that enables information to be shared by different computers and applications. The IQ3 XML syntax is described in the IQ3 Configuration Manual (TE200768).

Inputs and Outputs

The IQ3 has 10 universal inputs and 6 analogue outputs. See "Hardware" on page 3 for further details.

I/O Expansion Modules
Further I/O channels can be added to the IQ3XCITE by the connection of various types of I/O expansion modules to the I/O bus.
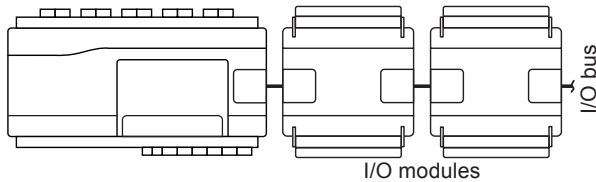
I/O modules

Several IQ3 variants are available to provide support for differing numbers of I/O channels up to a maximum of 128 (16 onboard, 112 on I/O bus) (see "Order Codes" on page 9).

The following I/O module ranges are compatible with the IQ3 v3.10 or greater:

▪   IQ4/IO   see IQ4/IO Modules Data Sheet (TA201341).
▪   XCITE/IO   see XCITE/IO Modules Data Sheet (TA201352).

Up to 15 modules from either range can be connected to the I/O bus, subject to power requirements and the number of I/O channels supported by the controller.

The last module on the I/O bus must be fitted with a terminator. A suitable terminator (compatible with XCITE/IO modules only) is supplied with the IQ3.

Networking

In order to connect to the Trend network the IQ3 will create its own internal LAN which includes the following nodes:

▪   a CNC for its own controller,
▪   a supervisor CNC (sCNC1) for its RS232 port,
▪   a virtual CNCs (vCNC), and
▪   a virtual INC (vINC).
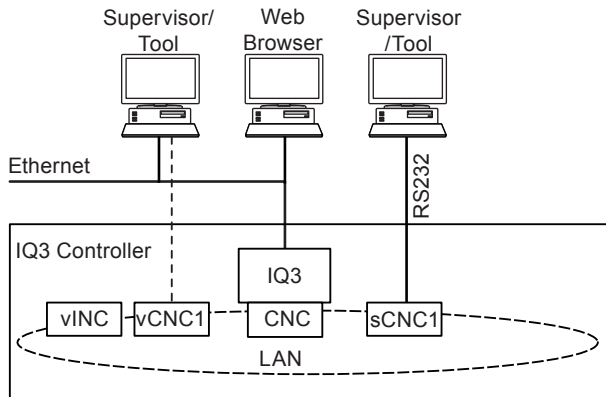
sCNC1 Functionality: If the RS232 port address is set to 0 (default), sCNC1 is disabled and a connected device can only communicate with the IQ3. If the address is configured to be non-zero, sCNC1 is enabled with that address on the LAN and allows a connected device to communicate with the entire Trend network.

vCNC Functionality: Allows a supervisor tool/display to make a permanent connection to the Trend network using TCP/IP. By default the vCNC is disabled.

vINC Functionality: When the IQ3 joins a LAN on Ethernet, the controller with the lowest IP address assumes INC functionality (using its vINC at address 126); any vINCs in other controllers on that LAN will automatically be disabled. The vINC does not exist on a current loop LAN.

IC Comms: The IQ3 can communicate with other IQ controllers and BACnet devices using IC Comms. Some controllers running earlier versions of firmware may not support all IC Comms types. See "Compatibility" on page 8.

HARDWARE

Inputs and Outputs

The I/O channels available vary with the IQ3 type as shown in the table below:

IQ3XCITE/16	10 universal inputs, and 6 analogue outputs
IQ3XCITE/96 IQ3XCITE/128	10 universal inputs, and 6 analogue outputs plus additional I/O channels can be provided by connecting I/O modules to the I/O bus to provide up to a maximum of 96 or 128 channels.

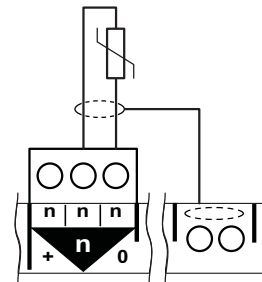### Universal Inputs: (Channels 1 to 10)

Each input channel will function as one of the following:

▪   thermistor input,
▪   voltage input,
▪   digital input, or
▪   current input.

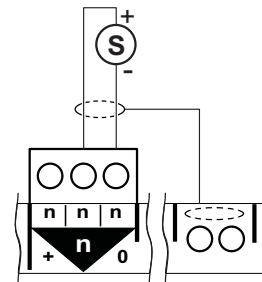The input function is set automatically by hardware links.

Thermistor input: Used for a thermistor inputs.
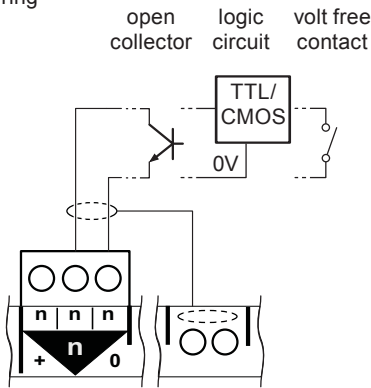
Example wiring

Voltage input: Used with a 0 to 10 Vdc source.
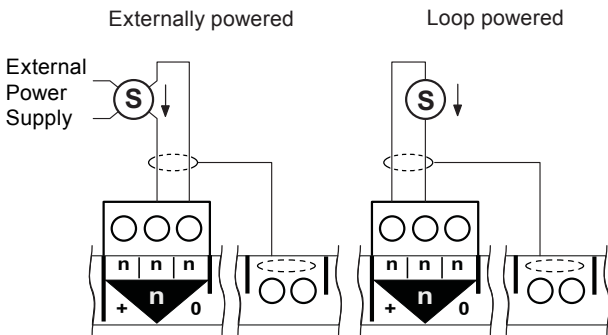
Example wiring

Digital input: Used for a volt free contact, logic circuit (e.g. TTL, CMOS), open collector (transistor) or open drain (FET).

Example wiring

Current input: Used for 0 to 20 mA sources which can be externally powered or loop powered.
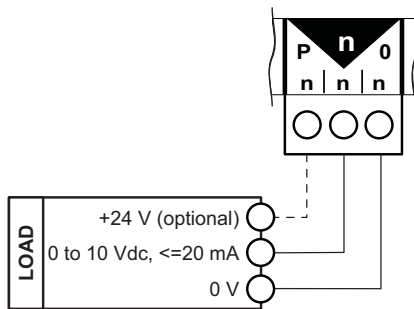
Example wiring

Analogue Voltage Outputs (Channels 11 to 16.)

These provide a variable control voltage between 0 and 10 Vdc. The output can source up to 20 mA (see "Combined Supply").

Example wiring

Auxiliary Supply Output

This output can be used to supply I/O devices (e.g. sensors). It provides 24 Vdc. The available current also depends on other current demands (see "Combined Supply").

P Terminals: The P terminals supply power to the output devices. The power can come from the auxiliary supply output, or from a dedicated, isolated, 24 Vac/Vdc power supply.

The external supply can be either 24 Vac or 24 Vdc, but if the output devices require a mix of 24 Vac and 24 Vdc a decision will have to be made over which supply to connect to the P bus; the other supply will need to be provided by external wiring.

The analogue output circuitry is protected against the wrong connection of a non-isolated external supply by a non-replaceable fuse. The P terminals are protected by a 1.6 A self-resetting multifuse.

Note: If an external 24 Vac/dc power supply is used, it must be dedicated to I/O channel use, and it must comply with the relevant EMC and safety standards.

Combined Supply

The IQ3's combined supply provides power for the:

- ▪ Inputs
- ▪ Analogue outputs,
- ▪ Auxiliary supply terminals,
- ▪ RS232 port,
- ▪ I/O Bus supply.

The total available current is 700 mA (reducing to 550 mA for /100-240 version if the 230 Vac input power supply is less than 200 Vac).

The input and output channels are current limited at 22 mA each. The part of the combined supply used by the RS232 connector and the auxiliary output supply is current limited to 150 mA (typical). The following checks should be made:

- ▪ The maximum current 700 mA (550 mA) available from 24 Vdc combined supply is not exceeded.
- ▪ The 150 mA supply to the RS232 and Auxiliary output supply is not exceeded.

If the total power requirement of the combined supply is more than the controller can supply it will be necessary to power some to the items using external power sources.

For details on calculating the available current from the combined supply, see the IQ3 Configuration Manual (TE200768).

PSU has thermal overload protection and the combined supply is protected by a self resetting electronic circuit breaker.

Enclosure

The IQ3 is housed in a polycarbonate case. Integral spring clips on the back of the case enable the unit to be clipped on to (and quickly released from) a standard TS35 DIN rail.

The IQ3 must be installed in a secondary enclosure with a minimum protective rating of IP20 (or equivalent).

The unit may be mounted horizontally or vertically but not upside down or on its back:
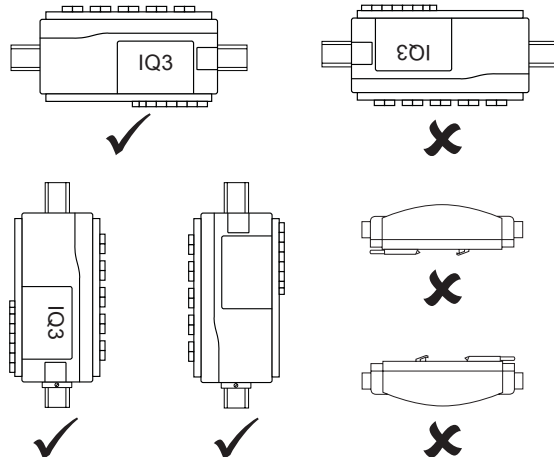
Clear polycarbonate covers provide access for the power, communications and I/O connections.

Input Power Supply

The IQ3 has both 100-240 Vac and 24 Vac input power options.

The power supply is protected against catastrophic failure by a non-replaceable fuse.

/100-240: This option requires 100 to 240 Vac at 50 or 60 Hz. The supply must include a dedicated 5A fuse complying with IEC60269 (BS1362) and a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit. A 5 A circuit breaker with high breaking capacity may be used as an alternative.

/24VAC: This option requires 24 Vac at 50 or 60 Hz, 24 to 60 Vdc (36 Vdc maximum for /UL versions). Power requirement is 40 VA maximum.
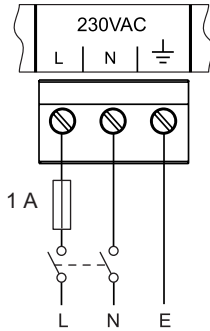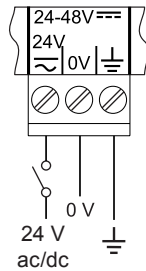
The 24 V supply must include a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit. Do not position the equipment so that the disconnecting device is difficult to operate.

Service Button

Can be used to reset the IQ3 to its factory default condition.

Indicators

Various indicators are provided giving feedback on the operational status of the controller.

General

Indicator	Colour	Function
Power	Green	Condition of input power supply
Watchdog	Red	Presence of a firmware/strategy fault
I/O Bus	Red	Status of connection to I/O modules

Ethernet (on end of Ethernet connector)

Indicator	Colour	Function
OK	Green	Status of connection (Ethernet LINK)
RX	Yellow	Presence of data reception

Inputs/Outputs (in line with the appropriate I/O terminals and next to the label).

Indicator	Colour	Function
Input	Yellow	On/Off state of associated input (digital input mode only)
Output	Yellow	Light intensity varies with output voltage

Trend Current Loop (located on current loop LAN auxiliary board).

Indicator	Colour	Function
RX	Yellow	Status of connection to previous device
TX	Yellow	Status of connection to next device

Backup

The data (firmware, strategy, parameters) is stored in flash memory which is non-volatile in the case of power failure. Changes to the Address module are stored immediately. Other changes are generally stored around midnight, in addition structural changes (e.g. module interconnections) are stored 15s after the last change, and critical data changes (e.g strategy values), are stored on power failure or other similar fault conditions. Tools (e.g. SET) will send an archive instruction after parameter changes causing immediate storage of changes.

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).

Optionally a battery board (XCITE/BBC) can be fitted into the unit; this will support the clock for several years in the event of power failure (e.g. for Timemaster).

If the battery hasn't been discharged, it should be replaced routinely every 5 years. The battery (type CR2032) can be replaced after turning the power off and removing the auxiliary board cover (while the battery is not in circuit the supercap will maintain the real time clock).

LAN Auxiliary Board

The /LAN variants are supplied with a LAN auxiliary board in the auxiliary board slot, and a special auxiliary board cover which enables access to the auxiliary board switches and connectors. The board contains the normal hardware for an Trend current loop LAN node:

Address/Baud rate switch: The address on the LAN is set by poles 1 to 7 in range 1, 4 to 9, 11 to 119. The Address module's 'Local Address' parameter monitors the address switch settings and is read only for IQ3/LAN. The baud rate is set by poles 8 to 10 in the range 9k6, 19k2 and must match the other nodes on the LAN.

Network terminals: The network terminals facilitate connection of 4 wire cables (enabling a 'weaving' connection method).

Indicators: The standard LEDs are fitted (TX, RX, and network OK).

Bypass relays: The board contains 2 changeover relays which bypass the receive and transmit circuitry and maintain network integrity during power fail.

The LAN auxiliary board contains the circuit for a backup battery so it can also fulfil the function of XCITE/BBC. However, the battery is not supplied so must be purchased separately if a battery backup option is required.

FIRMWARE

The firmware in the IQ3 controls its basic functionality and provides a range of modules that can be configured to produce a control strategy.

Modules

The range of modules provided in the IQ3 firmware are listed in the table below. Full details of each module can be found in the IQ3 Configuration Manual (TE200768).

Module	brIQs	Max. number of Modules	Note
Address	24	1 (fixed)	③
Alarm Destination	14	(8)	
Alarm Group	9	500	
Alarm Route	9	500	
Alarm Log	0	1 (fixed)	③
Analog Node	16	510	
Digital Byte	16	1012	
Digital Input	28	1000	①
Directory	13	500	
Display	19	500	
Driver	57	500	①
Function	19	500	①
IC Comms	19	250	①
I/O Module	14	15	
Knob	13	1000	
Logic	19	500	①
Loop	55	500	
Network	0		③
NTD	30	limited by max. brIQs only	
Option	0		③
OSS	34	500	
Page	4	500	
Plot	12	500	
Program	0	1 (fixed)	③
Schedule	21	500	
Sensor	76	1000	①
Sensor type	12	99	
Sequence	106	1 (fixed)	
Switch	10	1000	
Time	38	1 (fixed)	
Time Zone	566	100	②
User	12	500	
Virtual CNC	9	1	③
XNC Interface	130	1	

Notes:
① *The number of brIQs used on these modules varies with the module type. The largest size is shown here.*
② *The Time Zone module brIQ count given here allows for 20 exceptions. Further exceptions requires 13 brIQs each.*
③ *These modules are always present in the IQ3.*

The quantity of each type of module may be adjusted to match the requirements of the application subject to the following:

▪ A maximum of 4000 modules in total,
▪ A maximum for each type of module, and
▪ The IQ3's memory capacity (measured in 'brIQs').

The maximum number of modules for each type, and the number of brIQs required per module are shown in the table above.

The total available memory capacity varies with the IQ3 type:

number of I/O channels	maximum brIQs available
16	30,000
96	30,000
128	37,000

Plot Modules
The IQ3 Plot modules can plot any connectable module output (analogue or digital). There are three types of Plot module: Synchronised, Triggered, and Periodic. Although all three types are BACnet interoperable, only Periodic plots can be compliant with the BACnet standard. All Plot modules can generate a buffer ready alarm when the number of records equals a notification threshold.

The maximum number of records per plot is 1000. The maximum total number of records (for all plots) depends on the plot memory available and the type of plots used - each synchronised plot record requires 5 log points, while each triggered or periodic plot record requires 10 log points:

number of I/O channels	maximum plot memory (log points)	max. number of records	
		synchronised plots	triggered or periodic plots
16	100,000	20,000	10,000
96	500,000	100,000	50,000
128	500,000	100,000	50,000

Note: A maximum of 100 plots can be serviced in a 1s period (e.g. 100 x 1s plots only). This is calculated on the average plots serviced in 1s, so a 1 minute plot would contribute a 1/60. For example 90 x 1s plots plus 360 x 1 min would give 96 (90+6) plots per second on average. The periodic and triggered plots must also be counted and it's up to the engineer to make his best estimate.

Sequence Table Module
The maximum number of steps in the sequence table is 600.

Firmware Upgrades

New versions of firmware may be made available to change or add functionality or to provide support for new products.

Firmware can be upgraded using a PC running the IQTool Firmware Upgrade Applet, and to the IQ3 connected over Ethernet (recommended for speed) or the Trend current loop.

Timemaster

The IQ3 can act as a Timemaster to synchronise the time and date across the Trend system. Daylight saving can be implemented manually by specified dates and time adjustment.

Note: If operating as the Timemaster the IQ3 should be fitted with the XCITE/BBC.

Alarms

The IQ3 will generate Network, General, and Item alarms. Network alarms are generated by the Trend Network nodes, General alarms are generated when the IQ3 detects a problem within its own hardware or program, and Item alarms are generated by the strategy, and are normally due to a faulty plant condition.

Network alarms are sent to supervisors or tools connected to the RS232 local supervisor port, or to the controller's vCNCs.

General and Item alarms can be sent either to a designated Trend LAN address, to an IP address, or as an email. Alternatively, certain Item alarms (sensor, digital input, digital driver readback, and plot), can be sent to a BACnet device.

Alarms sent to a Trend LAN address, or to an IP address can either be sent in text, coded, or attribute format. Network alarms are sent in text format only.

For coded alarms the protocol limits the item number to 255 maximum. For text alarms the maximum item label length is 20 characters (although the 963 can be set up to use labels previously learnt).

Sending an alarm by email requires the Email Server Address to be set up in the address module. The Email Server Address can be set up as an IP address, an internet domain name, or a host name; the internet domain name or host name require a DNS server address or a WINS server address respectively to be set up in the network module so that the name can be resolved.

All alarms (except Network alarms) are also stored locally in the alarm log. The alarm log can record up to 300 alarms. Once this limit is reached each new alarm will overwrite the oldest record.

Web Pages

An integral web interface can be accessed over an Ethernet/IP connection using a Web browser.

Access can be restricted by entry of a valid user name and password. Once connection to the IQ3 has been made, it is possible to view and adjust occupation times, view the alarm log, and view/adjust/graph individual module parameters.

The web interface does not allow the strategy structure to be modified (e.g. changing module interconnections, adding or deleting modules).

Graphical display pages (GraphIQs), which are configured using IQ3's Display and Directory modules, can also be accessed.

For further details of web pages see the IQ3 Configuration Manual (TE200768), the IQ3 Web User Guide (TC200631), and the Graphical Display Pages Editor Manual (TE200629).

Language

The user can specify which language the IQ3 uses for the display of web pages and for transmitted alarms. The standard languages are in the controller as supplied. The Address module has a 'Language' parameter which will be set to the default language, but can be changed to any one of the other available languages. The IQ3 can use languages which require 8 bit code (i.e. special or accented characters) and can also operate with right to left languages (e.g. Chinese, Arabic).

Identification

The IQ3 will identify itself as an IQ3 to w comms.

STRATEGY

In order to operate as a controller, the modules provided by the firmware must be configured to define the way the controller is to control the connected equipment. This configuration is known as the strategy. Strategies are configured using the System Engineering Tool (SET).

This produces a strategy file (filename.IQ3) that can be downloaded to the controller to define its operation. This file consists of all the strategy module instances, their parameters, and links. When this is downloaded it is stored in the controller and then run using the controller firmware.

For details of using SET see the System Engineering Tool Manual (TE200147).

FIELD MAINTENANCE

The IQ3 requires no routine maintenance, however it is recommended that if the battery option board is fitted, the battery should be replaced every 5 years.

> ⚠️ **WARNING:** Contains no serviceable parts. Do not attempt to open the unit. Failure to comply may cause damage to the unit.

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF IQ CONTROLLER. The only part affected is the lithium battery (on the 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.

> **WEEE Directive:**
>
> At the end of their useful life the packaging, and product and battery (if fitted) should be disposed of by a suitable recycling centre.
>
> Do not dispose of with normal household waste.
> Do not burn.

COMPATIBILITY

Browsers: v6, v7, v8, or v9, with the JAVA runtime environment, smart phones (Windows Mobile 2003 Second Edition), and PDAs (Windows CE4).

Note: Mobile smart phones and PDAs cannot display graphs and right to left languages.

Note: IQ3 has not been tested with all devices and Trend cannot guarantee a particular device's compatibility.

Supervisors and Displays: 963 v3.50 or higher (for full compatibility), IQView8, IQView4, RD-IQ, SDU-xcite.

Note: The NDP is not compatible with IQ3; it will not recognise an IQ3 connected to its network.

Utility Software: SET v6.7 or greater

I/O Modules: IQ3XCITE compatible with IQ4/IO and, XCITE/IO.

Controllers: IQ3 AND IQ4 directly and IQ1, IQ2, IQL via XTEND. IQ3/LAN communicates with IQ2, IQ1 directly. IQeco by way of IQ4NC.

IC Comms: IQ4, IQ3, IQeco, IQ2 (including IQL, IQ1 (v3 onwards)).

Strategies: IQ1, and IQ2, can be imported into SET, converted into IQ3 strategies, and then downloaded into an IQ3. If the strategy file accesses I/O channels beyond those available in the IQ3 the strategy will be rejected.

Ethernet Nodes: XTEND, NXIP, or EINC.

Note: NXIP or EINC must not be used in an automatic IP addressing (DHCP) environment.

BACnet Devices: The IQ3 is certified as a BACnet Application Specific Controller (B-ASC), for details of the certification go to:

   http://www.bacnetinternational.net/btl/index.php?m=52.

Compatibility is defined in IQ3 Product Implementation Conformance Statement (TP201002).

INSTALLATION

The IQ3 is designed to be clipped on to a standard TS35 DIN rail. The IQ3 must be installed in a secondary enclosure with a minimum protective rating of IP20 (or equivalent).

The installation procedure involves:

Mounting the controller in position	Setting up IP address parameters (if using Ethernet)
Connecting power	Setting up LAN number and device address,
Connecting Ethernet (if required)	Checking network
Connecting RS232 (if required)	Configuring the strategy
Connecting Current Loop (../LAN only)	Testing strategy using Controller Simulation in SET
Connecting the I/O channels (as required)	Downloading strategy and other configuration files
Mounting and connecting additional I/O modules (if required)	Check BACnet communications (/BAC only)
Inserting battery in auxiliary board (if required)	Connecting inputs and checking operation
Powering up	Connecting outputs and checking operation

A full description of installing the unit is given in the These installation procedures are covered as follows: IQ3xcite Installation Instructions - Mounting (TG200626); IQ3 Controller Installation Instructions - Configuration (TG201160); XCITE/BBC IQ3 Battery Option Board Installation Instructions (TG200686); IQ3../.../LAN/... Installation Instructions - Mounting (TG200916), IQ3 XML Web Services Upgrade Information Sheet (TP201077).

ORDER CODES

This section does not provide order codes for the /XNC option. This information is provided in the IQ3../.../XNC/... Controller Interface Data Sheet (TA200912).

IQ3[TYPE]/[AUX BD]/[COUNTRY]/[BAC]/[POWER]

[TYPE]	XCITE/16	16 I/O points, 10 universal inputs, 6 analogue voltage outputs, non expandable via I/O bus. Supplied with bus terminator.
	XCITE/96	16 I/O points, 10 universal inputs, 6 analogue outputs expandable up to 96 points (i.e. 80 additional I/O channels) by addition of I/O modules to I/O bus. Supplied with I/O bus terminator.
	XCITE/128	16 I/O points, 10 universal inputs, 6 analogue outputs expandable up to 128 points (i.e. 112 additional I/O channels) by addition of I/O modules to I/O bus. Supplied with I/O bus terminator.
[AUX BD]	Blank	No auxiliary board fitted
	LAN	IQ system current loop Lan interface fitted
	SER	Second serial port interface fitted (RS232 or RS422/485). See IQ3/XNC Data Sheet
[COUNTRY]	Blank	Worldwide except US
	USA/UL	For sale in US, UL rated
[BAC]	Blank	No BACnet protocol capability
	BAC	BACnet protocol capability included
[POWER]	100-240	100 to 240 Vac supply
	24	24 Vac or 24 to 60 Vdc supply (36 Vdc maximum for UL versions)

IQ3XCITE/16/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 100 to 240 Vac supply.
IQ3XCITE/16/LAN/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/16/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 24 Vac or 24 to 60 Vdc supply.
IQ3XCITE/16/LAN/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 124 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.
IQ3XCITE/96/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 100 to 240 Vac supply.
IQ3XCITE/96/LAN/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/96/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 24 Vac or 24 to 60 Vdc supply.
IQ3XCITE/96/LAN/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 24 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.
IQ3XCITE/128/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 100 to 240 Vac supply.
IQ3XCITE/128/LAN/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/128/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 124 Vac or 24 to 60 Vdc supply.
IQ3XCITE/128/LAN/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 124 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.
IQ3XCITE/16/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 100 to 240 Vac supply with BACnet option.
IQ3XCITE/16/LAN/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus with BACnet option and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/16/BAC/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus and 24 Vac or 24 to 60 Vdc supply with BACnet option.
IQ3XCITE/16/LAN/BAC/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, non expandable by the I/O bus with BACnet option and 124 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.
IQ3XCITE/96/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 100 to 240 Vac supply with BACnet option.
IQ3XCITE/96/LAN/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points with BACnet option and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/96/BAC/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points and 24 Vac or 24 to 60 Vdc supply with BACnet option.
IQ3XCITE/96/LAN/BAC/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 96 points with BACnet option and 24 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.

ORDER CODES (continued)

IQ3XCITE/128/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 100 to 240 Vac supply with BACnet option.
IQ3XCITE/128/LAN/BAC/100-240	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points with BACnet option and 100 to 240 Vac supply with LAN auxiliary board fitted.
IQ3XCITE/128/BAC/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O bus up to 128 points and 124 Vac or 24 to 60 Vdc supply with BACnet option.
IQ3XCITE/128/LAN/24	IQ3XCITE with 6 Universal Inputs, and 10 Analogue Voltage Outputs, expandable by the I/O BAC/bus up to 128 points with BACnet option and 124 Vac or 24 to 60 Vdc supply with LAN auxiliary board fitted.

Note: The versions available in the USA are restricted to /BAC/24 versions (BACnet, 24 V power) and are identified by adding /USA/ UL/ before BAC/24.

UPGRADES

IQ3XCITE/XML/UP	:XML Web Services upgrade for IQ3xcite
IQ3XCITE/BAC/UP	:BACnet upgrade for IQ3xcite

ACCESSORIES

XCITE/BBC	:Battery option board increases protection time of clock (in case of input power supply failure) to several years (e.g. for Timemaster).
IQ4/IO/..	Range of IQ4/IO modules (see IQ4/IO Modules Data Sheet, TA201341)
XCITE/IO/..	Range of XCITE/IO modules (see XCITE/IO Modules Data Sheet, TA201352)

SPECIFICATIONS

ELECTRICAL

Power Input
  IQ3xcite/16
  /100-240   :100 to 240 Vac ±10% 50/60 Hz, 39 VA max
  /24   :24 to 48 Vdc ±10% (36 Vdc maximum for /UL versions), 1.2A
                   24 Vac ±15% 50/60 Hz, 28 VA
  IQ3xcite/96, IQ3xcite/128
  /100-240   :100 to 240 Vac ±10% 50/60 Hz, 56 VA max
  /24   :24 to 48 Vdc ±10% (36 Vdc maximum for /UL versions), 1.5A
                   24 Vac ±15% 50/60 Hz, 40 VA

Fusing   :No replaceable fuses required.
  24 Vdc combined
  supply   :Self resetting solid state circuit breaker.
  RS232, 24 V   :part of the combined supply to RS232, 24 V auxiliary output supply (and output power bus, if linked) is protected by 150 mA current limit.
  P terminals   :1.6 A multifuse.
  Power supply   :Non-replaceable fuse.
  Analogue output :Non-replaceable fuse.

Power failure protection
  Strategy & data :non-volatile memory
  Real time clock :supercap, maintained for up to 6 days (typical). Option to fit a battery board to maintain clock for up to several years in the case of input supply failure.

Clock accuracy   :30 s per month (typical).
Cycle time   :sequence table 1s

Ethernet Network

Transmission   :10 BASE-T (IEEE 802.3).
Connection   :RJ45, auto MDI-X.
Cable Type   :Cat 5e, UTP (unshielded twisted pair).
Distance (to hub) :100 m (109 yds) maximum.
Virtual CNCs   :1.
  Addresses   :Not set by default – set to desired value in range 1 to 119 (excluding 2, 3, & 10) using configuration mode. Address must be unique on LAN.

Current Loop (/LAN variants only)

Transmission   :20 mA, two wire current loop, opto-isolated, polarity independent receiver, balanced transmitter.
Baud Rate   :9k6, 19k2 settable by board switches.
Device Address   :1 to 119, (2, 3 and 10 not permitted) settable by board switches.
LAN Number   :1 to 119, (2, 3 and 10 not permitted) settable in software.
Distance (node to node) :dependent on cable type and baud rate (see table below):

Cable	9k6 baud	19k2 baud	No. of Wires
Belden 9182	1000 m (1090 yds)	700 m (765 yds)	2
Belden 9207	1000 m (1090 yds)	500 m (545 yds)	2
Trend TP/1/1/22/HF/200 (Belden 8761)	700 m (765 yds)	350 m (380 yds)	2
Trend TP/2/2/22/HF/200 (Belden 8723)	500 m (545 yds)	250 m (270 yds)	4

Note: Adjacent devices may specify different maximum cable lengths and baud rates. The shortest cable length (for the chosen baud rate) applies when connecting to the IQ3 current loop.

RS232 Local Supervisor Port

Transmission   :RS232, EIA/TIA/232E, V28 supports Trend comms.
Distance   :15 m (16 yards) maximum.
Baud Rate   :9k6.
Address (sCNC1) :1 to 119, (2, 3 and 10 not permitted) settable in software.

I/O Bus

Maximum Length   :30 m (33 yds),
Maximum Modules :15.
Maximum Channels :128 (including 16 onboard).
Cable Type   :Belden 3084A (up to 100 m);
For further details see:
IQ4/IO Modules Data Sheet (TA201341);
XCITE/IO Modules Data Sheet (TA201352).

Inputs/Outputs

Universal Inputs

Number of Channels :10.
Function   :Measuring voltage, current, thermistor or digital input (function set by strategy).
Input Noise Rejection :Minimum 60 dB series mode rejection at input power supply frequency.
Input Resolution :12 bit (4096 steps).
Voltage Input
  Input range   :0 to 10 V.
  Input resistance :200 kΩ.
  Accuracy   :±0.5% of span (50 mV).
Current Input
  Input range   :0 to 20 mA.
  Input resistance :240 Ω.
  Accuracy   :±0.5% of span (100 µA).
  Loop powered
  input supply   :20 to 36 Vdc.
Thermistor Input
  Accuracy   :0.1%, accuracy 0.5% of span.
  Bridge resistor :10 kΩ.
  Bridge supply :5 V.
Digital Input   :volt free contact, open collector (or drain), or logic input. Count rate 30 Hz (minimum pulse width of 16.6 ms). 5 V supply. Status LED per channel. Volt free contact input: Wetting current = 3 mA nominal. (ON = closed contact.) Open collector (or drain) input: Must be able to sink 3 mA. Must be earthed (grounded) to same earth (ground) as IQ3. Polarity dependent. (ON = transistor/FET conducts.) Logic input: Logic high level 5 to 50 V. Logic low level must be able to sink 3 mA (ON = logic low.)

Analogue Outputs

Number of Channels :6.
Voltage Range   :0 to 10 Vdc.
Current (maximum*) :up to 20 mA (source).
Accuracy   :±0.5% of span.
Resolution   :11 bit (2048 steps).

Auxiliary Supply Output

Voltage   :20 to 24 Vdc ±5%.
Current (maximum*) :150 mA shared with RS232 (Local Supervisor Port).

Combined supply

Voltage   : 24 Vdc ±10%.
Current (maximum*) :700 mA maximum (typical) to supply 24 Vdc auxiliary supply terminals, I/O bus, RS232, the I/O channels (see page 11). Output derated to 550 mA for input power supply <200 Vac.

*Available current may be affected by demands on other outputs - see "Combined Supply" on page 4.

IQ3/..   Data Sheet

INDICATORS

Power (⚡)	:Green LED
Watchdog (❗)	:Red LED
I/O Bus (📶)	:Red LED
OK (current loop)	:Green LED
RX (current loop)	:Yellow LED
TX (current loop)	:Yellow LED
OK (Ethernet)	:Green LED
RX (Ethernet)	:Yellow LED
IN1 to IN10	:Yellow LED
OUT11 to OUT16	:Yellow LED

MECHANICAL

Dimensions (WxHxD)
- IQ3 :263 mm (10.35") x 147.5 mm (5.81") x 46 mm (1.81")
- IQ3../.../LAN 263 mm (10.35") x 147.5 mm (5.81") x 56 mm (2.2")

Material :Polycarbonate
Weight :702 g (1.5 lb)
Mounting :TS35 DIN Rail (EN500022).

Connectors

Power
- Connector type :2 part connector with rising cage clamp screw terminals.
- Cable size :0.5 to 2.5 mm² (14 to 20 AWG). For UL compliance the input power connections must be made using 18 AWG or larger wire rated at least 90°C (194 °F).
- For UL compliance use copper cable only.

Inputs/Outputs.
- Connector type: :2 part connector (0.2" pitch) with rising cage clamp screw terminals.
- Cable size :0.14 to 2.5 mm² (22 to 12 AWG)

Screens
- Connector type: :Single part connector with rising cage clamp screw terminals.
- Cable size :0.14 to 2.5 mm² (22 to 12 AWG)
- Use copper cable only

I/O Bus :5 wide connector
RS232 (Supervisor Port):RJ11 (FCC68).
Ethernet Port :RJ45 connector.

ENVIRONMENTAL

EMC	:EN61326 -1: 2006.
Immunity	:Table 2 - for equipment intended for use in industrial locations.
Emissions	:Class B.
Safety	:EN61010-1:2010
USA/Canada	:USA/UL only. UL rated as 'UL916 listed open energy management equipment'
Canada	:CSA22.2 No. 205-M1983 - Signal Equipment

Ambient limits
- Storage :-10 °C (14 °F) to +50 °C (122 °F)
- Operating :0 °C (32 °F) to 45 °C (113 °F)
- Humidity :0 to 90 %RH non-condensing

Altitude :<2000 m (6562')
Protection IP20, NEMA1

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