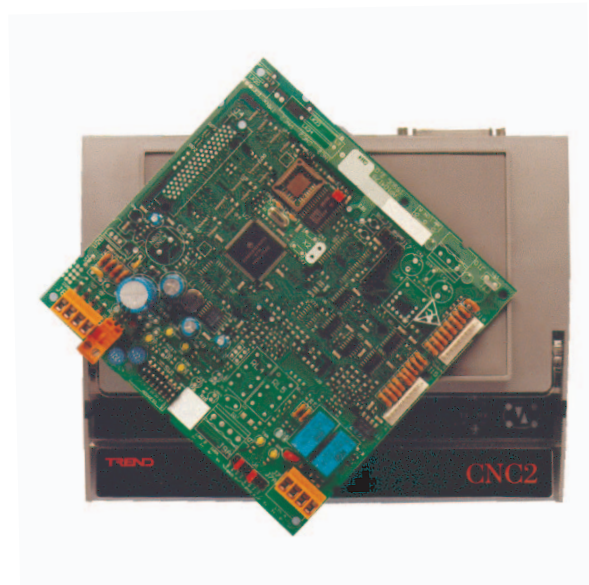


### CNC2 Communications Node Controller



#### Description

The Communications Node Controller (CNC2) interfaces between a Supervisor or Software Tool and the IQ network (RS232 to current loop Lan). It is available in an IP30 enclosure (NBOX) or can be supplied without an enclosure for mounting inside an IQ system device, e.g. an IQ controller. There are 230 V and 24 V input power supply versions. A boxed battery backed version is available (230 Vac only).

#### Features

- Automatic network test.
- 116 node addressable.
- 24 Vdc auxiliary output supply.
- 230 Vac or 24 Vac/dc input power supply versions.
- Trend Lan alarms available in 10 languages
- Battery backed version (NBOXB/CNC2/230)

#### Physical

NBOX(B)/CNC2

230 Vac input power supply option

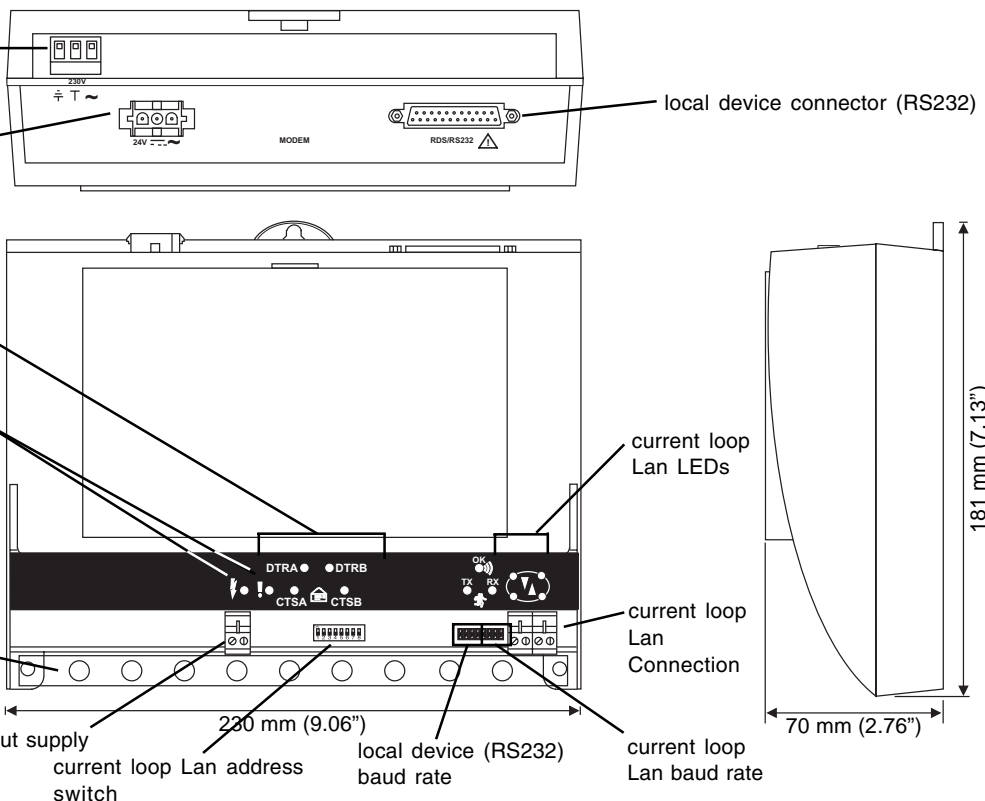
24 Vac or dc input power supply option

communications status LEDs

power/watchdog LEDs

earth (ground) bus

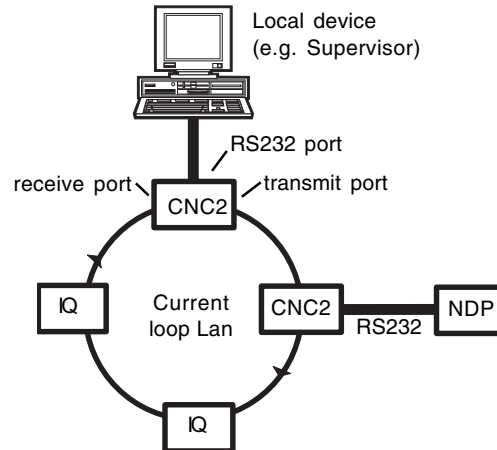
auxiliary 24 Vdc output supply



## FUNCTIONALITY

The CNC2 interfaces between a local device connected by way of the RS232 port (e.g. an NDP, or a PC running a Trend Supervisor or Software Tool) and the current loop Lan; it also provides certain network maintenance operations. The CNC2 continually monitors the Lan, if it receives data that is addressed to a different node it passes it on around the Lan through its transmit port. If it receives data for its own address, it will transmit it to the RS232 port. When data arrives from the RS232 port, it transmits the data onto the Lan through the transmit port.

The CNC2 also monitors Lan integrity by performing continuous checking of network messages. Alarm messages are generated whenever a problem occurs.





## HARDWARE

**Packaging:** The CNC2 can be provided boxed, or as a board version.


**Boxed version:** The CNC2 can be supplied in a plastic enclosure with a transparent plastic flip-up terminal cover (NBOX/CNC2/...). It has 3 point mounting to facilitate installation. There is an optional battery backup to keep the node functioning in the event of input power supply failure (NBOXB/CNC2/230- 230 Vac version only). An optional metal enclosure with cable gland knockouts is available (ENCLS/MBOX/IQ22x).

**Board version:** The board version will fit inside certain IQ controllers. The controllers can be ordered pre-fitted with the node (e.g. IQ241/CNC2/...), or the node can be retrofitted by using the appropriate fitting kit (KIT/NODE/IQ23x for IQ231/233, KIT/NODE/IQ24x for IQ241/242, or KIT/NODE/IQ25x for IQ250/251).

**Network** : The two part network terminals are for 2 wire cables. The standard IQ system node features are identified (Lan OK, TX, RX indicators, bypass relay, network alarm generation).

**Address Switch** : The CNC2 device address on the local Lan is selected by address switch poles 1 to 7. It may be set in the range 1, 4 to 9, 11 to 119 and must be unique on the local Lan.

**Dumb/Normal Switch:** The dumb/normal switch setting (SW1, pole 8) is ignored by the CNC2.

**Baud Rate Links** : The local Lan and local device (RS232) baud rates are set by two sets of links to 19k2, 9k6, 4k8, or 1k2. The local Lan baud rate must be set to match other nodes on the local Lan. The local device (RS232) baud rate must match the local device.

**Network bypass relay**: In order that the network continues to operate if the CNC2 fails, a node bypass relay is fitted to maintain network integrity in the event failure of the node's input power supply, or failure of the node itself. The bypassing of a node will be recognised by the downstream node, and reported as a Lan Changed alarm.

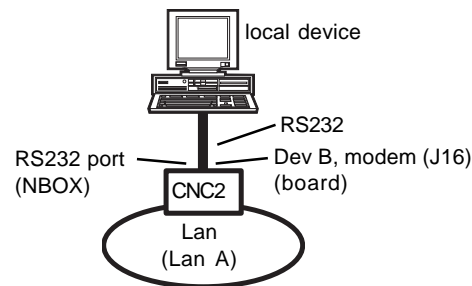
**Input Power Supply:** The battery backed boxed CNC2 (NBOXB/CNC2/230) can only be supplied in 230 Vac version but the boxed version without the battery backup (NBOX/CNC2/...) can be supplied in 230 Vac and 24 V(ac or dc) versions. The 230 Vac version is supplied with an optional input power supply terminal shroud.

The board version requires 24 Vdc, or 18 Vac (transformer isolated), or 18-0-18 Vac (transformer centre tapped).

**Fusing:** No replaceable fuses are fitted. Protection is provided by a self-resetting thermally protected transformer. The 24 V version is protected by a self-resetting PTC device.

**Auxiliary Output supply:** The CNC2 can supply 24 Vdc  $\pm 10\%$  at 150 mA maximum to a peripheral device (e.g. NDP).

**RS232/Lan connections:** The local device connection is referred to as the RS232 port on the NBOX version, and as the Device B connection on the board version. The IQ current loop Lan is referred to as Lan A.



The local Lan (Lan A) connection is duplicated on the CNC2 board as the Device A RS232 connection (J15). If an RS232 device were to be connected to the RS232 connector (Dev A), the Lan connection (Lan A) would be effectively disconnected.

**Battery Backup:** NBOXB/CNC2/230 (230 Vac version only). Rechargeable batteries maintain node operations for 20 minutes (typical) during input power supply failure. The battery circuit is enabled by two links (J12, J13), and by default the battery circuit is disabled (OFF). The battery links should be moved to the ON position after power up to enable the battery backup. The unit should be powered on for at least 16 hours after moving the links to the ON position to charge up the batteries.

## HARDWARE (continued)

**Indicators:** The CNC2 has 9 indicators to monitor unit status.

⚡ (Power)	(green) On when input power supply is on (normally ON); if OFF, power fail.
! (Watchdog)	(red) On if a processor or software fault (normally OFF); if ON, CNC2 fail.
DTRA	(yellow) CNC2 busy to local Lan (Lan A) (normally flashes).
CTSA	(yellow) not used.
DTRB	(yellow) CNC2 busy to local device (RS232 port or Dev B). (normally flashes).
CTSB	(yellow) Local device (RS232 port or Dev B) busy to CNC2.
TX	(yellow) Monitors current flow from CNC2 to current loop Lan (Lan A). (normally ON). If OFF, transmit connection to next node may be broken.
RX	(yellow) Monitors current flow to CNC2 from current loop Lan (Lan A). (normally ON). If OFF, receive connection from previous node may be broken or short-circuited.
OK 🗨️	(green) ON if local Lan (Lan A) OK. Flashes if prohibited Lan address (0, 2, 3, >119) set on address switch. OFF if Lan fault (e.g. baud rate conflict).

**Connectors:** Two part connectors are used throughout to facilitate wiring. A busbar is provided for screen termination (NBOX(B) only).

## FIRMWARE

**Alarms:** The CNC2 also helps to maintain a high level of network integrity by performing continuous checking of network messages. The following alarms are generated when faults are found:

“Remote LAN From CNC2 on Lan xx -

**Lan Broken NKBK**” - a break in communications over the local Lan.

**Lan OK NKOK**” - local Lan communications are restored.

**Lan Changed NKCH**” - a node has gone from or been added to the local Lan.

**Duplicate address NKDA**” - the CNC2’s address is duplicated on the local lan.

It will deliver these alarms to the RS232 port local device in the format required by the supervisor (text or critical).

**Device Ok DVOK**” - CNC2 has detected that the local device is connected and active.

**Device Dead DVDD**”- CNC2 has detected that the local device is either disconnected or is inactive.

These alarms are transmitted on the local Lan. Any other supervisor connected to the local Lan will receive these alarms.

**Identification:** The CNC2 will reply to a request for details sent to address 10 from the supervisor or software tool running in the PC connected by way of RS232.

If the local device is dead, the CNC2 identifies itself to ‘w’ Comms as CNC2 v5.xx.

**Alarm Language:** Some Trend Supervisors or software tools are able to set the CNC2 to report its network alarms in foreign languages (English, Spanish, Finnish, Swedish, Norwegian, Danish, German, Italian, Portuguese, French).

## INSTALLATION

If the CNC2 is supplied as a board, it must first be mounted in a suitable enclosure (e.g. certain IQ controllers, NBOX). It is normally mounted on 4 pillars. The NBOX(B)/CNC2 must be mounted on a flat surface by way of 3 off 6 mm (0.24") holes using screws/rawl plugs. The CNC2 installation involves the following procedure:

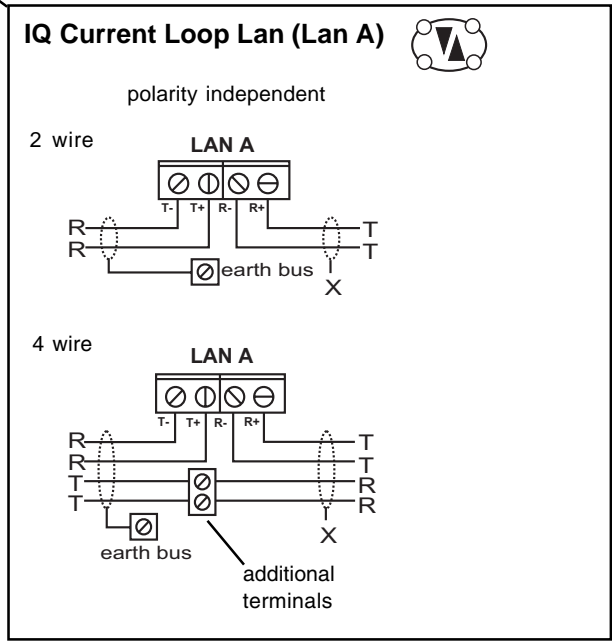
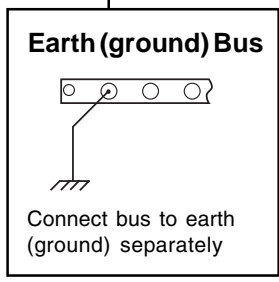
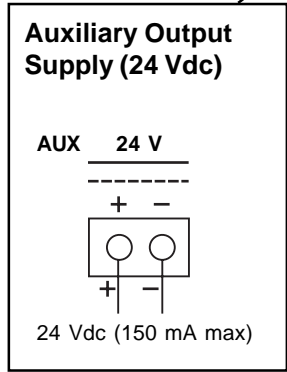
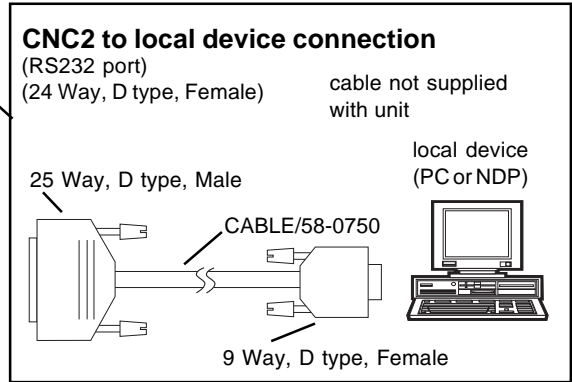
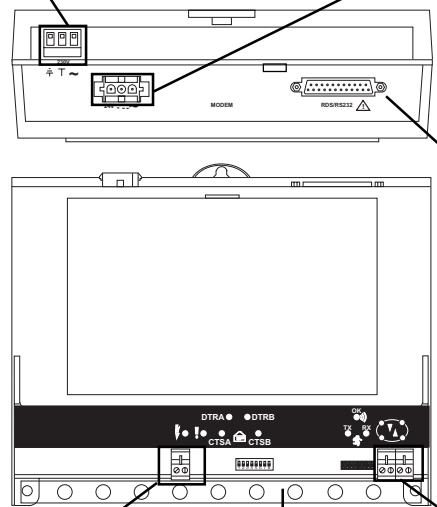
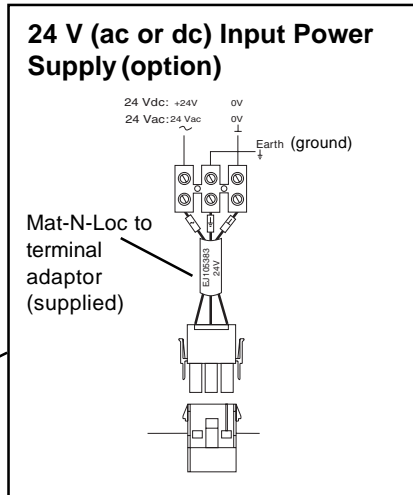
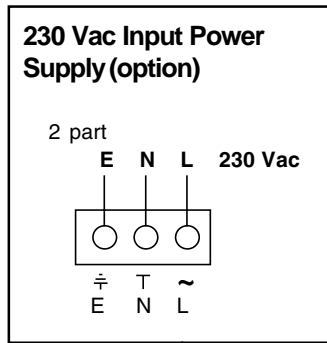
Mount the unit in position	Connect input power supply
Route cables	Connect to device
Connect the network	Connect Auxiliary Output Supply (if used)
Set network address	Test
Set network baud rate	

A full description of installing the NBOX(B)/CNC2 is provided in the NBOX(B)/CNC2 Installation Instructions, TG200265. Instructions for installing a CNC2 board only are provided in the CNC2 Installation Instructions, TG200262.

The installation of an NBOX(B)/CNC2 using an ENCLS/MBOX/IQ22x is covered by ENCLS/MBOX/IQ22x Installation Instructions TG200204.

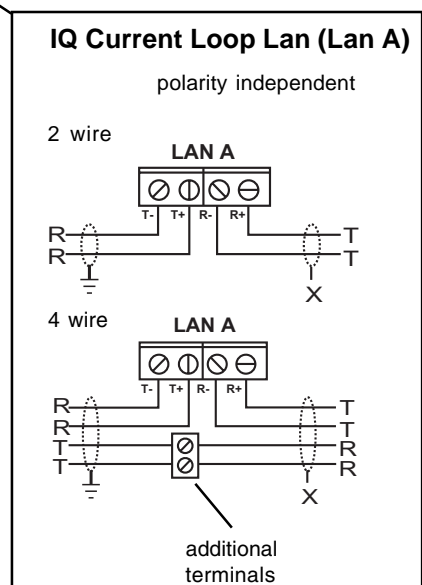
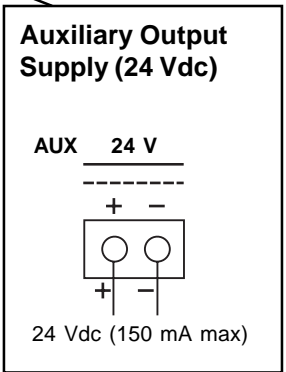
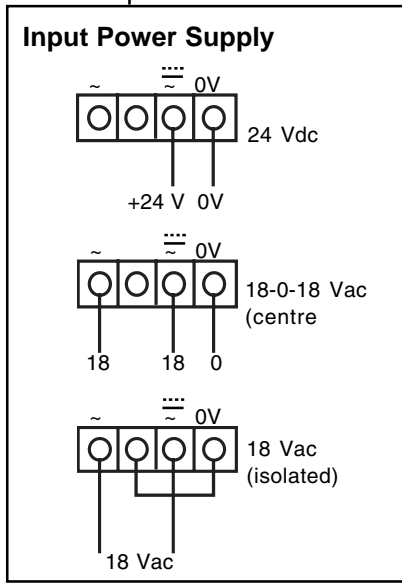
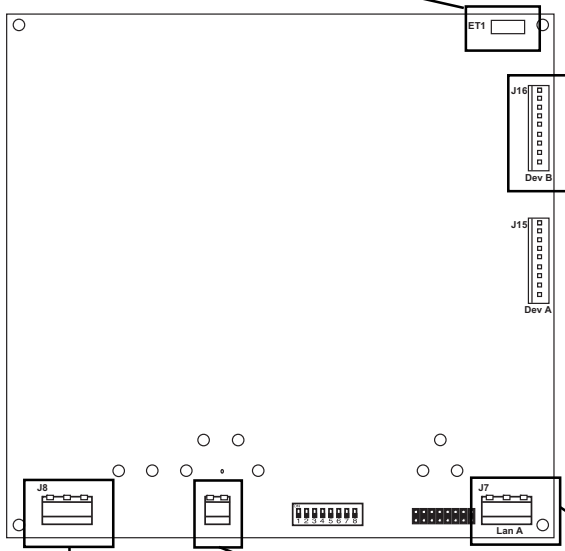
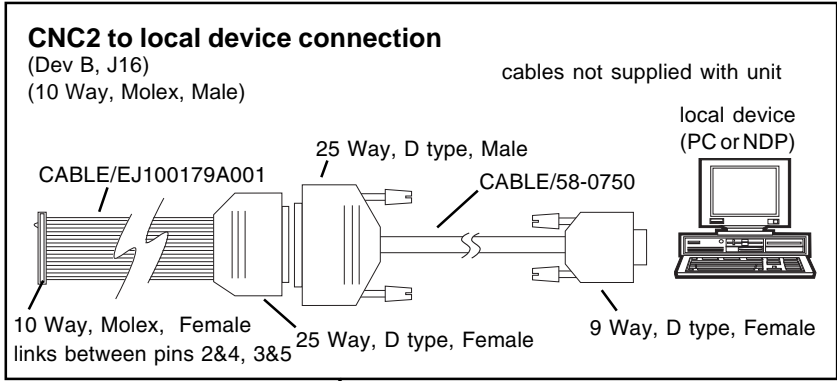
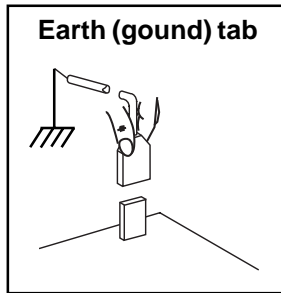
CONNECTIONS

Boxed NBOX(B)/CNC2



CONNECTIONS

Board CNC2

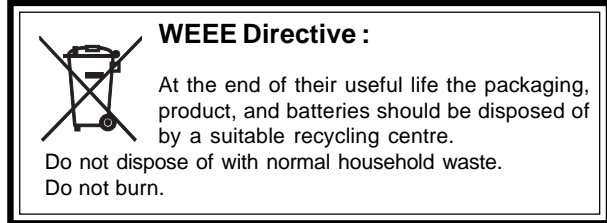


## DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF NODE CONTROLLER: No parts affected

### RECYCLING

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



## ORDER CODES

<b>CNC2</b>	Board only
<b>NBOX/CNC2/24</b>	24 Vac/Vdc version CNC2 in a NBOX plastic enclosure, including earth (ground) bus, earth (ground) bus screws.
<b>NBOX/CNC2/230</b>	230 Vac version CNC2 in a NBOX plastic enclosure, including earth (ground) bus, earth (ground) bus screws, and optional input power supply terminal shroud.
<b>NBOXB/CNC2/230</b>	Battery backed CNC2 in NBOX plastic enclosure, including earth (ground) bus, earth (ground) bus screws, and optional input power terminal shroud (230 Vac only).
<b>KIT/NODE/IQ25x</b>	Kit of items required to retrofit a node inside an IQ250/251 controller.
<b>KIT/NODE/24x</b>	Kit of items required to retrofit a node inside an IQ241/242 controller.
<b>KIT/NODE/IQ23x</b>	Kit of items required to retrofit a node inside an IQ231/233 controller.
<b>IQ2xx/CNC2/..</b>	CNC2 fitted inside an IQ231, 233, 241, 242, 250, or 251 (e.g. IQ241/CNC2/.. for CNC2 mounted in IQ241).
<b>ENCLS/MBOX/IQ22x</b>	261 mm x 285 mm x 77 mm (10.28" x 11.22" x 3.03") IP30 enclosure for wall mounting NBOX/CNC2 with glanding knockouts and integral busbar
<b>CABLE/58-0750</b>	CNC2 to local device (PC or NDP) RS232 adaptor cable, 25 Way, D type, Male, to 9 Way, D type, Female
<b>CABLE/EJ100179A001</b>	CNC2 board connector to RS232 device adaptor cable, 10 Way, Molex, Female to 25 Way, D type, Female
<b>TP/1/1/22/HF/200</b>	200 m (219 yds) of screened single twisted pair cable for use on IQ system current loop Lan (or inputs/outputs). Belden equivalent 8761NH.
<b>TP/2/2/22/HF/200</b>	200 m (219 yds) of screened twin twisted pair cable for use on IQ system current loop Lan. Belden equivalent 8723NH.

## SPECIFICATIONS

### Electrical

Input Power Supply CNC2 (board)	:24 Vdc $\pm 15\%$ at 250 mA, or 18-0-18 Vac $\pm 15\%$ (transformer centre tapped) 50 or 60 Hz 5 VA, or 18 Vac $\pm 15\%$ (transformer isolated) 50 or 60 Hz 5 VA. (board must be earthed, grounded).
NBOX(B)/CNC2 /230	:230 Vac -15% +10%, 50 or 60 Hz, 7.5 VA.
/24	:24 Vac 50/60 Hz, or 24 Vdc $\pm 15\%$ at 7.5 VA (not NBOXB)
Auxiliary Output Supply	:24 Vdc $\pm 15\%$ , 150 mA maximum
Fusing	:No fusing, protected by self-resetting devices
Battery Backup	:(NBOXB/CNC2/230). 230 Vac only. Maintains board operation for 20 minutes (typical) during input power supply failure
Lan transmission	:20 mA two wire current loop, opto-isolated, polarity independent receiver, balanced transmitter
Supervisor transmission:	RS232, EIA/TIA/232E, V28
Distance	
Supervisor	:15 m (17 yds)
Network	:Dependent on cable type, see table below:




Cable	1k2 baud	4k8 baud	9k6 baud	19k2 baud	No. of Wires
Belden 9182	1000 m (1090 yds)	1000 m (1090 yds)	1000 m (1090 yds)	700 m (765 yds)	2
Belden 9207	1000 m (1090 yds)	1000 m (1090 yds)	1000 m (1090 yds)	500 m (545 yds)	2
IQ system TP/1/1/22/HF/200 (Belden 8761)	1000 m (1090 yds)	1000 m (1090 yds)	700 m (765 yds)	350 m (380 yds)	2
IQ system TP/2/2/22/HF/200 (Belden 8723)	1000 m (1090 yds)	1000 m (1090 yds)	500 m (545 yds)	250 m (270 yds)	4

Baud Rate	
Network	:Selectable by links 1k2, 4k8, 9k6, 19k2 baud-set to be same as other nodes on Lan.
Supervisor	:Selectable by links 1k2, 4k8, 9k6, 19k2 baud - set to be same as supervisor.
Network address	:Selectable by board switches - set to be unique on network in range 1, 4 to 9, 11 to 119.

### Mechanical

Dimensions	
CNC2 (board)	:151 mm x 160 mm x 35 mm (5.94" x 6.3" x 1.38") (typical)
NBOX(B)/CNC2	:230 mm x 181 mm x 70 mm (9.06" x 7.13" x 2.76")
Enclosure Material	
NBOX(B)	:Box, ABS
	:Terminal cover - clear Styrolux
Protection	
NBOX(B)	:IP30
Weight	
Board	:0.3 kg (0.66 lbs)
NBOX	:1.0 kg (2.2 lbs)
NBOXB	:1.1 kg (2.42 lbs)
Connectors	
Power	:2 part connector screw terminals 0.5 to 2.5 mm <sup>2</sup> cross section area (14 to 20 AWG) cables.
Lan/Aux	:2 part connector screw terminals 0.5 to 2.5 mm <sup>2</sup> cross section area (14 to 20 AWG) cables.
RS232/NBOX(B)	:24 Way, D type, Female.
RS232/Board	:10 Way, Molex, Male

### Indicators

 (Power)	(green) On when input power supply is on.
 (Watchdog)	(red) On if a processor or software fault.
DTRA	(yellow) CNC2 busy to local Lan (Lan A), (normally flashes).
CTSA	(yellow) Not used.
DTRB	(yellow) CNC2 busy to local device (RS232 port), (normally flashes).
CTSB	(yellow) Local device (RS232 port) busy to CNC2.
TX	(yellow) Monitors current flow from CNC2 to IQ system current loop Lan (Lan A).
RX	(yellow) Monitors current flow to CNC2 from IQ system current loop Lan (Lan A).
OK 	(green) On if local Lan (Lan A) OK. Flashes if prohibited Lan address (0, 2, 3, >119) set on address switch.

### Environmental

EMC	
emissions	:EN50081-1
immunity	:EN50082-2
Electrical safety	:EN61010
Ambient limits	
Storage	:-10 °C to +50 °C (14 °F to 122 °F)
Operating	:0 °C to 45 °C (32 °F to 113 °F)
Humidity	:0 to 95 %RH non-condensing
Flammability	
Casing Material	:Flame retardant, UL99/V0 Glow wire test, UL746A(3)
Version	
Firmware	:v5.2
Board	:AM104178v3

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