F500 Elite.

FIELDBUS ADAPTER.

Watchdog (NTC) Elite to DeviceNet communications.

(Software Version 1.1.x)

Approvals: Suitable for use in Hazardous Locations
CL II Div 1 GPS E, F & G (CANADA ONLY)
CL II Div 2 GPS F & G (USA ONLY)

IMPORTANT NOTE:
Please refer to APENDIX 'B' for detail configuration of the DeviceNet Interface.

Document Revision 1 – April 2011

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Dear 4B Customer:

Congratulations on your purchase. 4B appreciates your business and is pleased you have chosen our products to meet your needs.

Please read in its entirety and understand the literature accompanying the product before you place the product into service. Please read the safety precautions carefully before operating the product. With each product you purchase from 4B, there are some basic but important safety considerations you must follow to be sure your purchase is permitted to perform its design function and operate properly and safely, giving you many years of reliable service. Please read and understand the Customer Safety Responsibilities listed below. Failure to follow this safety directive and the Operation Manuals and other material furnished or referenced, may result in serious injury or death.

SAFETY NOTICE TO OUR CUSTOMERS

A. In order to maximize efficiency and safety, selecting the right equipment for each operation is vital. The proper installation of the equipment, and regular maintenance and inspection is equally important in continuing the proper operation and safety of the product. The proper installation and maintenance of all our products is the responsibility of the user unless you have asked 4B to perform these tasks.

B. All installation and wiring must be in accordance with Local and National Electrical Codes and other standards applicable to your industry. (Please see the article “Hazard Monitoring Equipment Selection, Installation and Maintenance” at www.go4b.com.) The installation of the wiring should be undertaken by an experienced and qualified professional electrician. Failure to correctly wire any product and/or machinery can result in the product or machine failing to operate as intended, and can defeat its design function.

C. Periodic inspection by a qualified person will help assure your 4B product is performing properly. 4B recommends a documented inspection at least annually and more frequently under high use conditions.

D. Please see the last page of this manual for all warranty information regarding this product.

CUSTOMER SAFETY RESPONSIBILITIES

1. READ ALL LITERATURE PROVIDED WITH YOUR PRODUCT

Please read all user, instruction and safety manuals to ensure that you understand your product operation and are able to safely and effectively use this product.

2. YOU BEST UNDERSTAND YOUR NEEDS

Every customer and operation is unique, and only you best know the specific needs and capabilities of your operation. Please call the 24-hour hotline at 309-698-5611 for assistance with any questions about the performance of products purchased from 4B. 4B is happy to discuss product performance with you at any time.

3. SELECT A QUALIFIED AND COMPETENT INSTALLER

Correct installation of the product is important for safety and performance. If you have not asked 4B to perform the installation of the unit on your behalf, it is critical for the safety of your operation and those who may perform work on your operation that you select a qualified and competent electrical installer to undertake the installation. The product must be installed properly to perform its designed functions. The installer should be qualified, trained, and competent to perform the installation in accordance with Local and National Electrical Codes, all relevant OSHA Regulations, as well as any of your own standards and preventive maintenance requirements, and other product installation information supplied with the product. You should be prepared to provide the installer with all necessary installation information to assist in the installation.

4. ESTABLISH AND FOLLOW A REGULAR MAINTENANCE AND INSPECTION SCHEDULE FOR YOUR 4B PRODUCTS

You should develop a proper maintenance and inspection program to confirm that your system is in good working order at all times. You will be in the best position to determine the appropriate frequency for inspection. Many different factors known to the user will assist you in deciding the frequency of inspection. These factors may include but are not limited to weather conditions; construction work at the facility; hours of operation; animal or insect infestation; and the real-world experience of knowing how your employees perform their jobs. The personnel or person you select to install, operate, maintain, inspect or perform any work whatsoever, should be trained and qualified to perform these important functions. Complete and accurate records of the maintenance and inspection process should be created and retained by you at all times.

5. RETAIN AND REFER TO THE OPERATION MANUAL FOR 4B'S SUGGESTED MAINTENANCE AND INSPECTION RECOMMENDATIONS

As all operations are different, please understand that your specific operation may require additional adjustments in the maintenance and inspection process essential to permit the monitoring device to perform its intended function. Retain the Operation Manual and other important maintenance and service documents provided by 4B and have them readily available for people servicing your 4B equipment. Should you have any questions, please call the 4B location who supplied the product or the 24-hour hotline number in the USA -309-698-5611.

6. SERVICE REQUEST

If you have questions or comments about the operation of your unit or require the unit to be serviced please contact the 4B location who supplied the product or send your request via fax (309-698-5615), email (4b-usa@go4b.com), or call us via our 24-hour hotline number in the USA - 309-698-5611. Please have available product part numbers, serial numbers, and approximate date of installation. In order to assist you, complete the following information after the product has been placed into service and fax this page to 309-698-5615.

SITE NAME:
SITE LOCATION:
CONTACT NAME:
CONTACT NUMBER:
PART NUMBER:
SERIAL NUMBER:
DATE OF INSTALL:

F500 FIELDBUS ADAPTER.

INTRODUCTION

This version of the F500 Elite Fieldbus adapter had been designed to work as a Watchdog Elite communications gateway and has been designed specifically to allow up to 7 Watchdog NTC control units to be networked together through their own built in communications system. The network data can then be passed through the Fieldbus adapter to a DeviceNet master. The communications control unit is housed in a self-contained wall-mounting enclosure, and will operate from 100-240v AC or from 24v DC.

1. SPECIFICATIONS

1.1 The Control Unit

A plastic enclosure houses the electronics and terminal connectors. The unit contains a printed circuit board to accommodate power supply circuitry, microprocessor, Fieldbus card and terminals. The design is capable of accommodating 8 of the most common Fieldbus interfaces.

Electrical Supply	–	100 to 230VAC +/- 10% 50/60Hz
	-	24VDC +/- 10%
Power Consumption	-	12 WATTS
Terminals	-	Power 4mm² 14 AWG max
	-	Communications, as appropriate to the Fieldbus module.
Protection	-	NEMA12, IP65
Height	-	9.7”, 246mm
Width	-	7.4”, 188mm
Depth	-	4”, 102mm
Fixing Centres	-	8.75” high x 4” wide, 222mm x 102mm
Cable Entry	-	2 Holes 11/8” DIA, 28mm, ¾” CONDUIT
Weight	-	3lbs, 1.3Kg

Approvals: Suitable for use in Hazardous Locations
CL II Div 1 GPS E, F & G (CANADA ONLY)
CL II Div 2 GPS F & G (USA ONLY)

2. INSTALLATION INSTRUCTIONS

The Control Unit

The Control Unit box should be installed in a suitable control or starter switch room. The box should have sufficient space to open the lid for wiring.

The Control Unit is susceptible to static voltage. Connection of a clean ground to terminal 29 is essential for optimum performance. Prior to this connection, static handling precautions should be taken.

3 ELECRICAL WIRING

Refer to Drawings A, B, C & D

When installing the equipment in an area which is likely to be hazardous from Ignitable Dusts, use liquid tight conduit and fittings and follow all local codes.

4 OPERATING INSTRUCTIONS

The Fieldbus Adapter is a self contained unit and there are no user configurable options with the exception of the DeviceNet baud rate and MAC address. The adapter is equipped with two communications ports; RS485 and DeviceNet and is supplied preconfigured for 125K baud and MAC address 1.

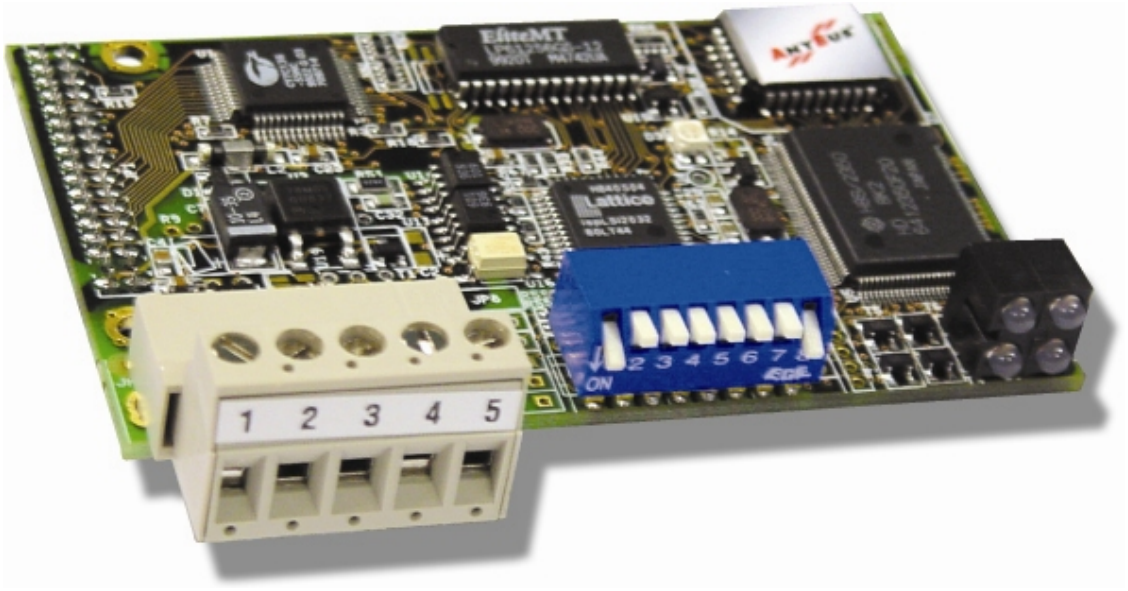
The RS485 port is a four wire; twin twisted pair full duplex serial port and has been specifically configured to work with the Watchdog. You should not connect any other devices to this port.

The configuration switch can be seen in the picture on page 7 and allows selection of the baud rate and the units MAC address. The switches are numbered left to right 1 to 8. The switch is OFF when in the UP position and ON when in the DOWN position.

The configuration is as follows.

Switch 1 & 2
Switch 1 OFF + Switch 2 OFF = 125K Baud
Switch 1 ON + Switch 2 OFF = 250K Baud
Switch 1 OFF + Switch 2 ON = 500K Baud
Switch 1 ON + Switch 2 ON = Reserved

Switch 3 to 8 represents the MAC address settings. Switch 3 is the Most Significant Bit of the address and switch 8 is the Least Significant Bit of the address. Refer to APPENDIX A for a full list of address settings.



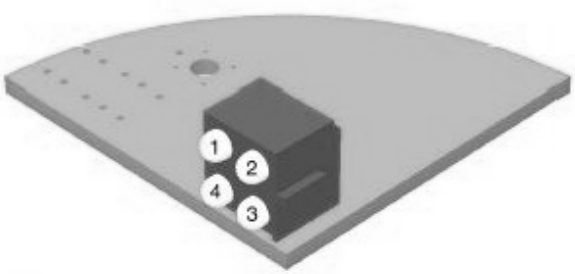
The above picture shows the location of the main parts of the DeviceNet Fieldbus module.

The DeviceNet connector is on the front left of the picture and conforms to the standard connection form.

Terminal 1 = V-	(Negative supply voltage)
Terminal 2 = CAN_L	(CAN L bus line)
Terminal 3 = SHIELD	(Cable shield)
Terminal 4 = CAN_H	(CAN H bus line)
Terminal 5 = V+	(Positive supply voltage)

The switches can be clearly seen in the front middle of the picture and a status LED block is located at the front right of the picture.

The statuses LED's are grouped in a single block of four and indicate the following status.



Led 1 Status
Not used in this version of the Fieldbus module.

Led 2 Network Status

State	*Description*
Off	Not powered / Not On line
Green Steady	Link OK, On Line, Connected
Green Flashing	On Line but not connected
Red Steady	Critical Link Failure
Red Flashing	Connection Timeout

Led 3 Module Status

State	*Description*
Off	Not powered
Green Steady	Module initialized and operational
Green Flashing	Data size is bigger than configured
Red Steady	Unrecoverable Fault
Red Flashing	Minor Fault

Led 4 Status
Not used in this version of the Fieldbus module.

Input register data map

The DeviceNet module is equipped with a **240 byte** data memory. This data memory is used to hold the status values for the Watchdog units connected to the F500.

The Watchdog data is automatically read for up to **7** controllers. The data returned is processed and stored in the following format. The position of the data is fixed within the input data table.

Watchdog Address	Input Words	Input Byte
-	0	0-1
1	1 – 17	2 – 35
2	18 – 34	36 – 69
3	35 – 51	70 -104
4	52 – 68	105 -137
5	69 – 85	138 -171
6	86 – 102	172 - 205
7	103 – 119	206 - 239

The Watchdog data is automatically read for up to 7 controllers. The data returned is processed and stored in the following format. The position of the data is fixed within the input data table.

Word 0 (Byte 0) is used to indicate the number of Watchdogs that are responding to the request for data. Word 0 (Byte 1) is unused. The remaining data stored in the input bytes is constructed as shown in the table on the right.

All the values are stored in Hexadecimal and Word aligned in this example

Number of Watchdogs detected this time (Byte 1,0) Once only	0	No.Of WD	0x0200
Watchdog current speed (Byte 3,2)	1	WD1 Speed	0x0000
Watchdog current operating status (Byte 5,4)	2	Status	0x0000
Under speed alarm and stop in % (Byte 7,6)	3	USA/USS	0x0000
Over speed alarm and stop in % (Byte 9,8)	4	OSA/OSS	0x0000
Current calibration value in PPM (Byte 11,10)	5	Calibration PPM	0x0000
Display scaling factor (Byte 13,12)	6	Scale Factor	0x0000
NTC Temperature 1 and 2 (Byte 15, 14)	7	T1/T2	0x0000
NTC Temperature 3 and 4 (Byte 17, 16)	8	T3/T4	0x0000
NTC Temperature 5 and 6 (Byte 19, 18)	9	T5/T6	0x0000
NTC temperature sensor status 1 and 2 (Byte 21,20)	10	ST1/ST2	0x0000
NTC temperature sensor status 3 and 4 (Byte 23,22)	11	ST3/ST4	0x0000
NTC temperature sensor status 5 and 6 (Byte 25,24)	12	ST5/ST6	0x0000
Sensor 1 and sensor 2 alarm level (Byte 27,26)	13	ALM1/ALM2	0x0000
Sensor 3 and sensor 4 alarm level (Byte 29,28)	14	ALM3/ALM4	0x0000
Sensor 5 and sensor 6 alarm level (Byte 31,30)	15	ALM5/ALM6	0x0000
Number of sensors in use (Byte 33), Relay status (Byte 32)	16	NOS/REL	0x0000
Persistent alarm value (Byte 35), update counter (Byte 34	17	PERALM/CNT	0x0000

The data from each Watchdog is stored in 17 consecutive words (or 34 bytes) of data.
The first two bytes of the group (e.g. word 1) represent the Watchdog speed.
The second two bytes of the group of the group (e.g. word 2) represent the Watchdog status.

The Watchdog speed is encoded in the following manner. Four hexadecimal digits are used to represent the measured speed for the Watchdog. The rightmost three and a half are the main body of the speed and the upper half of the fourth is the position of the decimal place within the information. If the most significant two bits are '00' then decoding of the speed is not required. If the two bits are '01', then the resulting value should be divided by 10 and if the two bits are '10' then the speed should be divided by 100. The top two bits should never be '11' as this has no meaning.

Bit 7	Bit 6	Description (e.g. most significant bits of the first speed byte 3)
0	0	Bits 5-0 of the first byte and the whole second represent the speed.
0	1	Same as above but the speed and should be divided by 10
1	0	Same as above but the speed and should be divided by 100
1	1	Not used.

An example of this can be seen below.
Watchdog speed = 6E (e.g. byte 3) & 1E (e.g. byte 2). The leftmost digit (6) = '0110' in binary which can be separated into '01' (bits 7 and 6) for speed scaling and '10' (bits 5 and 4) for the upper speed digit. If you strip off bits 7 and 6 you are left with a decoded value of 2E & 1E for the speed and '01' or divide by 10 for the scaling. The speed 2E1E converted to decimal = 11806 and then divided by 10 results in an actual speed of 1180.6. By default the Watchdog will display speed in pulses per minute but it can be scaled to display any value required, refer to the Watchdog manual for further detail.

The Watchdog status is encoded as described in the following manner.
Two data bytes are used to represent the status for the Watchdog. The first status byte (e.g. byte 5) is the status code and the second byte (e.g. byte 4) represents any data which is associated with the status code. All data is in hexadecimal.

Status Code (Byte 5)	Status Data (Byte 4)	What it means.
09	% Complete	Watchdog is calibrating (% complete).
0F	-	Elevator is stopped due to persistent belt slip.
10	-	Elevator is stopped due to persistent over calibration.
11	-	Misalignment detected on Top & Bottom sensors.
22	-	Elevator is stopped and is ready to run (Normal stop condition)
23	Start-up Delay In seconds	Elevator is accelerating. (xx seconds remain)
24	Speed %	Elevator running within programmed limits.
25	Speed %	Stop relay has been de-energised (Fault stop condition)
27	Time to alarm In seconds	Misalignment detected. (xx seconds to alarm)
2A	Time to alarm In seconds	Over speeding: Alarm relay about to de-energise (xx seconds to alarm)
2D	-	Misalignment detected at the top of the elevator.
2F	Time to stop In seconds	Over speeding: Stop relay about to de-energise (xx seconds to stop)
31	-	Speed display is over range: check the scaling factor.
32	-	Start elevator to commence calibration procedure.
36	1-4	Watchdog has detected an internal fault.
39	Time to alarm In seconds	Belt slipping. (xx seconds to alarm)
3A	Time to stop In seconds	Belt slipping: Stop relay about to de-energise. (xx seconds to stop)
3B	-	Elevator stopped due to lack of acceleration.
3C	Time to stop In seconds	Persistent alarm. (xx seconds to alarm)
3D	-	Elevator stopped: Speed has exceeded over speed limit.
3E	-	Interlock signal off, waiting for zero speed.
3F	-	Elevator stopped: Persistent alarm condition.
40	-	Elevator stopped: Severe under speed.
41	-	Watchdog is not calibrated: Please see the manual.
42	-	Misalignment detected at the bottom of the elevator.
44	-	Wrong access code used when changing setup.
46	Speed %	Elevator speed less than alarm level (slipping)
47	Speed %	Elevator speed more than alarm level (Over speeding)
49	-	Suspected open circuit or faulty PTC bearing temperature sensor.

4A	-	Suspected fault on one or more MAS. Could be mains pickup.
4E	-	Plug switch is open.
50	-	PTC Hot bearing at zone 1.
51	-	PTC Hot bearing at zone 2.
52	-	PTC Hot bearing at zone 3.
53	-	PTC Hot bearing at zone 4.
54	-	PTC Hot bearing at zone 5.
55	-	PTC Hot bearing at zone 6.
56	-	HBS is open circuit at zone 1
57	-	HBS is open circuit at zone 2
58	-	HBS is open circuit at zone 3
59	-	HBS is open circuit at zone 4
5A	-	HBS is open circuit at zone 5
5B	-	HBS is open circuit at zone 6

An example of the status code might be ‘2463’. The first status byte (byte 5) ‘24’ show that the equipment is running within the specified alarm limits and the second status byte (byte 4) ‘63’ indicate that the speed is 99% if it’s calibrated value. Where a value is not shown or a ‘-‘is used in the table, this indicates that any data present in this field should be ignored.

Several different conditions may occur at the same time whilst the Watchdog is operating. If the Watchdog is running within calibrated range but also detects a motion sensor fault then the information returned may look something like this.

‘2463’ Running at 99% of calibrated speed.
Followed three seconds later by
2D--’ Misalignment detected at the top of the elevator.
Followed three seconds later by
‘3CAA’ Persistent alarm, 170 seconds to go.
The messages would then repeat with any new values in the status data field.

Due to some limitations in the speeds involved in updating the Watchdog information, rapid changed of data could be missed or be present for only a very short period of time.

If the Watchdog is placed in one of the two test modes, the messages below will be returned in the following order.

Bytes 3 and 2	Bytes 5 and 4	The first two bytes show the speed data and the second two bytes show the status and status data.
xx & xx	06 & xx	Over speed Stop as a percentage of calibrated speed.
xx & xx	05 & xx	Over speed Alarm as a percentage of calibrated speed.
xx & xx	02 & xx	The actual calibrated speed
xx & xx	03 & xx	Under speed Alarm as a percentage of calibrated speed.
xx & xx	04 & xx	Under speed Stop as a percentage of calibrated speed.
-----	07 & --	Performing internal test.
----	4C & --	Testing the Alarm relay.
----	4D & --	Testing the Stop relay.

Codes 4C and 4D are only returned if the extended test is in operation.

Under speed alarm and stop in % (Byte 7, 6)
These two bytes show (in % of calibrated speed) the under speed alarm and stop levels. These represent the point at which the Watchdog will generate an alarm or stop condition. Example, if byte 7 is '0A' and byte 6 is '14' then this means that the Watchdog will generate an under speed alarm at 10% (0A) below calibrated speed and will generate a stop condition at 20% (14) below the calibrated speed.

Over speed alarm and stop in % (Byte 9, 8)
These two bytes show (in % of calibrated speed) the over speed alarm and stop levels. These represent the point at which the Watchdog will generate an alarm or stop condition. Example, if byte 7 is '0A' and byte 6 is '14' then this means that the Watchdog will generate an over speed alarm at 10% (0A) above calibrated speed and will generate a stop condition at 20% (14) above the calibrated speed.

Current calibration value in PPM (Byte 11, 10)
These two bytes represent the current calibration speed value in Pulses Per Minute (Default). The representation can be changed to other scaled values by using the display scaling value below. Refer to the Watchdog manual for further details about display scaling.

Display scaling factor (Byte 13, 12)
These two bytes contain a value which is used by the Watchdog to scale the information on the display into a format which represents more accurately what the elevator is doing. The default scaling factor (04B0) results in the display showing the current speed in PPM. Refer to the Watchdog manual for further details about display scaling.

NTC Temperature 1 and 2 (Byte 15, 14)
These two bytes show the actual temperature of temperature sensors 1 & 2. The values are in Dec C or Deg F according to the settings on the Watchdog. Refer to the Watchdog manual NTC section for more detail.

NTC Temperature 3 and 4 (Byte 17, 16) & NTC Temperature 5 and 6 (Byte 19, 18)
See the detail above for temperature sensors 1 and 2

NTC temperature sensor status 1 and 2 (Byte 21, 20)
These two bytes show the current status of temperature sensors number 1 & 2.
If byte 21 is 0 then sensor 1 is NORMAL
If byte 21 is 1 then the temperature of sensor 1 is HIGH so an alarm has been generated.
If byte 21 is 2 then sensor 1 may be OPEN circuit
If byte 21 is 3 then sensor 1 may be SHORT circuit

NTC temperature sensors 2 to 6 operate in an identical manner as described for sensor 1 above.

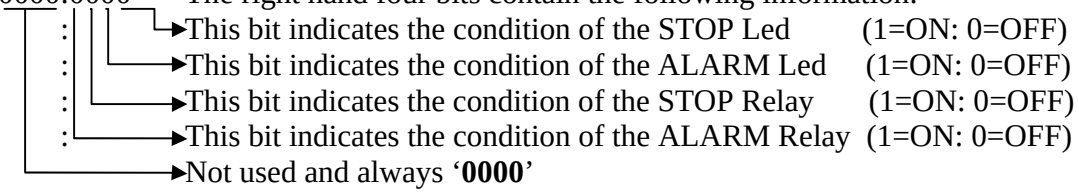
Sensor 1 and sensor 2 alarm level (Byte 27,26)
These two bytes represent the alarm value for the temperature sensor. The default values for this alarm level are '9E' (158) when measuring in Deg 'F' and '50' (80) when measuring in Deg 'C'. Refer to the Watchdog manual for further detail regarding this value.

Sensor 3 and sensor 4 alarm level (Byte 29, 28) & Sensor 5 and sensor 6 alarm level (Byte 31, 30) operate in an identical manner as described above.

Number of sensors in use (Byte 33)
Byte 33 shows the total number of NTC temperature sensors that are currently being monitored by the Watchdog. This value ranges from 0 to 6. See the watchdog manual for further detail.

Relay status (Byte 32)
This byte contains information relating to the status of the Watchdog LED's and Relays. Although the byte is represented in Hexadecimal converting it to binary helps to explain the contents a little better.

0000:0000 The left hand four bits are always **0000** and can be ignored.
0000:0000 The right hand four bits contain the following information.



When a relay is considered to be 'ON' we mean energized and when 'OFF' we mean de-energized.

0000:0000 = 00 then no conditions exist
0000:0010 = 02 then the alarm Led is on
0000:1010 = 0A then the alarm Led and Alarm Relay are active
0000:0011 = 03 then both Led's are 'on' and both Relays are 'off' (de-energized)

Persistent alarm value NTC only (Byte 35)
This is how long the temperature alarm will take in seconds before stopping the elevator. The default value is ‘B4’ 180 seconds. If this value reaches ‘0’ then the elevator will be stopped.

Update counter (Byte 34)
Every time the F500 successfully receives information from the chosen watchdog, then this counter value will be incremented by 1. The watchdog treats serial communications as low priority so occasionally requests for data can be ignored. It is advisable to keep checking this value so as to know when new data has arrived in the F500. The counter will increment from 0 to 255 and then return to 0 again in a continuous loop.

Below is an example of the data returned when the F500 is polling Watchdogs


WDF500.mbp

Tx = 491: Err = 0: ID = 1: F = 03: SR = 500ms

	Alias	00000	Alias	00010	Alias	00020	Alias	00030	Alias	00040	Alias	00050
0	No.Of WD	0x0100	ST1/ST2	0x0000	USA/USS	0x0A14	ALM1/ALM2	0x9E9E	Scale Factor	0x04B0	NOS/REL	0x0103
1	WD1 Speed	0x0000	ST3/ST4	0x0000	OSA/OSS	0x0A14	ALM3/ALM4	0x9E9E	T1/T2	0x6C4F	PERALM/CNT	0x004B
2	Status	0x0000	ST5/ST6	0x0000	Calibration P…	0x0475	ALM5/ALM6	0x9E9E	T3/T4	0x42C2	WD4 Speed	0x0000
3	USA/USS	0x0000	ALM1/ALM2	0x0000	Scale Factor	0x04B0	NOS/REL	0x0208	T5/T6	0x11AA	Status	0x0000
4	OSA/OSS	0x0000	ALM3/ALM4	0x0000	T1/T2	0x4C50	PERALM/CNT	0xB49C	ST1/ST2	0x0200	USA/USS	0x0000
5	Calibration PPM	0x0000	ALM5/ALM6	0x0000	T3/T4	0x3000	WD3 Speed	0x0000	ST3/ST4	0x0000	OSA/OSS	0x0000
6	Scale Factor	0x0000	NOS/REL	0x0000	T5/T6	0x4158	Status	0x4100	ST5/ST6	0x0000	Calibration PPM	0x0000
7	T1/T2	0x0000	PERALM/CNT	0x0000	ST1/ST2	0x0000	USA/USS	0x0A14	ALM1/ALM2	0x0045	Scale Factor	0x0000
8	T3/T4	0x0000	WD2 Speed	0x0484	ST3/ST4	0x0000	OSA/OSS	0x0A14	ALM3/ALM4	0x20D6	T1/T2	0x0000
9	T5/T6	0x0000	Status	0x2465	ST5/ST6	0x0000	Calibration PPM	0xFF19	ALM5/ALM6	0x8B4B	T3/T4	0x0000

Words 1 to 17 (pink) represent Watchdog 1. These are currently all 0 because watchdog 1 isn’t present at this time. Words 18 to 34 (green) represent Watchdog 2. Word 18 which is 0484 HEX tells us that the Watchdog is currently running at 1156 pulses per minutes. Word 19 which is 2465 HEX tells us that the Watchdog is ‘running (24) at 101% (65) of the calibrated speed. The remainder of the information in the example can be decoded using the information as previously described. Words 35 to 51 (blue) represent Watchdog 3. Word 35 which is 0000 HEX tells us that the Watchdog is currently NOT running. Word 36 which is 4100 HEX tells us that the Watchdog is in fact NOT calibrated (41), see the Watchdog manual for more detail about calibration.

Diagnostics Display.

The F500 Elite is equipped with a simple RS232 serial interface. This interface can be used to monitor the communications with the Watchdog Elite. The information displayed contains diagnostic data about the Fieldbus module and Watchdog number 1. A VT100 or compatible display terminal should be used to display the information.

```
F500 Elite Communications Gateway - Watchdog NTC
Elite Software Version - 3.2.0

CBU Version= 1.00
API Version= 2.16
FBI Version= 1.05
ABI Version= 1.05
FieldBus Type = ModBus RTU
S2468E

DATA ARRAY FOR WATCHDOG NUMBER 1
   Speed 0423        ST1/ST2  0000
  Status 2464        ST3/ST4  0000
 USA/USS 0A14        ST5/ST6  0000
 OSA/OSS 0A14      ALM1/ALM2  9E9E
   Calib 0423      ALM3/ALM4  9E9E
 Scaling 04B0      ALM5/ALM6  9E9E
   T1/T2 605E        NOS/REL  022C
   T3/T4 3040      P-ALM/CNT  3CB1_
   T5/T6 A93A

Total Watchdogs Read = 1
```

Above is an ***example*** screen image from the diagnostics display. The information displayed will vary slightly dependent upon the fieldbus interface used.

CBU Version = X.XX – This is the control base unit software version.
API Version = X.XX – This is the application interface software version.
FBI Version = X.XX – This is the Fieldbus interface software version.
ABI Version = X.XX – This is the AnyBus interface software version.

Fieldbus type = DeviceNet – This describes the type of Fieldbus module which is installed in the F500 Elite. If the Fieldbus module is faulty some or all of this data will change to suggest which area may be at fault. For example, FBI version number might become 245.55. An unusually large number such as this is not usually associated with a normally functioning module and would suggest that the Fieldbus interface controller has failed. In the event of this or any other fault, contact your supplier.

The sequence S2468E indicated that the system has initialised correctly, a deviation from this indicates that one or more parts of the initialisation process has failed. If this is the case, recycle power and see if this clears the problem. If you still have problems with the initialisation of the unit contact your supplier and tell them what you see on the diagnostics display. The main area of the display shows the complete data from Watchdog address number 1 as described on pages 8 to 14 of this manual.

Diagnostics LED

Located on the main circuit board, just above the RS485 connections to the Watchdog you will find an LED indicator (usually RED). This indicator will flash every time the F500 attempts to communicate with the Watchdogs. The LED will normally flash at a consistent rate followed by a very short pause. The short pause indicates that the F500 is updating the information which it stores internally. A significant deviation from this sequence is an indication that there is a problem. If this happens, contact your supplier for further information.

Electronic Data Sheet (EDS)

An electronics data sheet is supplied with each unit to simplify the configuration of the F500 interface when connected to DeviceNet. Importing and then downloading this EDS to the scanner module or other similar device will allow the module to be accessed by either of the following methods:

- † Explicit Messaging
- † Polled I/O
- † Bit-strobed I/O
- † Change of state / Cyclic I/O

A number of explicit messaging options are available but the most widely used one is the following.

I/O data Input Mapping Object: Class A0h, Instance 1h, Attribute 1h

This will result in 240 bytes of data being returned in the format described on page 8 of this manual. For further information about explicit messaging contact your DeviceNet supplier.

The F500 software version 1.1.x is preconfigured to work with 240 bytes of data. Therefore the DeviceNet scanner module must be configured to work with and have 240 bytes of data space available.

CHECK LIST
For problems after initial start-up

1. Is there excessive interference on the electrical power supply? Power conditioners and surge (spike) suppressor may have to be fitted.

2. Has the wiring for the F500 and Fieldbus been routed away from power cables?

3. Is the F500 Elite circuit properly grounded?

4. Is the Micro-processor control unit overheating, if so mount the unit in a temperature-controlled environment of maximum temperature 113°F (45°C).

5. Check that high powered 'Walkie Talkie' radios are not operated immediately near the control unit or F500 as this will affect the performance.

6. Check that the communications/power cable is connected correctly and in accordance with DRG A,B,C and D.

7. Check the led status indication as described on page 5 and 6

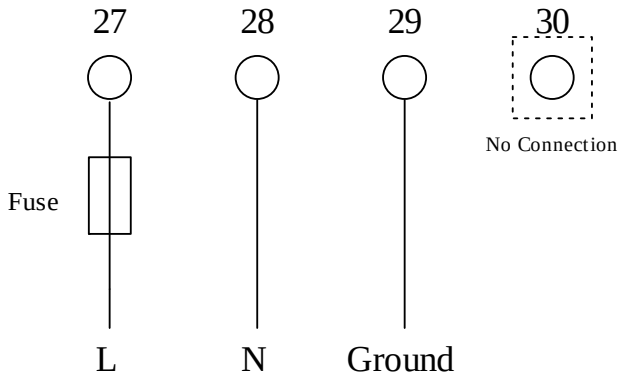
8. If the Watchdog unit does not respond or is intermittent, check that the termination resistors are correctly fitted.

9. If your scanner module shows E#77 (error 77) for the F500 node number, then you have incorrectly set the data size in the scan list for the F500. Please refer to Appendix 'B'

CONTACT INFORMATION

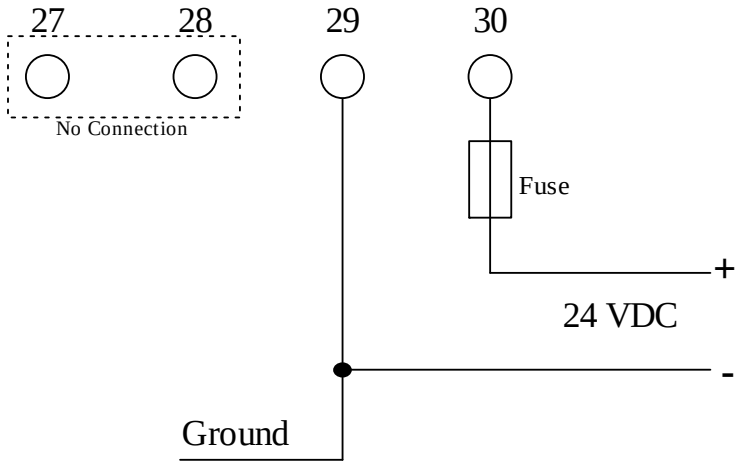
www.go4b.com

Drawing 'A'

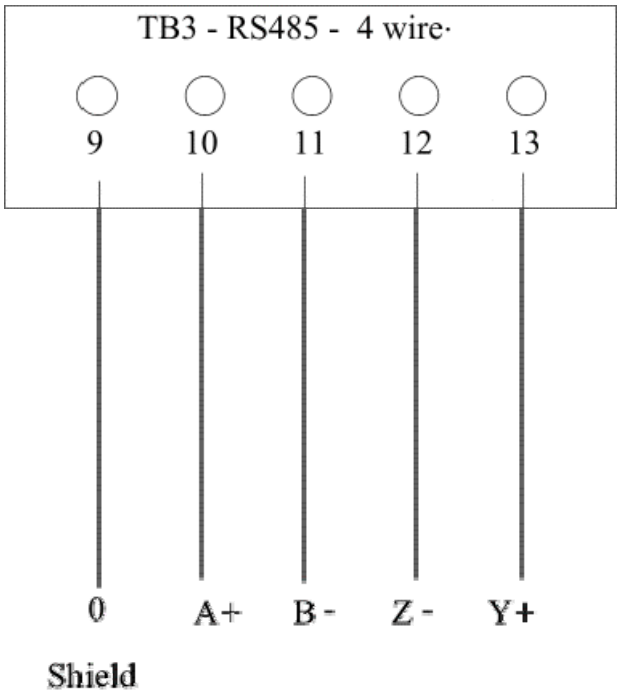


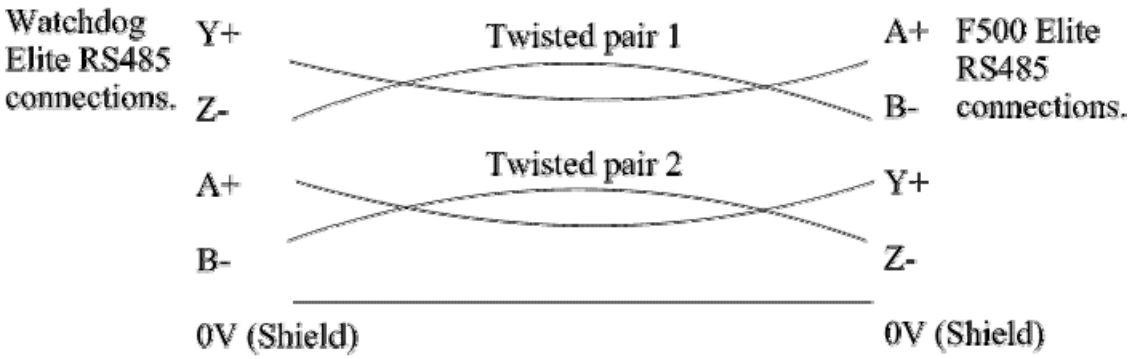
115 - 240 VAC 50/60 Hz

Drawing 'B'



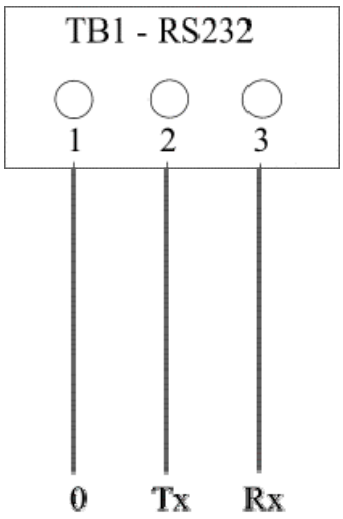
F500 elite to Watchdog connections

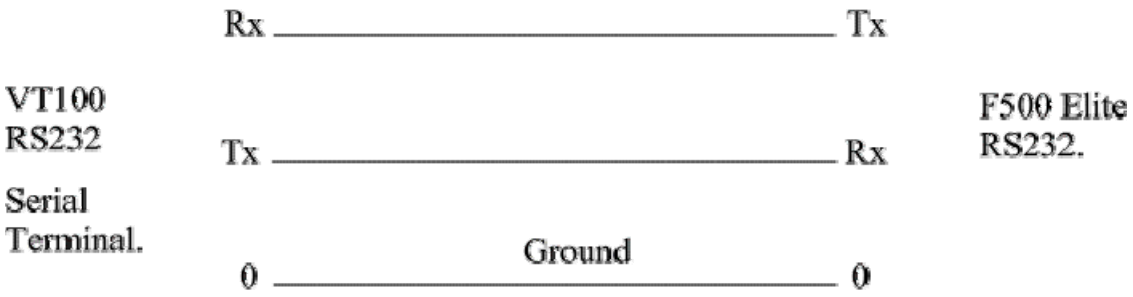




DRG 'C"

F500 elite to VT100 terminal connections.

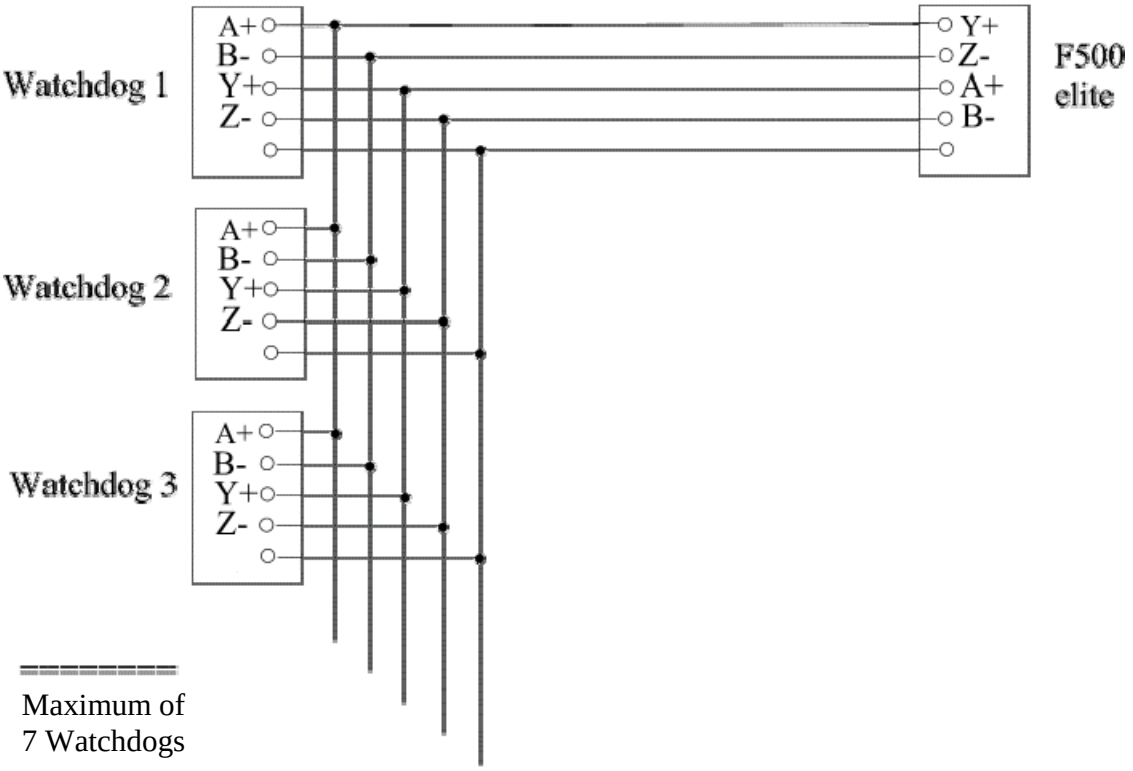


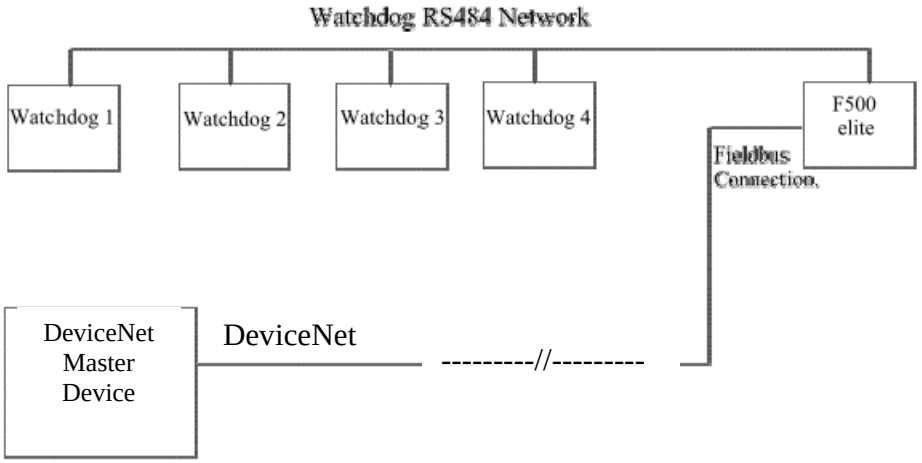


On more recent versions of the F500 TB1 may be a standard 9 pin Dee connector. This Dee connector is designed to work with a standard 9 pin to 9 pin serial lead for monitoring the F500

DRG 'D'

General connection detail for the Watchdog to an F500 elite.





DRG 'E'

Appendix 'A'

The table below represents the settings for the modules MAC address switch as described on page 5. The F500 is supplied with a default MAC address of 1. The switches are numbered 1 to 8 left to right but the address only uses switch 3 to 8, switch 8 represents the lowest binary number. In the table below a '0' represents the switch in the OFF or UP position and a '1' represents the switch in the DOWN or ON position.

MAC ID: SW345678

01	000001	17	010001	33	100001	49	110001
02	000010	18	010010	34	100010	50	110010
03	000011	19	010011	35	100011	51	110011
04	000100	20	010100	36	100100	52	110100
05	000101	21	010101	37	100101	53	110101
06	000110	22	010110	38	100110	54	110110
07	000111	23	010111	39	100111	55	110111
08	001000	24	011000	40	101000	56	111000
09	001001	25	011001	41	101001	57	111001
10	001010	26	011010	42	101010	58	111010
11	001011	27	011011	43	101011	59	111011
12	001100	28	011100	44	101100	60	111100
13	001101	29	011101	45	101101	61	111101
14	001110	30	011110	46	101110	62	111110
15	001111	31	011111	47	101111	63	111111
16	010000	32	100000	48	110000	00	000000

The baud rate can be set by switch 1 and 2

00xxxxxx	125 K baud
01xxxxxx	250 K baud
10xxxxxx	500 K baud
11xxxxxx	Reserved, don't use

Appendix 'B'

DeviceNet and its implementation are governed by a set of rules determined by the ODVA (www.odva.org). The DeviceNet module used in the F500 conforms fully to the device specifications laid down in profile number 12, and acts as a 'Group two only server' on the DeviceNet network. The F500 has been designed with as much flexibility in mind as possible. However, when using the F500 with other DeviceNet systems such as Allen Bradley a number of limitations apply. The F500 is a DeviceNet slave and will not instigate the transmitting of data without the proper instruction from a master unit, which in most cases is a DeviceNet scanner module. An example of this is the Allen Bradley 1756 DNB module. This DeviceNet scanner allows a Control Logix PLC to be connected to a DeviceNet system with multiple salve node units attached of which the F500 is one of them. The 1756 DNB has a limited amount of memory available to it and each slave unit connected will require the use of some of this memory. Currently the 1756 DNB has 490 bytes of data memory of which a maximum of 255 bytes can be allocated to a slave unit. The F500 has been configured to 240 bytes to allow for connection of 7 WatchDog Controllers and diagnostics information and therefore **the scanner module MUST be set to 240 bytes.**

Communications will NOT take place until the two numbers match. Although the number of bytes allocated is fixed at 240 this number, it can be changed by the factory to suit your installation. Please ask your supplier if you need a different value for your application.

Application notes are available from
http://www.hms-networks.com/applications/appl_notes.shtml
Two documents are available in PDF form which will help in the initial setting up of the system,

- Establishing I/O communication between AnyBus-S DeviceNet and ControlLogix5000 using RsNetWorx™
- Reading/writing data from AnyBus-S DeviceNet using ControlLogix5000 MSG instruction

The application notes are not extensive but do cover the necessary areas. This information may also be used as a guide to configuring other systems such as Allen Bradley SLC500 series PLC and DeviceNet scanner modules.

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