

IQ251 CONTROLLER



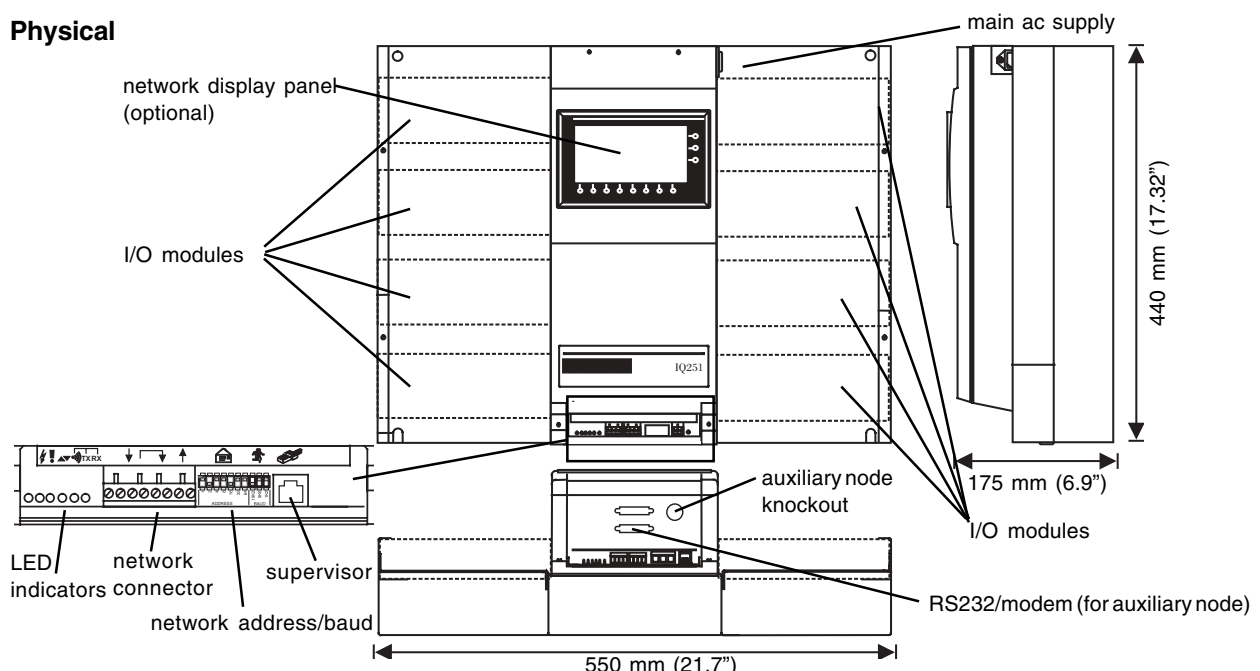
Description

The IQ251 is a large capacity controller designed for the control of all types of building plant. It can provide up to 128 I/O points by connecting 8 I/O modules in any combination. The range of I/O modules comprises an 8 analogue plus 8 digital input module, an 8 analogue output module, and an 8 digital output module. Trend accessory modules may be connected to the input/output channels to provide greater I/O flexibility. They enable the IQ251 to provide sufficient capability for more complex strategies. It can operate either as a stand alone device or as part of a Building Management System. An optional Network Display Panel can be fitted on the front cover, or remotely. It provides access to all IQ controllers on a single or multi-Lan system via a node controller integrated within the IQ251. The IQ251 also provides the ability to connect any Trend supervisor or Engineering Tool to the network without the need for a separate node controller.

Features

- 1 second cycle time.
- Optional integral Network Display Panel.
- Access to entire network via local supervisor connection.
- Facility for mounting an additional node controller.
- High capacity DDC with PID control loops.
- Stand alone or integrated system operation.
- Up to 8 input/output modules for optimum configuration.
- Up to 96 logs.
- Up to 1000 values per log.
- Compatible with IQ151+ data files.
- Flexible I/O combinations

Physical



FUNCTIONALITY

The IQ Controller’s functionality can be divided into three sections, strategy, firmware, and hardware.

STRATEGY

The strategy processes inputs according to a set of instructions and then outputs signals which can be used to control plant.

Configuration: The IQ251 uses the standard IQ configuration mode which enables configuration via the network, or via the supervisor port. SET can be used to create a strategy data file (.IQ2) which can then be downloaded to the controller and subsequently uploaded for backup purposes if connected to the controller directly or via the network. PowerTool can be used to upload and download IQ2 files if connected via a modem.

Modules: The strategy consists of a number of individual functional blocks known as configuration modules. These blocks can be linked in various combinations to enable plant to be controlled in accordance with the building’s requirements. The table lists the different types of configuration modules and the number of each type available with IQ251.

Module Type	Number	Module Type	Number
Sensor	96	Critical Alarm	4
Sensor type	20	Alarm History	20
Loop	32	IC Comms	16
Function	240	Digital Inputs	96
Logic	240	Fast Sequence	8
Driver	64	Zone	5
Knob	60	Schedule	32
Switch	60	Calendar	20
Sensor log	96	User Password	6
Sequence step	560	Sequence time	1 s
Analogue Nodes	510	Digital Nodes	1012
Display	400	Directory	80
Page	80	Group	10
Route	50	Destination	7
New Alarm Log	300		

Full details of the modules are given in the IQ Configuration Manual and Addendum. The IQ251 contains the normal IQ2 features as described in IQ Configuration Manual Addendum: Engineers Journal (J), I/O Summary (i/o) Loader Issue (R(c), 'c' lower case), Serial Number (R(s), 's' lower case), Supply Frequency Option, Enhanced Logging, Module position, and Strategy Cleardown.

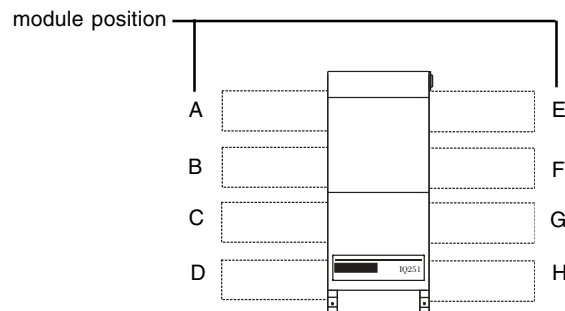
External Channels: Because the I/O modules may be fitted in any combination in any of the 8 I/O slots, the channel numbers must be carefully identified. In configuration mode the IQ251 identifies the external channel numbers corresponding to the module number (in the case of sensors or digital inputs) or output channel number (in the case of drivers).

The sensor and digital input modules, and the output channels specified in the driver modules are related to the external channels as shown in the table:

Sensor Channels		Digital Input Channels		Driver Channels	
Sensor Number	External Channel	Dig. Input Number	External Channel	Output Channel	External Channel
S1 to S8	AA1 to AA8	I1 to I8	AD1 to AD8	1 to 8	E1 to E8
S9 to S16	BA1 to BA8	I9 to I16	BD1 to BD8	9 to 16	F1 to F8
S17 to S24	CA1 to CA8	I17 to I24	CD1 to CD8	17 to 24	G1 to G8
S25 to S32	DA1 to DA8	I25 to I32	DD1 to DD8	25 to 32	H1 to H8
S33 to S48	internal only	I33 to I48	internal only	33 to 48	dummy channels
S49 to S56	EA1 to EA8	I49 to I56	ED1 to ED8	49 to 56	A1 to A8
S57 to S64	FA1 to FA8	I57 to I64	FD1 to FD8	57 to 64	B1 to B8
S65 to S72	GA1 to GA8	I65 to I72	GD1 to GD8	65 to 72	C1 to C8
S73 to S80	HA1 to HA8	I73 to I80	HD1 to HD8	73 to 80	D1 to D8
S81 to S96	internal only	I81 to I96	internal only	81 to 96	dummy channels

The external channels are referenced as follows:

[module position],[analogue(A) or digital(D) - input module only],[channel number]



- e.g. BA1 position B, Analogue input, channel 1
- BD1 position B, Digital input, channel 1
- F1 position F, output channel 1
- A7 position A, output channel 7
- GD8 position G, Digital input, channel 8

FIRMWARE

Communications: When operating as part of a Building Management System, the IQ251 will be connected to other devices via the Trend Network. This means that information within the IQ251 can be accessed using one of the Trend supervisor programs, or passed to other Trend IQ controllers using inter-controller communications, enabling the sharing of information across the whole system.

When connected to the network the controller can use up to 3 different addresses. One address is for the controller itself (set by front panel switch) the second and third are optional, and are for the locally connected supervisor (supervisor port address) and for an integral NDP (ndp port address). Thus both local supervisor and NDP have their own network addresses when connected to the network via the controller.

The controller's address is set by a switch, and the address for the local supervisor and NDP are set up in the strategy configuration (address module).

Battery Status: The IQ251 has a battery status checking circuit that checks the battery on power up and thereafter every midnight and sets byte 506 bit 0 if the voltage has falls below a threshold value. This bit being set indicates that the battery needs to be changed. It should be used within the strategy to generate an alarm (e.g. critical alarm). The battery should be changed after the first indication. The battery will have a typical life of 10 years at 20 °C (68 °F). It is recommended that the battery is replaced every 5 years.

HARDWARE

Unit: The IQ251 has a metal chassis and a front cover consisting of a plastic fascia on a metal frame. The I/O modules are of aluminium extrusion. The I/O modules are fitted to the controller by snapping off a section in the cover and removing the relevant side plate. The module connector then slides into a socket on the controller. There is an option to fit a 16 terminal earthing bar below each I/O module for cable screens (Part/LA102359K). Cable access is via holes in the rear plate, or from top or bottom, cables can be run down the central column behind the controller board. Cleats are fitted to the rear plate to facilitate cable fixing. There is a 25 Way D type knockout on the bottom of the front panel for RS232 connection to an auxiliary node, and a circular knockout for M20 gland or grommet for internetwork, PSTN, ISDN or Lon cables. If required the IQ251 can be fitted in an IP55 metal enclosure (ENCLS).

Connectors: Two part connectors are used throughout to facilitate wiring. A busbar is provided for screen termination.

Power: 230 Vac 50/60 Hz, 24 Vac 50/60 Hz, or 24 Vdc.

Fusing: The controller has no replaceable fuses; protection is provided by means of a self-resetting thermally protected transformer. The 24 V ac or dc version has a solid state multifuse. The I/O modules are also individually protected against short circuits.

Indicators: LED indicators for receive and transmit network current flow (RX, TX) and network OK (●), also for power (⚡), all I/O channels (▲), and watchdog (⚡). See specification section for details.

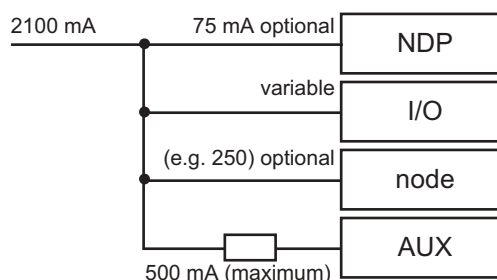
Network: The network terminals facilitate connection of 2 or 4 wire cables. The standard Trend node features are included (TX, RX, and network OK, ●), indicators, bypass relay, and network alarm generation). There is also the facility for connection of a supervisor and integral network display panel to the network via the controller without the need for additional node controllers.

Note that the IQ251 does not have a balanced line transmitter like other IQ2 series controllers and this may result in reduced network resilience. Balanced transmission can be achieved with the use of a BLT (Balanced Line Transmitter).

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 and must be unique on the Lan. The baud rate is set by poles 8 to 10 in the range 1k2, 9k6, 19k2 and must match the other nodes on the Lan. The address/baud rate switch may also be used to perform a strategy clear-down; this is done by setting all the address/baud rate poles to zero before power up (see Installation Instructions, TG103483 sheet 4 and IQ Configuration Manual Addendum). For this reason the address should normally be set non-zero.

Battery Backup: Details about the strategy configuration, time and date, and logged data are stored in RAM. A plug-in lithium cell provides power to maintain the data in the event of power failure, or the controller being switched off.

Auxiliary Supply: There is a 24 Vdc auxiliary supply provided on the power supply board to power external relay modules, sensors, external NDP etc. It is thermally protected and can supply a maximum of 500 mA. This will normally be available, but if the IQ251 has a full complement of I/O modules with integral NDP, and an integral comms node fitted the amount of auxiliary power available for other purposes will have to be calculated. The 24 Vdc supply in the IQ251 has 2100 mA available after deduction of current required for main board and network. This has to supply I/O modules, integral node, integral NDP, and the 24 Vdc auxiliary supply. These loads can be calculated as follows:



Input module

8 digital inputs @ 8 mA per channel

8 analogue inputs @ 20 mA per channel (thermistor and voltage inputs can be ignored)

Max total for whole I/O module = (8x8)+(20x8) = 224 mA

Output module

8 analogue outputs @ 20 mA per channel

Max total for whole board = 20x8 = 160 mA

8 digital outputs @ 24 mA per channel

Max total for whole I/O module = 24x8 = 192 mA

Integral NDP= 75 mA

Integral Node (e.g. TMN) = 250 mA.

(For consumption of other nodes see the respective data sheet).

For example:

IQ251 with 4 input I/O modules, 2 digital output I/O modules, 2 analogue output I/O modules, an integral NDP, and an MNC. How much current is available from the auxiliary supply?

Current consumed:

4 input I/O modules (all analogs are current) 4 x 224 = 896 mA

2 digital output I/O modules 2 x 192 mA = 384 mA

2 analogue output I/O modules (at max). 2 x 160 mA = 320 mA

1 NDP 75 mA

1 TMN 250 mA

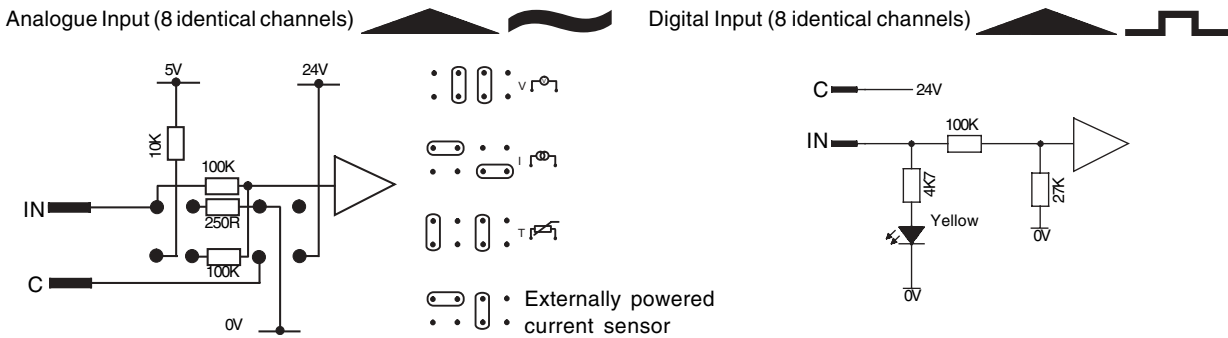
Total 1925 mA

Current available: 2100 - 1925 = 175 mA

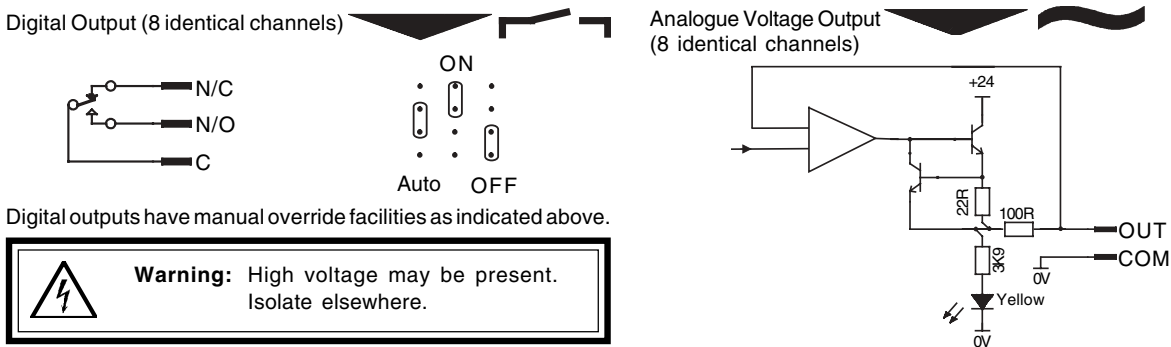
HARDWARE (continued)

I/O modules: The IQ251 has a range of I/O modules which may be fitted in any combination in the 8 I/O slots. The range comprises an 8 analogue and 8 digital input module (EIN), an 8 analogue output module (EAO), and an 8 digital output module (EDO).

Inputs: The input channel combination is dependent on the number of input modules fitted. Each EIN module provides 8 analogue, and 8 digital inputs.



Outputs: The output channel combination is dependent on the output modules fitted. There are two different modules; the EDO which provides 8 digital outputs, and the EAO which provides 8 analogue voltage outputs. A Trend 2VID interface module can be used in conjunction with 2 analogue voltage outputs to provide 2 analogue current outputs.

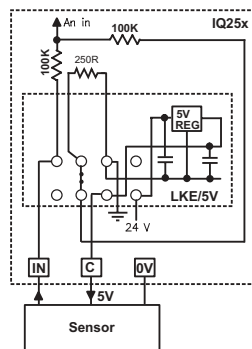


Digital outputs have manual override facilities as indicated above.

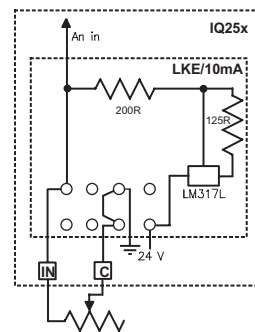
Warning: High voltage may be present. Isolate elsewhere.

Link Headers: A range of link headers is available to enable the input channels to accept a wider range of inputs:

LKE/5V Provide 5V, 20 mA supply

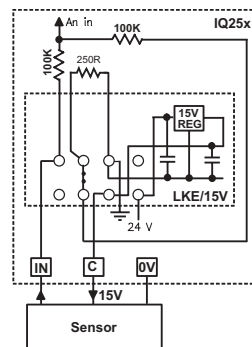


LKE/10mA Provides 10 mA supply (e.g. for potentiometer)

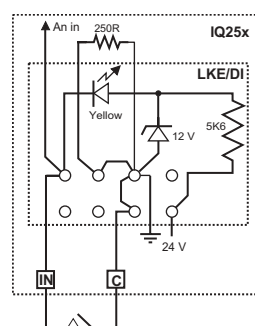


If the input device is 100 Ω to 1000 Ω, the analogue input will be 1 V to 10 V.

LKE/15V Provides 15 V, 20 mA supply



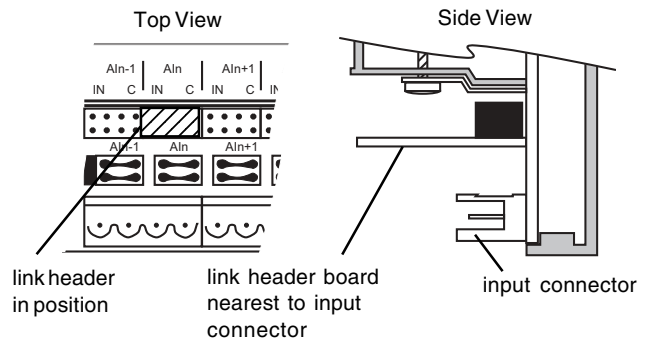
LKE/DI Converts analogue input to digital input.



Note: If LKE/DI is fitted, there is a special strategy module to support it (see LKE installation instructions TG102847).

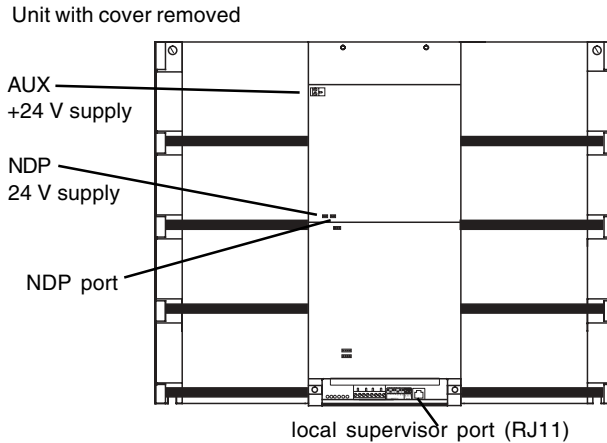
HARDWARE (continued)

To install a link header on a channel, the input links are removed and the link header is plugged onto the input linking pins of the EIN board, with the link header board nearest the input connector as shown:



Displays and Local Supervisor: The IQ251 has 2 ports, the local supervisor port on the front panel (RJ11) and the NDP port under the top cover on the main board.

These correspond to the two extra CNC addresses provided by the IQ251: the local supervisor port address, and the NDP port address.

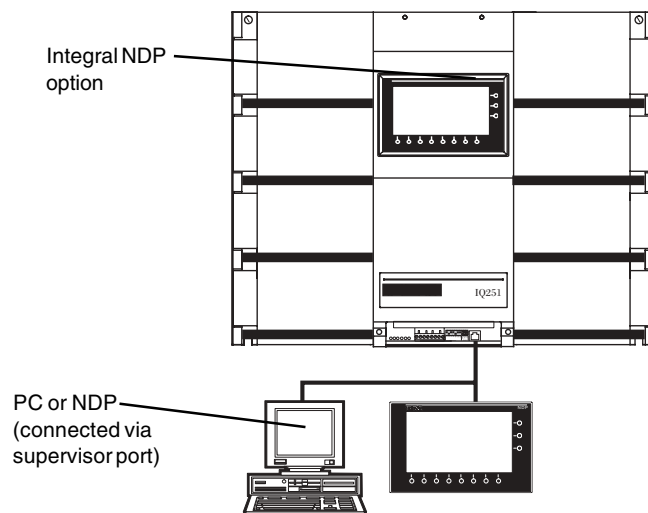


Supervisor: A PC running a Trend Supervisor or Utility program can be connected to the network via the controller’s supervisor port without the need for an additional node controller although it does have its own network address. When connected in this way the PC will have access to all devices on the network, and will function as if it were connected via its own node controller.

Network Display Panel: The optional NDP can be mounted integrally on the front cover, using the NDP port and a special 24 V connector, or remotely, using the local supervisor port (RJ11) and the AUX supply connector. It provides access to all IQ controllers on a single or multi-Lan system without the need for an additional node controller although it does have its own network address. Using icons, and softkeys it allows an operator to perform, under password protection, supervisory functions, such as setpoint adjustments, or to view logs and alarms from all controllers on the system. It can be powered from the IQ251. It uses 75 mA from the 24 Vdc supply (see auxiliary supply section above). If an NDP is connected externally, the CABLE/EJ1104029 should be used to connect both the signal (RJ11) and power (AUX).

Note that if the NDP is connected externally via the local supervisor port (RJ11) it uses the local supervisor port address (not NDP port address).

The diagram below illustrates the combinations in which NDPs and local supervisor/engineering tools can be connected.



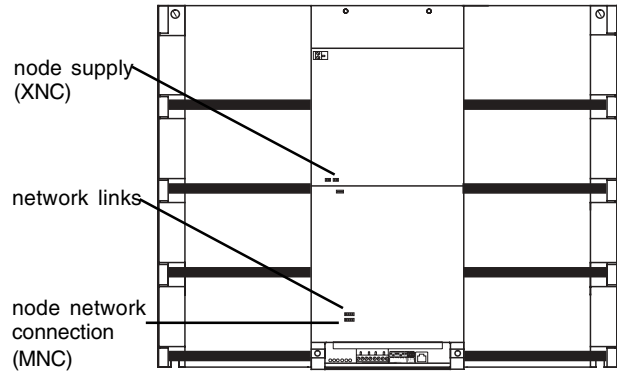
HARDWARE (continued)

Integral Node :If required an additional node controller (e.g. TMNH, TMNE, CNC2, PNC2, INC2, LINC/FTT) may be fitted inside the IQ251 using the node fixing kit. KIT/NODE/IQ25x.

The fixing kit contains nylon pillars which are screwed into the 4 aluminium threaded inserts on the IQ251. The node card has 4 semi-circular cutouts that fit between the fixing screws; the screws are then tightened to clamp the board. There is a special 24 Vdc supply connection (labelled XNC) and a network connector (labelled MNC). The two on-board network links must be removed to enable the network to connect to the node.

Note that an additional node controller will consume current from the 24 Vdc auxiliary supply; see auxiliary supply section above and appropriate node controller data sheet.

There is a front panel knockout for RS232 to auxiliary node, and a circular knockout for other auxiliary node cables.

**COMPATIBILITY**

- Supervisors:** 94x series, 921, NDP (V2.3 or greater), 962, Viewpoint+, 915.
Utility software: PowerTool, 822+/Toolbox version 6, 841 Strategy Browser (Vx), 842 Change Tracker, SET, WupDn.
Controllers: It can communicate to other Trend IQ controllers using inter-controller communications.
Interface: It can be connected to Trend interface modules. Check interface module specification to ensure compatibility.
Local Display: Network Display Panel.

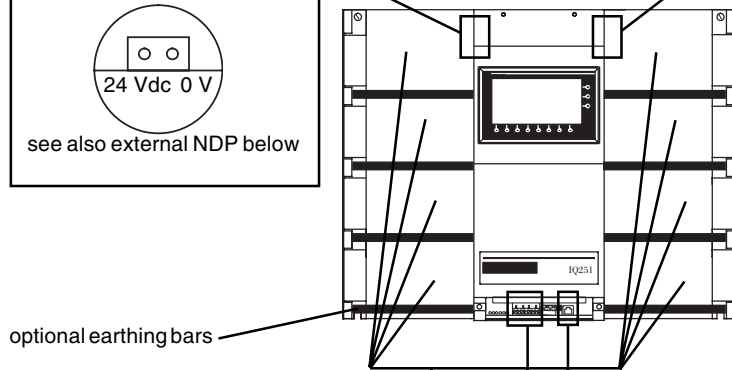
The IQ Configuration Reference Manual Addendum covers the compatibility between different types of strategy files, and between the IQ251 sensor logs, and supervisors and software tools.

INSTALLATION

CONNECTIONS

Auxiliary Supply Output
24 Vdc at 500 mA

24 Vdc 0 V
see also external NDP below



Supply

/230

IEC

/24 VAC

yellow 24 Vac
green 0 V
blue earth } 24 Vac

/24 VDC

yellow +24 V
green 0 V
blue earth } 24 Vdc

24 V units have 2 part Mat-N-Loc connectors

Inputs and Outputs

Inputs (EIN module)

8 ~ 8 ~

A11	A12	A13	A14	A15	A16	A17	A18	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
IN	C	IN	C	IN	C	IN	C	IN	C	IN	C	IN	C	IN	C

Analogue Outputs (EAO module)

8 ~

AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
OUT C	OUT C	OUT C	OUT C	OUT C	OUT C	OUT C	OUT C

Digital Outputs (EDO module)

8 ~

DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO8
C	No Nc	C	No Nc	C	No Nc	C	No Nc
C	No Nc	C	No Nc	C	No Nc	C	No Nc

Local Supervisor Port

RJ11 (FCC68)

see also external NDP below

RJ11 to 9 way 'D' type' female cable
CABLE/EJ101442

Network

2 wire

4 wire

External NDP
(recommended connection)

either connect signal and power single cable

9 way 'D' type female

AUX supply

24 Vdc 0 V

Supervisor Port

RJ11

CABLE/EJ103952

INSTALLATION (continued)

The IQ251 Controller is installed in a cabinet or panel using 4 screws and washers. For IQ251/USA, the unit is UL rated as 'UL916, enclosed energy management equipment'. The procedure involves:

Mount the controller in position
 Fit earthing bars (if required)
 Route and tie cables
 Fit I/O modules
 Connect I/O
 Connect power, do not power up
 Connect network
 Connect auxiliary supply output (if used)
 Isolate and disconnect I/O
 Set network address and baud rate
 Link analog input channels
 Fit link headers (if required)
 Set digital output links (if required)
 Switch On
 Check controller
 Check network
 Configure strategy
 Check operation
 Backup strategy
 Close panel

The installation procedure is covered in the IQ251 Installation Instructions TG103483. Sections (1.3, 2.1, 2.2, 3.1). Sections 3.3, 3.4 cover mounting in an enclosure (ENCLS) and connecting a PC. Section 4.1 covers connecting an external NDP and section 4.3 covers resetting the IQ251.

Other installation Instructions:


Post fitting an integral NDP	KIT/ENDP/IQ251 installation instructions	TG200593
Fitting link headers	LKE installation instructions	TG102487
Fitting an integral node	KIT/NODE/IQ25x	TG200595
Fitting an external NDP or ENCLS/FNDP	NDP installation instructions	TG200168

FIELD MAINTENANCE

The IQ Controller requires virtually no routine maintenance, however it is recommended that the lithium battery be replaced every 5 years, as explained in the IQ251 Installation Instructions, TG103483, Section 4.2 Replacing the Battery.

DISPOSAL

COSHH ASSESSMENT FOR DISPOSAL OF IQ CONTROLLER. The only part affected is the lithium battery 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.

ORDER CODES

IQ251/[Display]/[Node]/[I/O Modules]/[Power]

[Display]		[Node]		[I/O Modules]		[Power]	
blank	IQ251 with no display	blank	No node	EIN	8 analogue + 8 digital inputs	230	230 Vac power supply
ENDP	IQ251 with NDP on front cover	TMNH	Node including integral modem	EAO	8 analogue voltage outputs	24VAC	24 Vac power supply
		TMNE	Node for external modem	EDO	8 digital outputs	24VDC	24 Vdc power supply
		CNC2	Node for Trend network	Only specify the modules required (Max 8 I/O modules)			
		PNC2	Node for remote printer				
		INC2	Node for Trend Internetwork				
		LINC/FTT	Node for LonWorks network				

e.g. IQ251/TMNH/4EIN/3EDO/230 Specifies an IQ251 with integral modem node, 4 input modules, and 3 digital output modules with 230 Vac supply.

Controller comes complete with mains cable and moulded IEC connector (230 V) or supply cable and MAT-N-LOC connector (24 V).

PART/LA102359K Earthing bar with fixing screw and nuts and bag of earthing screws.
 KIT/NODE/IQ25x Kit for fixing an auxiliary node card in IQ251 or IQ250 (appropriate node cards listed above; node card must be ordered separately).
 ENCLS 600 mm x 600 mm x 210 mm IP55 enclosure.
 ENCLS/FNDP 600 mm x 600 mm x 210 mm IP55 enclosure with NDP fitted in front of enclosure.
 KIT/ENDP/IQ251 Kit for fitting an integral NDP into the IQ251.
 LKE/5V Link header to convert an analogue channel to provide 5 V, 20 mA sensor supply. Pack of 8.
 LKE/15V Link header to convert an analogue channel to provide 15 V, 20 mA sensor supply. Pack of 8.
 LKE/10mA Link header to convert an analogue channel to provide 10 mA sensor supply (e.g. for potentiometer). Pack of 8.
 LKE/DI Link header to convert an analogue input channel to a digital input (needs special strategy to be configured). Pack of 8.
 CABLE/EJ101442 Adaptor cable RJ11 to 9 Way D type female for local PC connection.
 CABLE/EJ103952 Adaptor cable 9 Way D type female and 2 terminal power to RJ11 and 2 terminal power for use with NDP.
 BLT Balanced line transmitter converts IQ251 network output to a balanced signal.

SPECIFICATIONS

CONTROLLER

Electrical

CPU	:68EC020 32 bit processor
CPU speed	:16.67 MHz
Cycle time	:1 s
Memory	:512 kbyte battery-backed SRAM, and 512 kbyte flash.
Supply voltage	
230	:230 Vac, +15% -10%, 50 to 60 Hz
/24VAC	:24 Vac, +25% -10%, 50 to 60 Hz
/24VDC	:24 Vdc, +25% -10%, (24 V to 36 Vdc)
Auxiliary supply	:24 Vdc \pm 10% 500 mA maximum (typical) dependent on configuration (see auxiliary supply section for details)
Consumption	:100 VA maximum
Fusing	:No replaceable fuses required. All protection self resetting.
Battery backup	:Battery maintains time, and logged data with mains off for at least 5 years.
Battery	:Saft LM2450, 3 V, or equivalent
Clock accuracy	:30 s per month (typical).
Network display panel	:Icon driven display panel with backlit display, for use on single or multi Lan systems. Can be mounted in front cover, or remotely.
Network	:20 mA serial 2 wire current loop, opto isolated, polarity independent receiver. Balanced line transmission can be achieved with addition of BLT module.
Supervisor transmission	:RS232, EIA/TIA/232E, V28
Distance	
supervisor	:15 m (16 yds)
network	:Dependent on cable type, see table below.

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

Baud rate	
network	:Selectable by switch 1k2, 9k6, or 19k2.
NDP	:9k6.
supervisor	:9k6.
Network addresses	
Controller	:Selectable by switch, 116 nodes addressable (1,4 to 119 excluding 10) set to be unique on Lan.
Supervisor port	:Software selectable, 116 nodes addressable (1, 4 to 119 excluding 10) set to be unique on Lan.
NDP port	:Software selectable, 116 nodes addressable (1, 4 to 119 excluding 10) set to be unique on Lan.
Input or Output modules	:8 modules in total. Any module type may be fitted in any position. Module types are: EIN 8 analogue and 8 digital inputs EAO 8 analogue outputs EDO 8 digital outputs





Mechanical

Dimensions	:550 mm (21.7") x 440 mm (7.32") x 175 mm (6.9")
Material	
Chassis	:Zinc plated and passivated mild steel
I/O modules	:Extruded aluminium with alocrom finish.
Cover	:Fire retardant moulded ABS.
Protection	:IP20
Weight	:14.5 kg (32 lbs) (fully loaded)
Connector	
I/O modules	:2 part connector, 50 mm (1.97") half pitch
power	:IEC plug (230 V) Mat-N-Loc (24 V)
network	:2 part connector with 8 screw terminals for 0.5 to 2.5 mm ² cross section area (14 to 20 AWG) cable.
supervisor	:RJ11 (FCC68), 6 pin, for Trend utility software connected via adaptor cable PART/10/1442.
NDP	:3 pin in line to 9 way D type connector cable (supplied with KIT/NODE/IQ25x).
UL	:(IQ251/USA only). The unit is UL rated as 'UL916, enclosed energy management equipment'.

Environmental

EMC	
emissions	:EN50081-1.
immunity	:prEN50082-2.
Safety	:EN61010.
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

Indicator Lamps

PWR 	:(green) ON when power supply is connected.
WD 	:(red) ON if controller has a software fault.
I/O 	:(red) Flashes during normal operation.
LAN 	:(green) ON if network is operating. Flashes if prohibited controller network address set (0, 2, 3, >119).
TX	:(yellow) ON if current is flowing from the network transmitter.
RX	:(yellow) ON if current is entering the network receiver.

SPECIFICATIONS (continued)**I/O MODULES**

Dimensions	:72 mm (2.83") x 202 mm (7.95") x 43 mm (1.69")
Weight	:0.3 kg approx. (0.66 lbs)
Connector	
Main board	:2 part connector, 50 mm (1.97") half pitch
inputs/Outputs	:2 part connector screw terminals for 0.5 to 2.5 mm ² cross section area (14 to 20 AWG) cable.
Signal Cable	:Analogue Voltage, Current, Thermistor, or Digital inputs, and Analogue outputs. Trend TP/1/1/22/HF/500 recommended (Belden 8761)

8 Analogue, 8 Digital Input Module (/EIN/)

Analogue inputs	:12 bit resolution (4096 steps). Minimum 60 dB series mode rejection at supply frequency. Linkable for analogue current (I), analogue voltage (V), or thermistor (T)
V	:0 to 10 V input resistance 200 k Ω , accuracy 50 mV equivalent to \pm 0.5% of span.
I	:0 to 20 mA input resistance 250 Ω 0.1%, accuracy 0.5 % of span (i.e. 100 μ A)
T	:Thermistor, bridge resistor 10 k Ω 0.1%, accuracy 0.5 % of span. Bridge supply 5V.
Digital inputs	:Volt free contact, or 24 Vdc self powered contact. Wetting current 5 mA @ 24 Vdc, count rate 32 Hz max.
Status LED	:(yellow) One per digital input. ON if input is closed

8 Analogue Output Module (/EAO/)

Analogue outputs	:8 bit resolution (256 steps). 0 to 10 V with 20 mA current limit, accuracy \pm 50mV equivalent to \pm 0.5 % span.
Status LED	:(yellow) 1 per channel. Light intensity increases with output voltage.

8 Digital Output Module (/EDO/)

Digital outputs	:Single pole change over relay, contacts rated for 240 Vac single phase only 8A (resistive load), 5A (inductive, $\cos\phi=0.4$), 30 Vdc at 5A (resistive load), and 20 Vdc at 5A (inductive load). For 24 Vdc (inductive load) reduce to 2A. Arc suppression recommended, see Relay Output Arc suppression Installation Instructions, TG200208). IQ251/USA only: Relay outputs are UL rated up to 30 V.
Status LED	:(yellow) 1 per channel. ON when relay is energised.
Manual override	:Each channel is linkable for ON, OFF, or AUTO.

Version	This document covers
firmware	:V3 or greater
boards	
EIN	:AM101687 v3
EAO	:AM101721 v1.1
EDO	:AM102022 v1.1
CPU	:AM101701 v1
PSU	:AM102060 v2.2

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