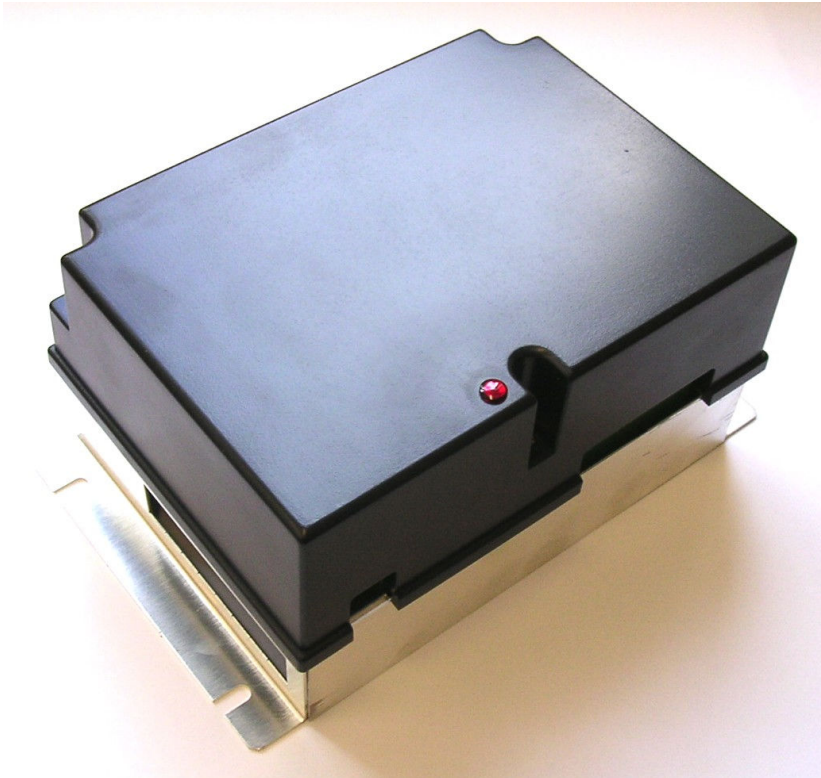




NXMBI-V2
JUNE 29, 2011



NXMBIV2 MODBUS INTERFACE VERSION 2

DESCRIPTION

The NXMBIV2 Modbus interface is designed to connect Fireeye's range of combustion control / monitoring equipment to other devices using the 'modbus' protocol, using 2 wire RS485.

The actual protocol is MODBUS RTU. There is also a MODBUS ASCII protocol that is not supported.

The hardware is based on the NX6100 and daughterboard configured to perform the Modbus protocol conversion. This device is designed to be fitted inside a burner control cabinet.

A network of up to 15 Fireeye devices can be linked to modbus with just one modbus interface.

Safety information



WARNING

The equipment described in this manual is capable of causing property damage, severe injury, or death. It is the responsibility of the owner or user to ensure that the equipment described herein is installed, operated and commissioned in compliance with the requirements of all national and local legislation, which may prevail.

When this equipment is fitted to an appliance due regard must also be given to the requirements of that appliance.

Before attempting to install, commission or operate this equipment all relevant sections of this document must be read and fully understood. If in doubt about any requirements consult Fireye.

Installation, commissioning or adjustment of this product MUST be carried out by suitably trained engineers or personnel qualified by training and experience.

After installation or modifications to the installation all functions of the equipment MUST be checked to ensure safe and reliable operation of the control.

The manufacturer of this equipment accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation, commissioning or adjustment of operating parameters of the equipment. Control panels **must not** be left uncovered while power is on. If it is essential to do so while rectifying faults only personnel qualified by training and experience should be involved.

The time any covers are off must be kept to a minimum and warning notices **must** be posted.

Before attempting any work on this equipment or any equipment controlled by or connected to this equipment, all related electrical supplies **must** be isolated.

Safety interlocks **must not** be removed or over-ridden. Any faults once detected **must** be corrected before the control is operated.

CAUTION – SOME VERSIONS OF THIS EQUIPMENT CONTAIN A LITHIUM BATTERY IN THE DISPLAY UNIT

NOTE

The manufacturer of this equipment has a policy of continual product improvement and reserves the right to change the specification of the equipment and the contents of this manual without notice.

1. Installation



WARNING

EXPLOSION OR FIRE HAZARD CAN CAUSE
PROPERTY DAMAGE, SEVERE INJURY OR DEATH

This control **MUST NOT** be directly connected to any part of a SELV circuit.

WHEN INSTALLING THIS PRODUCT :-

- Read these instructions carefully and ensure you fully understand the product requirements. Failure to follow them could damage the product or equipment to which it is connected.
- Check the ratings given in these instructions to ensure the product is suitable for your application.

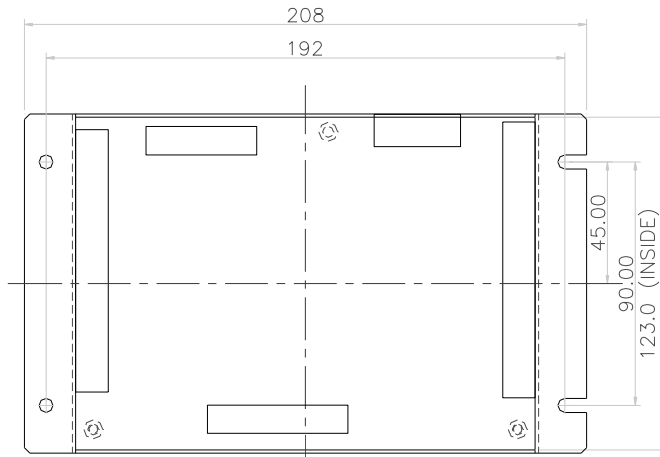
After installation is complete, check the product operation is as described in these instructions.



CAUTION

- Disconnect the power supply before beginning installation to prevent electrical shock, equipment and/or control damage. More than one power supply disconnect may be involved.
- Wiring must comply with all applicable codes, ordinances and regulations.
- Ensure all sections of the control are correctly earthed, to maintain electrical safety and ensure reliable operation.

1.1 Mechanical fixing details for the main control.



The interface has been designed for fitting inside a burner control cabinet. The cabinet should have a minimum protection level of IP40 for indoor use or IP54 for outdoor use.

The interface can be mounted in any attitude, clearances of a least 60mm should be left around the unit to allow sufficient space for wiring and to ensure reliable operation.

The control must be installed in a PD1 or PD2 environment, according to EN6730-1, and the local ambient operating temperature between 0 and 60°C.

Allow 100mm for the depth of the unit including the lid, and LED window. Provide additional clearance as required.

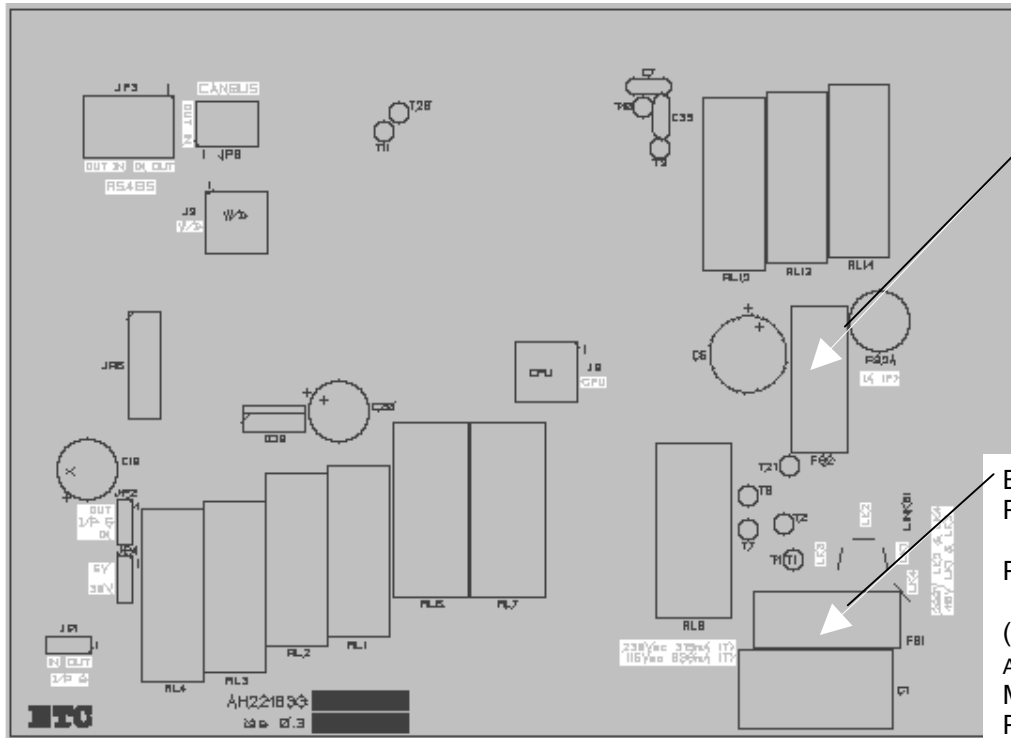
The interface **MUST** be earthed to maintain electrical safety and ensure reliable operation.

1.2 Supply Voltage link selection

1.2.1

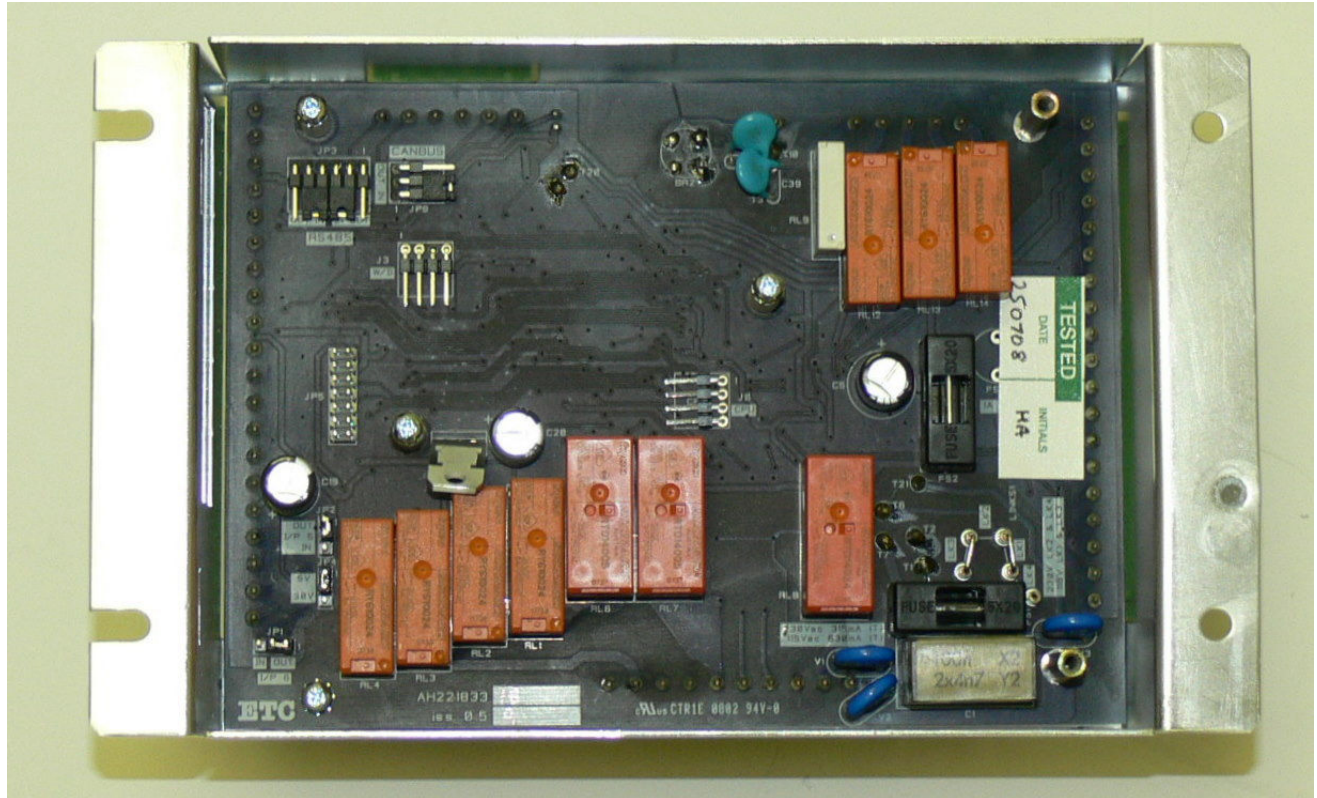
The NXMBIV2 allows for either 120 or 230Vac operation by use of voltage selection links, located on the circuit board which will not be accessible once the unit is mounted in the burner cabinet. links must be set to the correct position before power is applied to the control.

A copy of the layout showing the fuse and jumper locations is shown below.



Bussman S504 series
PN GMA-1
1 AMP (Fast Acting)
(to protect 5V DC circuit)
Alternate Source:
Mouser Electronics
PN 504-GMA-1

Bussmann - S504 series
P/N GMD-630 (TIME Delay)
for 115V
P/N GMD-315 (TIME Delay)
for 230V
(to protect 24V circuit)
Alternate Source::
Mouser Electronics
PN 504-GMD-630mA
PN 504-GMD-315mA



1.2.2 Line supply voltage (LK1 - 4)



WARNING

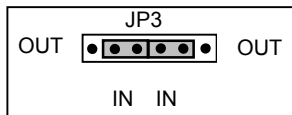
Incorrect setting of the Links **WILL** damage or destroy the unit.

The possible supply voltages are shown below, together with the necessary fuse rating. Incorrect setting of the 'supply selection links' will cause damage to the unit.

The correct fuse (type and rating) must be fitted, failure to do so may result in damage to the control.

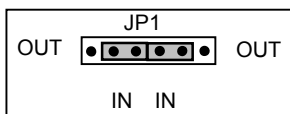
Supply voltage(V)	Links required	Fuse rating(mA)
120	LK1 and LK3	630 anti-surge
230	LK2 and LK4	315 anti-surge

1.2.3 RS485 serial communications termination resistor



The RS485 serial communications is non-isolated and the termination resistors are selected by JP3 jumpers on the main circuit board. The two controls at the end of the communications bus should have both of the JP3 links set to the IN position. All other controls should have the links set to the OUT position. If only two controls are on the communications bus, set the links on both controls to the IN positions.

1.2.4 Modbus serial communications termination resistor



The Modbus serial communication is isolated and the termination resistor is selected by JP1 jumpers on the daughter board but the terminals are provided as part of the main unit. The two controls at the end of the communications bus should have both of the JP1 links set to the IN position. All other controls should have the links set to the OUT position. If only two controls are on the communications bus, set the links on both controls to the IN position.

2. Wiring

General



CAUTION

- Disconnect the power supply before beginning installation to prevent electrical shock, equipment and/or control damage.
- Wiring must comply with all applicable codes, ordinances and regulations.
- This control **MUST NOT** be directly connected to any part of a SELV circuit.

WIRING INSTALLATION MUST BE CARRIED OUT BY A COMPETENT ELECTRICIAN AND IS SUBJECT TO I.E.E. WIRING REGULATIONS (BS 7671:1992) AND/OR LOCAL STANDARDS, WHICH MAY PREVAIL.

HAZARDOUS VOLTAGES MUST BE ISOLATED BEFORE SERVICE WORK IS CARRIED OUT.

The NXMBIV2 unit **MUST** be mounted within a 'burner cabinet' or similar and **MUST** be earthed to the overall enclosure to ensure safe and reliable operation. Do not use a green or green/yellow conductor for any purpose other than earth. The metal body of all component parts **MUST** be connected to earth using a green/yellow conductor.

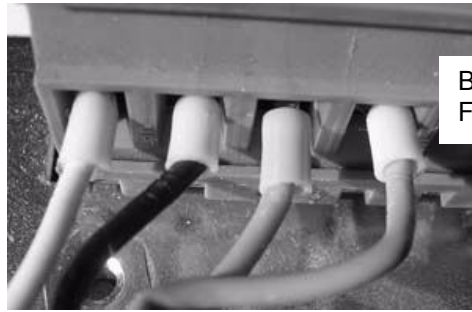
The screen of the signal cables **MUST** not be used to provide the safety earth, a separate connection using the largest cross-sectional area green/yellow earth wire possible **MUST** be made.

The screen termination clamps on the unit are only provided to allow connection of the cable screens to the unit - they do not provide strain relief. The signal cable screens **MUST** be connected at the screen termination clamps only, unless stated otherwise. **Screened cables MUST be of the 'copper braid shield' type** and not 'foil with drain wire', the cross section of the drain wire is insufficient to provide correct screening of the signals and there is no provision to connect the foil or drain at the main unit.

Secure all cables carried in conduit at both ends using a suitable anchorage method in the cabinet.

All cabling that is required to operate at above 50v must be multi-strand single core, PVC insulated, 16/0.2mm and should meet the requirements of I.E.C. 227 or I.E.C. 225.

To comply with EMC requirements, wire the unit using the specified cable sizes and screen connections observing any maximum cable length limitations. The manufacturer of this equipment recommends the use of bootlace ferules on all wire ends, as a "best practice".



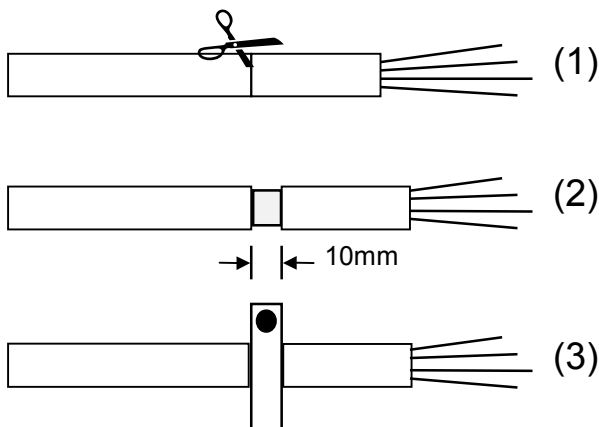
Bootlace
Ferules

Connect all signal cable 'braid' screens to earth using the screen termination clamps provided on the unit. Connect all cable screens to earth at both ends.

If the mains power is known to be noisy or suffer from occasional brown-outs or black-outs then a correctly rated un-interruptible power supply (UPS) should be used to ensure a clean continuous mains power supply to the unit. No rating for the supply is given here as the supply will need to include the power requirement of any other connected devices. The un-interruptible power supply must be located as close as possible to the unit(s).

Cable Screen Connection.

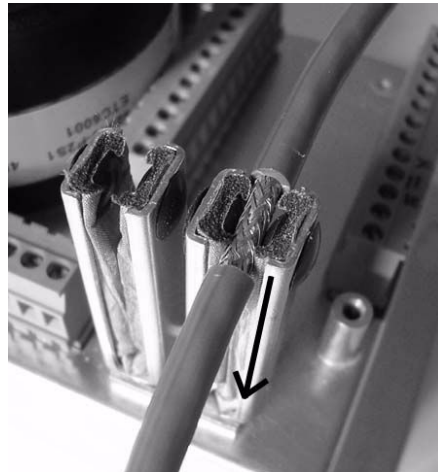
Screen termination clamps are provided on the unit for termination of cable screens (copper braid type) where necessary. It is important to ensure that the screen and associated insulation left on the cable until as close as possible to the terminals to which they are connected, and that it is not cut-back to where the cable passes through the screen termination clamp, the length of unscreened cable short be kept as short as possible but in any case **MUST** not exceed 30mm, per cable 'tail'.



The cable should be prepared by cutting around the outer insulation, taking care not to damage the screen (1).

Pull the insulation apart to expose 10mm of the screen braid (2).

Place the exposed length of screen braid between the conductive strips attached to the cable 'clamps', ensure a 'good' connection between the screen and the 'clamp' is achieved (3). The 'clamps' are not intended to provide strain relief for the cables.



Earth Connection

The unit **MUST** be connected to earth, the connection should be made at the tag showing the Earth symbol. This connection is required to maintain the overall electrical safety of the installation and ensure the EMC performance of the interface, failure to comply with the wiring requirements will affect the performance of the equipment and may cause a hazardous condition to occur. Ensure that a good electrical connection is made between both the unit and the burner panel then between the burner panel and earth. Where necessary, scrape any paint away from connection points and use shake-proof washers to ensure a reliable electrical connection. Always use the largest cross-sectional area earth wire possible.

2.1.1 Terminal Designation

All terminals within the system have 'unique' terminal designations to reduce the possibility of wiring errors. This information is tabulated below:

Terminal Number	Function	Voltage Range
PA1 - 4	Unused – must be left unconnected	
PA5	Common connection for PA7,8,9,12,15,19	0 – 5Vdc
PA6	Unused – must be left unconnected	
PA7	Used to set unit address – see table	0 – 5Vdc
PA8	Used to set unit address – see table	0 – 5Vdc
PA9	Used to set unit address – see table	0 – 5Vdc
PA10,11	Unused – must be left unconnected	
PA12	Used to set unit address – see table	0 – 5Vdc
PA13,14	Unused – must be left unconnected	
PA15	Used to set unit address – see table	0 – 5Vdc
PA16 - 18	Unused – must be left unconnected	
PA19	Used to set unit address – see table	0 – 5Vdc
PA20	Unused – must be left unconnected	
PB1 - 5	Unused – must be left unconnected	
PB6	Used to set baud rate – see table	0 – 5V



Terminal Number	Function	Voltage Range
PB7	Used to set baud rate – see table	0 – 5V
PB8,9	Unused – must be left unconnected	
PB10	Common connection for PB6,7	0 – 5V
PB11 - 19	Unused – must be left unconnected	
PC1	RS485 ground connect to Modbus master	0 – 5V
PC2	RS485 A/+ connect to Modbus master	0 – 5V
PC3	RS485 B/- connect to Modbus master	0 – 5V
PC4	RS485 ground connect to Fireeye product	0 – 5V
PC5	RS485 B/- connect to Fireeye product	0 – 5V
PC6	RS485 A/+ connect to Fireeye product	0 – 5V

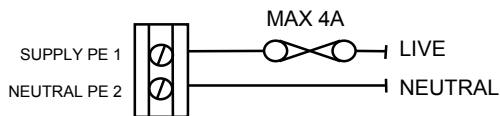
Terminal Number	Function	Voltage Range
PD1 - 5	Unused – must be left unconnected	0 – 250V
PE1	Unit Supply (live)	115 - 230Vac
PE2	Unit Supply (neutral)	115 - 230Vac
PE3 - 10	Unused – must be left unconnected	0 – 230Vac
PF1,2	Unused – must be left unconnected	500Vac

2.1.2 LIVE and NEUTRAL supply



WARNING

Incorrect setting of the Supply Voltage Links **WILL** damage or destroy the unit.

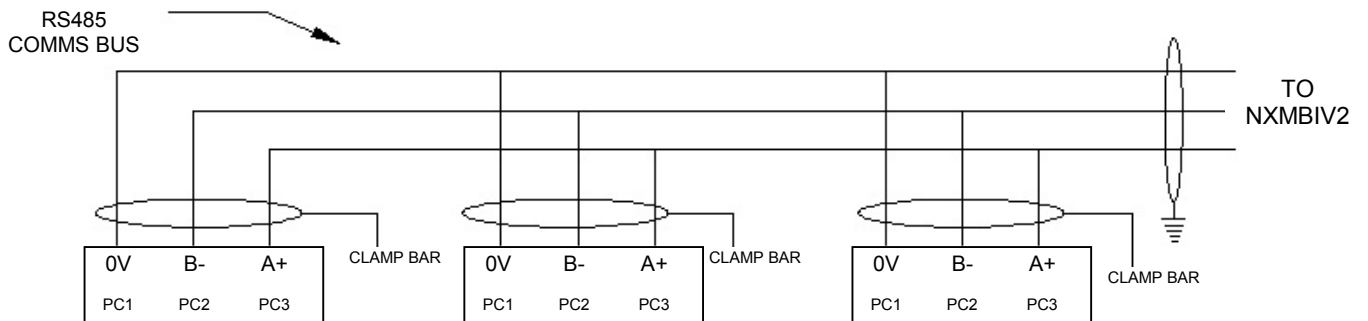


The LIVE and NEUTRAL supplies must be connected using multi-strand single core PVC insulated 16/0.2mm wire. The live connection should be protected with a **maximum 4A rating** fuse as shown.

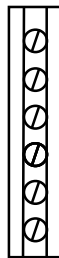
2.1.3 MODBUS interface

The unit allows the RS485 signals at the Fireye equipment to be interfaced to MODBUS. The unit may be used to interface several Fireye controls to one MODBUS master, as shown below. The RS485 and MODBUS cabling MUST be overall 'braid' screened 3-core PVC insulated 7/0.2mm. Since this cable may be run adjacent to, and/or in the same conduit as high voltage wiring, its voltage rating must exceed the maximum voltage carried by any other cable connected to the control or run in the same conduit.

Terminate the screen **at each control** using the cable clamps provided. **Incorrect connection or application of excess voltage may damage or destroy the units being connected.**



- RS485 ISOL GND PC 1
- RS485 ISOL A (+) PC 2
- RS 485 ISOL B (-) PC 3
- RS 485 GND PC 4
- RS485 B (-) PC 5
- RS485 A (+) PC 6



For details on connecting NX6100 series controls to a PC on the communications bus, refer to the manual NX1502 (Comfire2 combustion analysis tool).

NOTE: Isolated RS485 (PC1 thru PC3) for use with MODbus / BAS integration – Requires optional Daughter Board

3. Settings

3.1.1 FIREYE Address & Baud Rate Selection

The RS485 settings (the Fireeye protocol) are not adjustable as all Fireeye equipment is 9600 baud, 8 bits, no parity, 1 stop bit. This unit will automatically select its unit address on the Fireeye bus. If at any point it sees another item on the bus with the same unit address, it will choose another unused address.

3.1.2 Modbus Slave Address Selection



WARNING

When making changes to the settings which may be done at any time, power should always be removed from the unit first to ensure it is not damaged or destroyed by accidental shorting or misconnection of the input terminals.

The unit supports slave address's 1 to 64 only.
Only 2 wire RS485 is supported.

Please note the inputs used to set the slave address are additive, if no input is connected the unit address = 1.

	Connect	To	Addition
Row A	PA7	PA5	1
Row B	PA8	PA5	2
Row C	PA9	PA5	4
Row D	PA12	PA5	8
Row E	PA15	PA5	16
Row F	PA19	PA5	32
MODBUS ADDRESS = Add value of 'connected' rows (A to F) +1			
For example: If PA8 & PA12 are both connected to PA5 then address = (2 + 8)+1 = 11			

When making the connection use the 'shortest' length of cable possible.

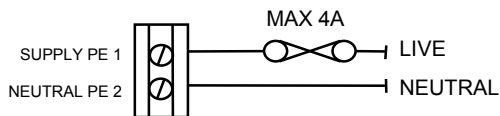
All other terminals on connector PB must be left un-connected.

Modbus Slave Baud Rate Selection



WARNING

When making changes to the settings which may be done at any time, power should always be removed from the unit first to ensure it is not damaged or destroyed by accidental shorting or misconnection of the input terminals.



The MODBUS baud rate can be adjusted by 'links' fitted to terminals PB6, 7 & 10 as detailed below.

The unit supports operation at 4800, 9600 & 19200 baud only.
Only 'no parity' is supported.

Baud Rate Selected	Connection from	To
4800	PB6 PB7	PB10 open
9600	PB6 PB7	Open open
19200	PB6 PB7	Open PB10

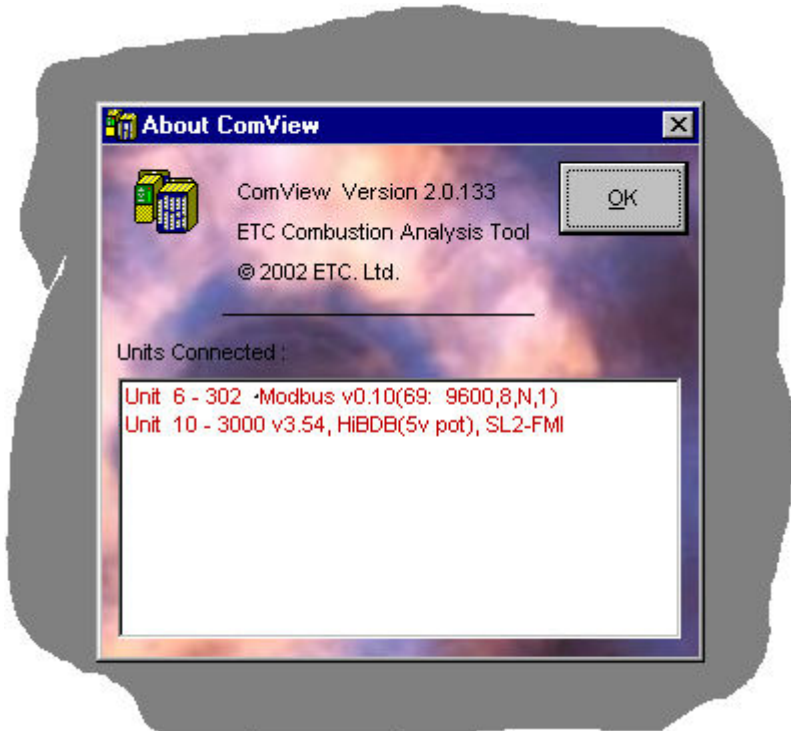
When making the connection use the 'shortest' length of cable possible.

All other terminals on connector PB must be left un-connected.

3.1.3 Checking Settings

This is best achieved using ComView or ComFire software running on a PC connected to the Fireeye bus side of the converter – port 1. A suitable RS232 / RS485 converter will be needed unless the PC has a built in RS485 port.

On start-up of the program, or when the 'scan' button is pushed, the 'about' window will open and show a list of all units connected. The NXMBIV2 modbus interface should be shown in here.



The interface will show as a NXMBIV2, followed by it's firmware version – in this case v0.10.

The modbus address is shown next – here it is 69, followed by the modbus baud rate, number of bits, parity and stop bits.



4. Modbus Registers

The NXMBIV2 Modbus interface supports the following modbus registers :

- COILS (1 to 320). These registers can be written to by a modbus master to provide control of Fireeye units.
- INPUT REGISTERS (1 to 4000, 16 bit). These can be read by a modbus master, to allow monitoring of combustion and other variables from the Fireeye units.
- HOLDING REGISTERS (1 to 1600, 16 bit). These can be written to by a modbus master to provide control of Fireeye units.

It is strongly recommended that only the registers that are actually of interest for the end user / current application are read.

Since firmware version 0.2, block-reads and block-writes have been allowed, but these should be used with care. It is a very bad idea to simply do a block read of say 50 registers from unit 1. It is never going to be the case that more than five or six consecutive registers actually have meaningful data in them for any one application. If you do a block read including registers without important data in them, you will be slowing the update times for the useful registers.

The NXMBIV2 interface 'remembers' which registers have been accessed and will update them continuously in the background – invisible to the modbus master system. The modbus master can read or write to registers as often as it likes, but how recent the data being read back depends on how many registers have been requested since power was applied to the NXMBIV2 unit (or it was re-booted – see coil write #20).

Typically the NXMBIV2 unit will refresh two of its registers per second. There is a recommended maximum of 100 registers that can be refreshed, so the worst-case refresh time would be 50 seconds. NOTE – THIS IS TRANSPARENT TO THE MODBUS MASTER, WHICH CAN READ/WRITE TO THE NXMBIV2 AS OFTEN AS IT LIKES. The NXMBIV2 will return a modbus error if more than 200 items are requested.

As long as only the registers with meaningful information are requested, the refresh times will be much faster (typically a few seconds). This is why block reads must be used only with care.

Some modbus applications refer to 'register numbers' and some refer to 'register addresses'. The tables below all give a 'register number'.

Where the application requires a 'register address' you must subtract 1. For example register number 201 can be accessed by register address 200.

Where a formula is given for the register number, 'unit' refers to the unit address of a device on the Fireeye bus. Any multiplications in the formula must be done before any additions.



4.1.1 COILS – WRITE TO (MODBUS FUNCTION CODES 5 & 15)

There are 320 coil write registers available in the NXMBIV2 modbus interface. Coils 1 to 20 relate to the device at address zero on the Fireeye bus, coils 21-40 relate to the device at unit address one on the Fireeye bus and so on.

Once a coil is written to, this value will be transmitted to the appropriate Fireeye unit indefinitely, until either the value of the coil register is changed again, or the power is removed from the NXMBIV2 interface.

Note : Not all items are valid for all types of equipment.

4.1.2 Register	Function	Details
1 + (unit x 20)	Setpoint Select	0 = Run to setpoint 1 1 = Run to setpoint 2 (use for night setback etc.)
2 + (unit x 20)	Release to Ignite	If used, must be 1 to allow the burner to ignite.
3 + (unit x 20)	Release to modulate	If used, must be 1 to allow the burner to modulate from low fire after light-up.
4 + (unit x 20)	Lead boiler Select	Choose this to be the lead boiler if boiler sequencing is in operation.
5 + (unit x 20)	Fault Mute	Due to differing approvals requirements, this function may be disabled.
6 + (unit x 20)	Oxygen Trim	1 = Turn trim ON
7 + (unit x 20)	Boiler Sequencing Enable	1 = Enable boiler sequencing (lead-lag). Must be done for every unit.
8 + (unit x 20)	Burner ON/OFF	If the burner is firing / able to fire, it can be turned off by writing a zero to this register.
9 + (unit x 20)	Reset Hours Run & Averages	Set to 1 to clear data. This should be set back to zero to allow the counters to work again.
10 + (unit x 20)	Profile Select	Allow the firing of a different fuel / air ratio for the same fuel combination. Integrated burner control models only.
11 + (unit x 20)	Forced Lockout	Will cause the unit concerned to generate a lockout type fault. Integrated burner control models only.
12 to 20 + (unit x 20)	Reserved for future use.	Note : When a '1' is written to coil 20 (at address 19), the modbus interface will be re-booted. This only happens when the register value was 0 and is changed to 1 and will clear the list of items that will be updated.



4.1.3 INPUT REGISTERS – READ FROM (MODBUS FUNCTION CODE 4)

There are 4000 input registers available in the NXMBIV2 modbus interface.

These are all 16 bit registers holding integer numbers. When a number has decimal information, it is multiplied up to give an integer number.

For example:

- 173 °C Flue Temperature will read as 173
- 3.2% oxygen will read as 32.
- 17.4° servo position will read as 174.
- 5.0 bar setpoint will read as 50.
- 5.00 bar setpoint will read as 500.

Whilst the decimal precision is different for different items, it will not change for any particular item during normal use.

Registers 1 to 200 relate to the device at address zero on the Fireye bus, and access information from it's 'engineers key'.

Registers 201 to 250 relate to the device at unit address zero on the Fireye bus and access data from it's 'display values'.

Registers 251 to 450 relate to the device at unit address 1, and access data from it's 'engineers key'

Registers 451 to 500 relate to the device at unit address 1 on the Fireye bus and access data from it's 'display values'.....and so on.

The first time one of these registers is read, the value returned will be zero. The first valid data will appear a few seconds later and all future reads will be up to date – whatever the elapsed time between them.

Note : Not all items are valid for all types of equipment.

Register	Function	Details
1 + (unit x 250)	Engineers Key 1	Device specific data.
2 + (unit x 250)	Engineers Key 2	Device specific data.
...
199 + (unit x 250)	Engineers Key 199	Device specific data.
200 + (unit x 250)	Engineers Key 200	Device specific data.
201 + (unit x 250)	Fuel 1 Drive Position	As on product display.
202 + (unit x 250)	Fuel 2 Drive Position	As on product display.
203 + (unit x 250)	Fuel 3 Drive Position	As on product display.
204 + (unit x 250)	Option 1 Drive Position	As on product display.
205 + (unit x 250)	Option 2 Drive Position	As on product display.
206 + (unit x 250)	Option 3 Drive Position	As on product display.
207 + (unit x 250)	Air Damper 1 Drive Position	As on product display.
208 + (unit x 250)	Air Damper 2 Drive Position	As on product display.
209 + (unit x 250)	Air Damper 3 Drive Position	As on product display.
210 + (unit x 250)	Air Damper 4 Drive Position	As on product display.
211 + (unit x 250)	Option 4 Drive Position	As on product display.
212 + (unit x 250)	Option 5 Drive Position	As on product display.
213 + (unit x 250)	Measured Value	As on product display.
214 + (unit x 250)	Efficiency	As on product display.
215 + (unit x 250)	Inlet Temp	As on product display.



Register	Function	Details
216 + (unit x 250)	O2 Level	As on product display.
217 + (unit x 250)	CO2 Level	As on product display.
218 + (unit x 250)	CO Level	As on product display.
219 + (unit x 250)	Hours Run	As on product display.
220 + (unit x 250)	Burner Status	As on product display.
221 + (unit x 250)	Trim	As on product display.
222 + (unit x 250)	Setpoint	As on product display.
223 + (unit x 250)	Flue Temp	As on product display.
224 + (unit x 250)	Fault Number	As on product display.
225 + (unit x 250)	Smoke Level	As on product display.
226 + (unit x 250)	SOx Level	As on product display.
227 + (unit x 250)	NOx Level	As on product display.
228 + (unit x 250)	Fuel	As on product display.
229 + (unit x 250)	Profile Set	Do not use.
230 + (unit x 250)	Option Set	Do not use.
231 + (unit x 250)	Modulation Rate	As on product display.
232 + (unit x 250)	Fuel Flow Rate	As on product display.
233 + (unit x 250)	Averaged Efficiency	As on product display.
234 + (unit x 250)	Averaged Modulation	As on product display.
235 + (unit x 250)	Total Fuel Flow	As on product display.
236 + (unit x 250)	Gas Pressure	As on product display.
237 + (unit x 250)	Valve Prove Status	As on product display.
238 + (unit x 250)	Flame Signal	As on product display.
239 to 250 + (unit x 250)	Reserved for future use	



4.1.4 HOLDING REGISTERS – WRITE TO (MODBUS FUNCTION CODES 6 & 16)

There are 1600 holding (write) registers available in the NXMBIV2 modbus interface. These are 16 bit registers holding integer values.

Registers 1 to 100 relate to the device at address zero on the Fireeye bus, coils 101-200 relate to the device at unit address one on the Fireeye bus and so on.

Once a holding register is written to, this value will be transmitted to the appropriate Fireeye unit indefinitely, until either the value of the coil register is changed again, or the power is removed from the NXMBIV2 interface.

Note : Not all items are valid for all types of equipment.

Register	Function	Details
1 + (unit x 100)	Setpoint 1 Control Value	Strip decimal information – i.e. 999 = 99.9 = 9.99
2 + (unit x 100)	Setpoint 2 Control Value	Strip decimal information – i.e. 999 = 99.9 = 9.99
3 + (unit x 100)	Setpoint 1 Low Control Limit	Strip decimal information – i.e. 999 = 99.9 = 9.99
4 + (unit x 100)	Setpoint 2 Low Control Limit	Strip decimal information – i.e. 999 = 99.9 = 9.99
5 + (unit x 100)	Setpoint 1 High Control Limit	Strip decimal information – i.e. 999 = 99.9 = 9.99
6 + (unit x 100)	Setpoint 2 High Control Limit	Strip decimal information – i.e. 999 = 99.9 = 9.99
7 + (unit x 100)	Modulation Rate	0 = low fire 999 = high fire
8 to 20 + (unit x 100)	Reserved for future use.	



5. Troubleshooting Checklist



6. Specifications

Subject to change without notice.

Modbus Communications	4800, 9600 & 19200 baud, no parity, 1 stop bit, 8 data bits.
RS485 Interface	Receiver threshold 200mV typical (differential). Hysteresis 70mV typical. Receiver input impedance 12k Ω minimum. Transmitter output swing 0 to +5V (no DC load); +2V to +3V (120 Ω load).
Power Supply	120/230Vac +10% -15% 50/60Hz +/-5%
Isolation	50V.
Environmental	Operating temperature 0 to +60°C. Relative humidity 0 to 90%, non-condensing.
Protection Category	IP20, unit must be mounted in a PD1 or PD2 environment According to EN6730-1. Indoor: use IP40 enclosure Outdoor; use IP54 enclosure
Dimensions	210 x 125 x 80mm deep
Weight	2.13Kg



7. Update History

1.0 – Initial release

1.1 – Corrected modbus connections on page 7 (Terminal Designation).



NOTICE

When Fireeye products are combined with equipment manufactured by other and/or integrated into systems designed or manufactured by others, the Fireeye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireeye products and not to any other equipment or to the combined system or its overall performance.

WARRANTIES

FIREYE guarantees for *one year from the date of installation or 18 months from date of manufacture* of its products to replace, or, at its option, to repair any product or part thereof (except lamps and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of the product on the face of its sales order. **THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES AND FIREYE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.** Except as specifically stated in these general terms and conditions of sale, remedies with respect to any product or part number manufactured or sold by Fireeye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireeye be liable for consequential or special damages of any nature that may arise in connection with such product or part.



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