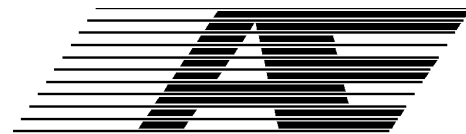




NFR3



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Nightflowreader

NFR 3 User manual issue 6
Software Version 2.0.3 & above
Firmware version 2.4 & above
October 2006

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1.0 Night Flow Reader

The Night Flow Reader is a unit which counts pulses from a variety of water meters, and monitors the accumulated total flow, daily total flows and windowed flows (night flows), storing the historical data for the previous 50 days. Version 2.xx and 3.xx includes a serial interface, allowing easier setting up via laptop via special download lead.

1.1 Data Logging

Versions above 2.xx and 3.xx also include data logging facilities of 1 minute, 5 minute, 10 minute or 15 minute logging intervals with a single channel capacity of more than 5 years at 15-minute intervals. Fast serial port speed of 57,600 Baud rate ensures that download times are kept to a minimum

1.2 Memory capacity

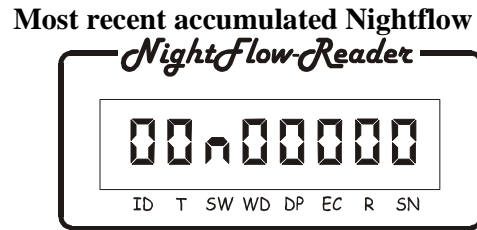
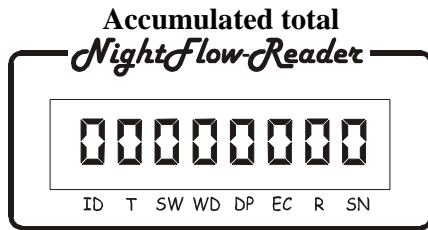
Memory capacity depends on many factors but as a guide: capacity at 15 minute intervals for single channel = 1920 days (5.2 years) or 960 days for two channel (combination meters)

1.3 Local controls

Four membrane keys ⇐ ↑ 'S' and ⇨ are used to access data and configure the unit.

1.4 Using the NFR

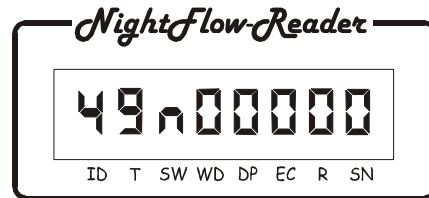
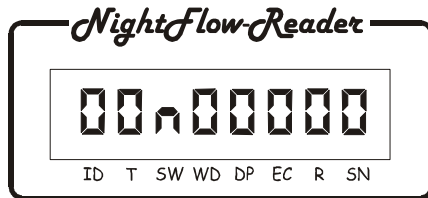
The display continually alternates at 10-second intervals between 'Accumulated total'; this is the combined total where combination meters are being logged and the last complete 'Nightflow' (Total flow during the Window Duration).



Historical Night Flows

Historical Nightflows; these are the combined total Nightflows, where combination meters are being logged and can be accessed by repeatedly pressing the 'S' key when the display is displaying the last Nightflow, i.e.

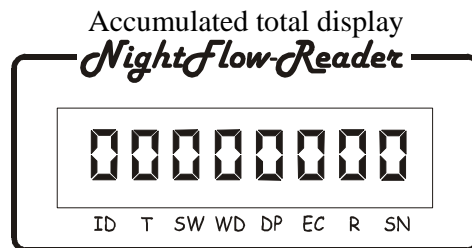
From the most recent Nightflow, through to the earliest, or oldest Nightflow

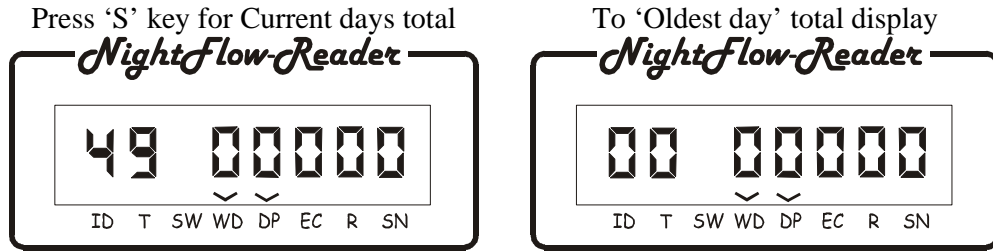


The unit returns to normal run mode after 10 seconds without key activity

Historical Daily accumulated Flows

Historical Daily flows; these are the combined total where combination meters are being logged and can be accessed by repeatedly pressing the 'S' key when the display is displaying the Accumulated total, i.e.





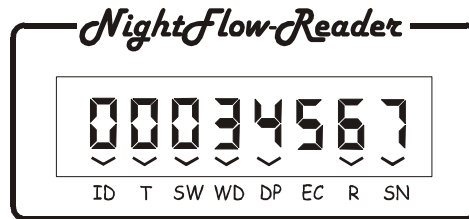
Viewing channel 1 totaliser

Press the ↵ key once to view channel 1 total (single chevron above EC)




Viewing channel 2 totaliser






Press the ↵ key a second time to view channel 2 total (single gap in chevrons above EC)



Note: Accumulated total and Daily totals are always displayed in Cubic Metres and are the combined totals, where combination meters are being logged, i.e. where a DP of 0.001 is entered (1,000 pulses per Cubic metre), the **Accumulated total** only displays the full integer values, whereas the **Nightflow** and **Rate** are displayed using the decimal point selected.

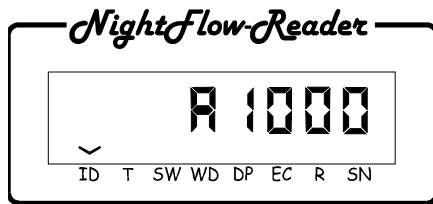
2.0 Configuration Parameters (Viewing and editing)

To View the parameters press the  key to scroll round and a single chevron, or inverted chevrons indicate the appropriate function.

To Edit the parameters hold down the  &  key for approx 3 seconds, and use the  key to enter password '5' and press , the current parameter being viewed is denoted by a  chevron above the abbreviation for that parameter. The parameters are:

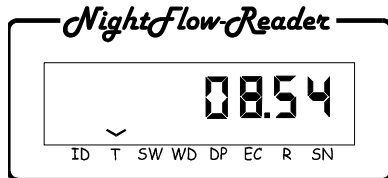
ID: Site ID

A Site identification can be stored in the unit using number 0-9, plus A, b, C, d, E, F



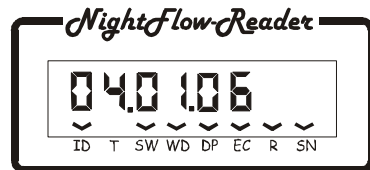
T: Time (24 Hour Clock)

Used to set the internal clock, this should be set to the current time. Note the clock will not adjust for daylight saving.



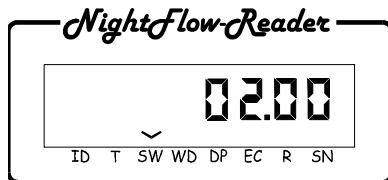
T: Date

Used to set the internal date. Note the clock will not adjust for daylight saving



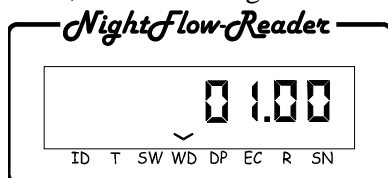
SW: Start Window (24 Hour Clock)

Used to set the time the Nightline window will start.



WD: Window Duration (Hours only)

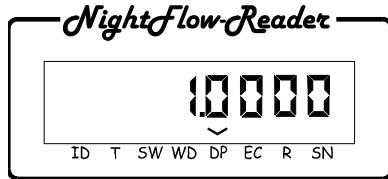
Used to set the duration of the Nightline window (1 to 23 hrs), if an invalid number is set, the unit will ignore this and revert to a 1 Hour window.



DP: Decimal Point for Main meter (Multiplier)

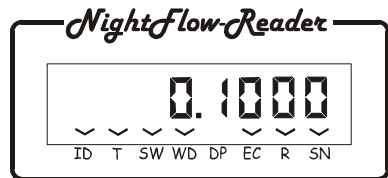
Used to set the multiplication factor for input pulses to actual flow units. e.g. for 1 pulse per litre input continue to press the left key until the display reads 0.001. This displays the totaliser in Cubic Metres (M³), but displays the nightlines with a resolution of 1 Litre (0.001 M³).

Use the left key to step through the options available, which cover the range 10 M³ through to 00.0001 per pulse



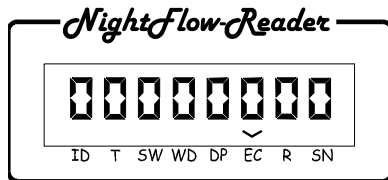
DP: Decimal Point for Bypass meter (Multiplier)

The word OFF appears when the unit has been set in single channel mode.



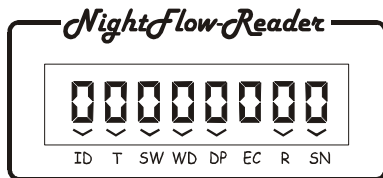
EC: Edit Counter (Main)

Can be used to view and or set the 'Accumulated Total' to match the display of the actual main meter.



EC: Edit Counter (Bypass)

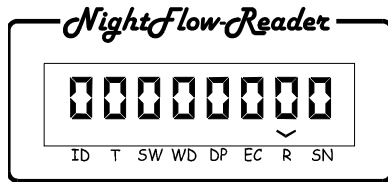
Can be used to view and or set the 'Accumulated Total' to match the display of the actual bypass meter. The word OFF appears when the unit has been set in single channel mode.



Please note: The accumulated totaliser display automatically displays the total of the main and the bypass meter totals

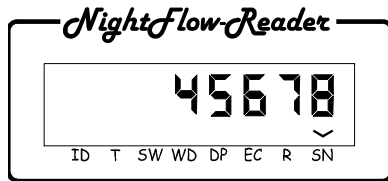
R: Rate of Flow (Read only)

Displays the current rate of flow per hour through the meter or combination meter and must be used as a guide only.



SN: Serial Number (Read only)

Displays the factory set serial number of the Night Flow Reader.



2.1 Determining Pulse Input Parameters

For the Night Flow Reader to display the correct flow values, the unit needs to be configured with the multiplication factors to match the water meter connected. Not all water meters output the same amount of pulses for set flows, so care must be taken to ensure the night flow reader is set to decode each meter correctly.

Depending on the size and usage of property, as a general rule of thumb meters will output the following pulses for the following properties:

		Password 5 setting
0.5 Litre / Pulse	Elster PSM/V100/V210 15/20mm	0.0005
5 Litres / Pulse	Elster PSM/V100 25-30/40mm	0.0050
1 Litre / Pulse	Elster PSM/V210 15/20mm	0.0010
1 Litres / Pulse	Elster Master 2000 40-50mm	0.0010
10 Litres / Pulse	Elster Master 2000 80-100mm	0.0100
10 Litres / Pulse	Elster Helix 2000 40-80mm	0.0100
100 Litres / Pulse	Elster Helix 2000 100-300mm	0.1000
10 Litres / Pulse	Elster Helix 3000 50-80/100mm	0.0100
100 Litres / Pulse	Elster Helix 3000 150mm	0.1000
10/1,000 Litres / Pulse	Elster Helix 4000 80-125mm	0.0100/01.0000
100/10,000 Litres / Pulse	Elster Helix 4000 150-300mm	0.1000/10.0000

Please note: The above list is for guidance only

There are two grades of pulse heads for meters, LRP (Low Resolution Pulse), and HRP (High Resolution Pulse). The Ashridge Nightflow Reader cannot accept inputs from HRP pulse heads.

Generally the meter and pulse head will display information stating how many litres per pulse will be outputted, e.g. 10 Litres/Pulse. For this value, lookup the two multiplications factors below (DP – Decimal Point Multiplier and Pulses per unit), and ensure the NFR is set to those values using the procedure detailed below.

Settings for NightFlow Reader to display in Cubic Metres (M³)

Meter Pulse Output	DP (Multiplier Selection) Password 1 to access
0.1 Litre / Pulse or 10 Pulses / Litre	0.0001 0.0010
0.5 Litre/Pulse or 2 Pulses / Litre Normally V100, ½” or ¾”	0.0005
1 Litre / Pulse Normally V210 or 140	0.0010
5 Litres / Pulse Normally V100 25 or 40mm	0.0050
10 Litres / Pulse Normally LRP	0.0100
50 Litres / Pulse	0.0500
100 Litres / Pulse	0.1000
500 Litres / Pulse	0.5000
1000 Litres / Pulse	1.0000

2.2 Resetting counters to zero

Hold down the \leftarrow & \rightarrow key for approx 3 seconds, this enters the edit mode and is characterised by a flashing digit, use the \uparrow key to enter password '9' and press \rightarrow key and all of the digits flash on/off now press the \rightarrow key again to clear all counters to zero (returns to normal mode after 10 seconds without clearing counters).

2.3 Digital outputs

There are 2 digital outputs with different options:

Digital output # 1, use password 2, options are:

P0 = Off

P1 = 1:1 input to output pulses from Input 1

Pd = Input pulses times the multiplier from Input 1

Digital output # 2, use password 4, options are:

P0 = Off

P1 = 1:1 input to output pulses from Input 2

Pd = Input pulses times the multiplier from Input 2

PA = Follows Digital output #1

3.0 Serial Interface

A special communication lead is required to communicate with the Nightflowreader and to download any logged information. The serial interface requires the special converter lead, communication is at 57,600 Baud rate, 8 data bits, 2 stop bits, no parity and no flow control.

All electrical connections are shown in paragraph 4.1

4.0 Installation

Fixing Centres: 3 off 4mm diameter holes equispaced on a 106mm PCD

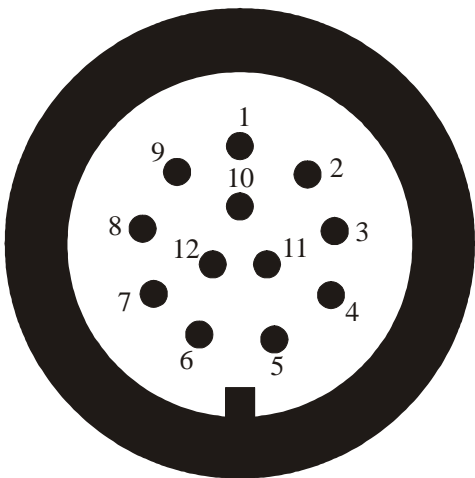
Do not install in direct sunlight, as the life of the Liquid Crystal Display will be compromised.

4.1 Electrical connection:

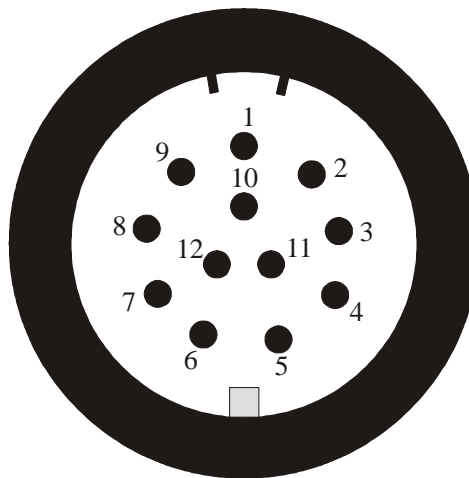
Ensure leads are firmly connected and watertight or battery consumption could be affected (Normal battery life expectancy: in excess of 7 years).

When installing the NFR please ensure that when removing the sealing cap from the 12 way connector that the sealing rubber in the sealing cap does not become detached, as the ingress of water into the cable or NFR will have a detrimental effect on the life of the battery and NFR.

When removing the NFR from site and leaving the cable and pulse head attached to the meter the sealing cap should be checked for both cleanliness and to ensure that the rubber seal has not become dislodged, then firmly screw the cap into place to ensure there is no opportunity for water ingress.



Front view of chassis plug



Rear view of cable socket

Bulgin pin number	<u>8 core cable</u>	Description	<u>12 core cable</u>	<u>Core Colours</u>
1		Common Ground	Common Ground	<i>Orange</i>
2	Common Ground	Common Ground	Common Ground	Green
3		Comms enable	Comms enable	<i>Pink</i>
4	Common Ground	Common Ground	Common Ground	Blue
5		Comms RX	Comms RX	<i>Turquoise</i>
6	Digital output #2	Digital output #2	Digital output #2	Red
7	Digital input #2	Digital input #2	Digital input #2	Yellow
8	Digital input #1	Digital input #1	Digital input #1	White
9	Common Ground	Common Ground	Common Ground	Black
10	Common Ground	Common Ground	Common Ground	Brown
11		Comms TX	Comms TX	<i>Grey</i>
12	Digital output #1	Digital output #1	Digital output #1	Violet

	<u>4 core cable</u>	<u>Core Colours</u>
1		
2	Common Ground	Black
3		
4	Common Ground	Blue
5		
6	Digital output #2	
7	Digital input #2	Yellow
8	Digital input #1	Red
9	Common Ground	
10	Common Ground	
11		
12	Digital output #1	

5.0 EMC

Meets the requirements of EN6000-6-2:2001 (Immunity for Industrial Environments).
Emissions to EN 55022, Class A & B

6.0 Battery

This product contains a lithium battery, which must be disposed of by a qualified disposal agency. Under no circumstances should they be crushed or incinerated.

Nightflowreader 1 and 2 have no facility to change the cell, however Nightflowreader 3 can be returned to the factory for a battery replacement.

7.0 Setting up with PDA

The ‘compact flash’ serial card must be inserted in the PDA or use the internal serial port (accessed by the Otterbox serial interface) and the NFR connected using the special serial converter lead. Run the Night Flow Reader program and click the “Read from NFR” box, this loads the data from the NFR and shows the unit serial number, firmware revision and time/date on read plus any user settings previously set.

To select details from list:

- 1 Click the “Choose” box

- 2 Option box opens, click the appropriate selection field tab before clicking OK

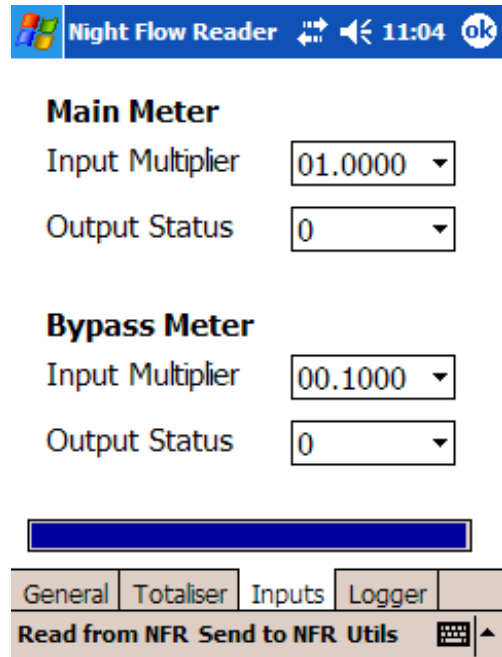
- 3 The user description field has been shown for clarity

- **Property ref:** Click on the keyboard symbol (bottom right) and enter the Property reference 15 characters maximum
- **Main meter serial number:** Click on the keyboard symbol (bottom right) and enter the Property reference 15 characters maximum.
- **Bypass meter serial number:** Click on the keyboard symbol (bottom right) and enter the Property reference 15 characters maximum
- **User description:** Click on the keyboard symbol (bottom right) and enter any text up to 25 characters.

7.1 Totaliser tab

- Click the totaliser tab and the Main meter and Bypass meter (if used) readings are displayed, including any nightline and dayline readings for up to the past 50 night/days.
- **Start Window** This is the start time for the nightline window and is usually set for GMT, click the box and select the start time.
- **Window duration** Select the number of hours duration for the nightline
- **Units** Click the box and select unit measurement
- **Main meter** Click this box and edit the main meter reading if required
- **Bypass meter** Click this box and edit the Bypass meter reading if required

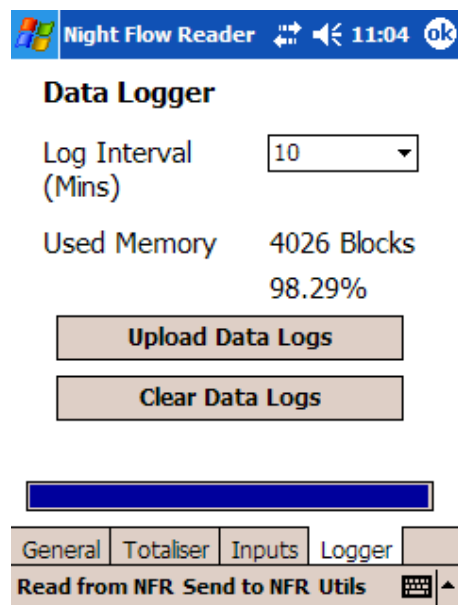
7.2 Input settings



- **Main meter multiplier** Click this box to select the pulse multiplier, see section 3 for full details.
- **Output status** Click this box to select the output pulse options
- **Bypass meter multiplier** Click this box to edit the pulse multiplier or switch OFF the bypass meter, where this option is not used, see section 3 for full details
- **Output status** Click this box to select the output pulse options

7.3 Data logger

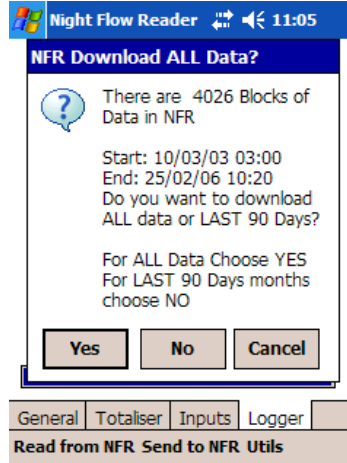
For CNUSMD use the 15 minute logging only



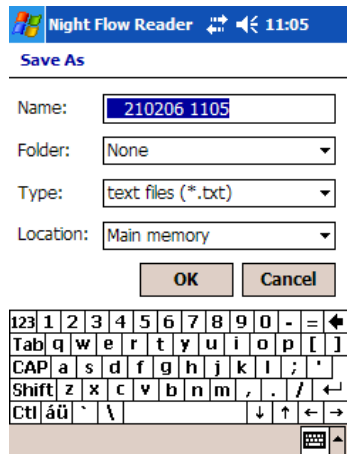
- Set log interval (1, 5, 10 or 15 minute intervals)

7.4 Data logger

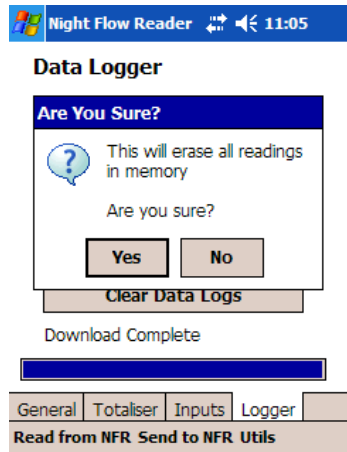
- When logged data has more than 90 days stored memory the following message will appear, allowing either all data to be downloaded or the past 90 days data. This option has been included to ensure faster download where only the past 90 days are required.



- The filename defaults to 'PROPERTY REF METER REF DDMMYYHHMM' but also allows the user to select another filename

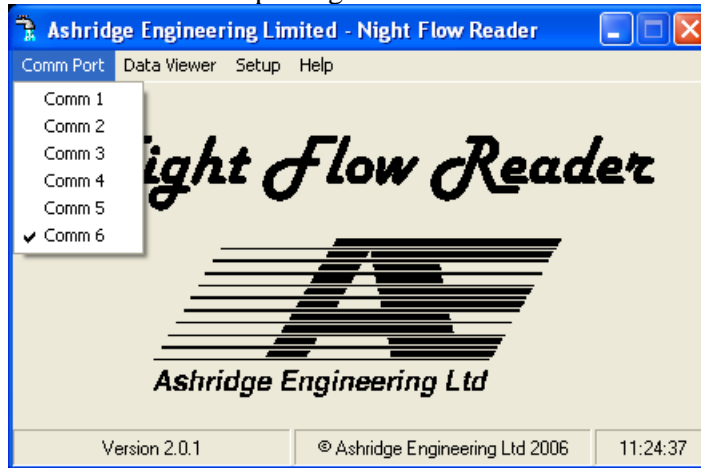


- When download is complete you may wish to erase the logged data, this will take about 10 seconds to erase the Flash memory



8.0 Setting up with PC

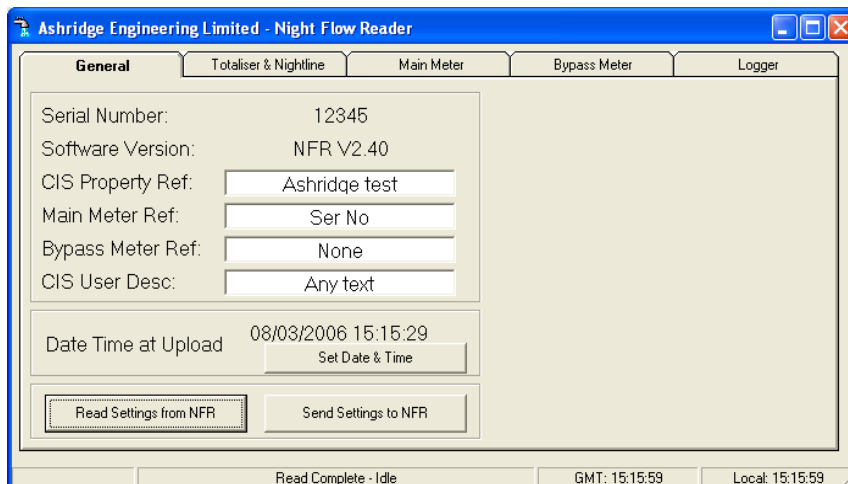
Run the Night Flow Reader program, firstly check the correct COM port is selected by choosing the 'Comm Port' menu and placing a tick next to the relevant Com Port



Next click the "Setup" menu to load the configuration utility.



Click 'Upload Settings from NFR', this will read current settings and display them on the screen.



The First Tab to be displayed is the ‘General’ tab which hold the following user settings:

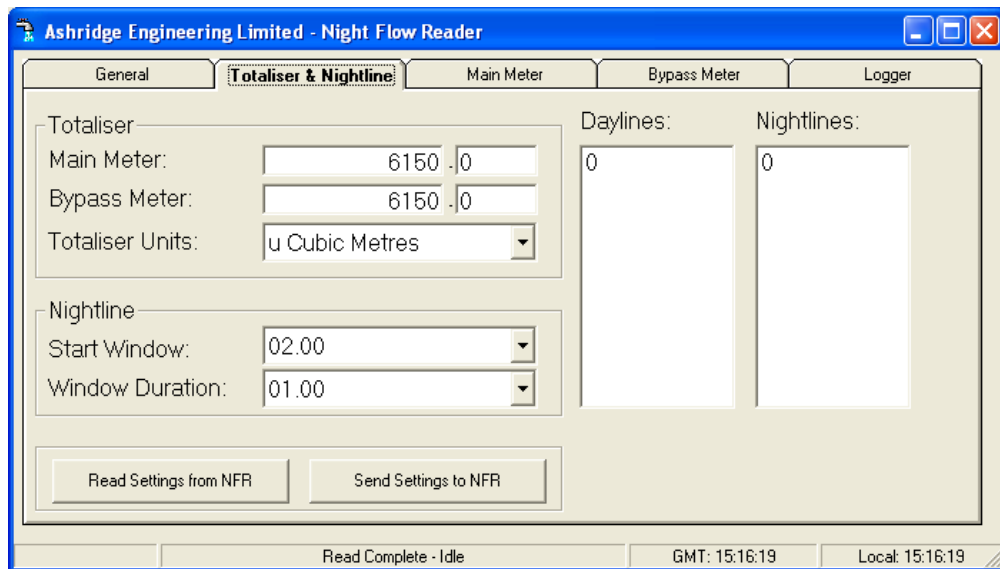
- **Property ref:** 15 characters maximum
- **Main meter serial number:** 15 characters maximum.
- **Bypass meter serial number:** 15 characters maximum
- **User description:** 25 characters maximum

These settings are stored as identification headers in uploaded data files, as well as forming part of the default filename.

The button ‘Set Time & Date’ is used to re-synchronise the clock in the NFR to match the PC clock. Note automatic correction is made to ensure the NFR is always set to GMT.

Please note: Before setting the time and date ensure your PC is set at the correct time and date.

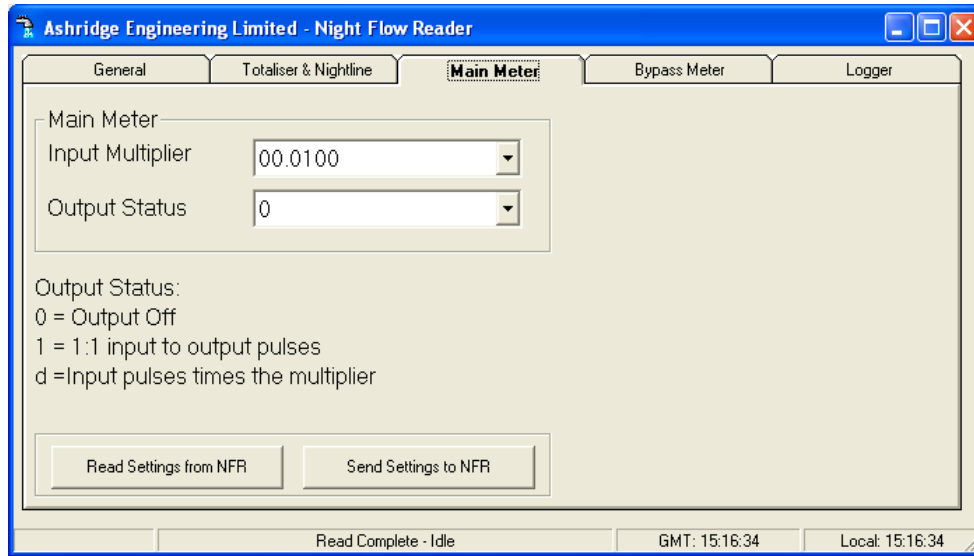
8.1 Totaliser tab



Click the **Totaliser** tab and the Main meter and Bypass meter (if used) readings are displayed, including any nightline and dayline readings for up to the past 50 night/days.

- **Start Window** This is the start time for the nightline window and is usually set for GMT, click the box and select the start time.
- **Window duration** Select the number of hours duration for the nightline
- **Units** Click the box and select unit measurement
- **Main meter** Click this box and edit the main meter reading if required
- **Bypass meter** Click this box and edit the Bypass meter reading if required

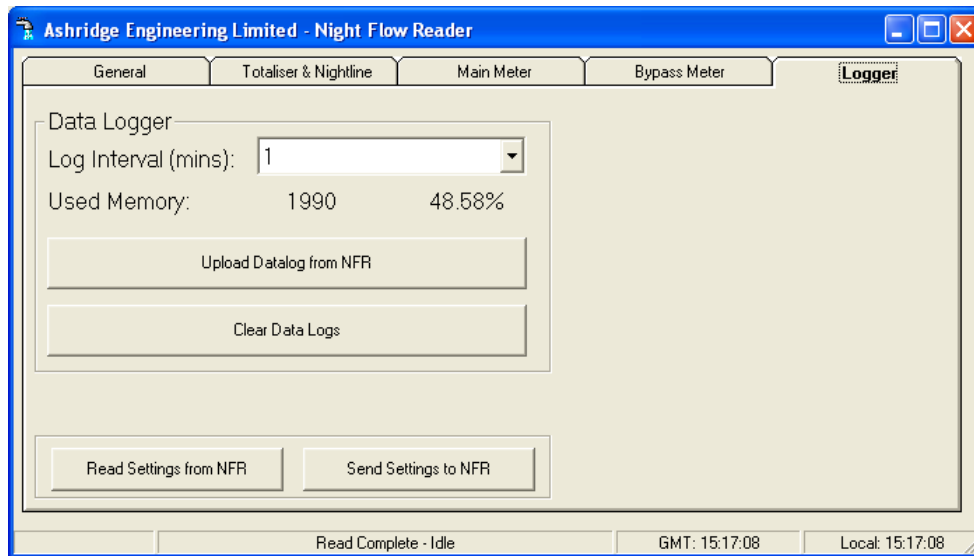
8.2 Input settings



To Edit the Input Settings Click either the '**Main Meter**' or '**Bypass Meter**' Tab

- **Meter multiplier** Click this box to select the pulse multiplier, see section 3 for full details.
- **Output status** Click this box to select the output pulse options
- **Repeat for the each input**

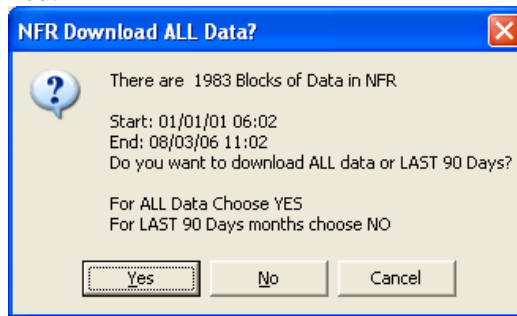
8.3 Data Logger



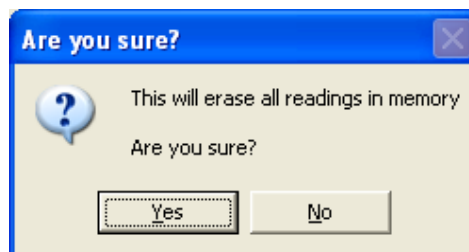
- Set log interval (1, 5, 10 or 15 minute intervals)

To Upload datalog click **‘Upload Datalog from NFR’**

- When logged data has more than 90 days stored memory the following message will appear, allowing either all data to be downloaded or the past 90 days data. This option has been included to ensure faster download where only the past 90 days are required.



- The filename defaults to ‘PROPERTY REF METER REF DDMMYYHHMM’ but also allows the user to select another filename
- When download is complete you may wish to erase the logged data, this will take about 10 seconds to erase the Flash memory



9.0 Datalog File Format

Below is a sample data file.

The first 7 lines contain header information:

Serial Number
 Property Reference
 Main Meter Reference
 Bypass Meter Reference
 Main Meter Input Multiplier
 Bypass Meter Input Multiplier

Line 8 onwards, is a single time stamped reading set per line, each value comma separated:

Date / Time (in Tdatetime format)
 Channel 1 Litres per Second (average over logging interval)
 Channel 2 Litres per Second (average over logging interval)
 Channel 1 Totaliser
 Channel 2 Totaliser

```
"12345"  

"11111111111111111111"  

"22222222222222222222"  

"33333333333333333333"  

"44444444444444444444444444444444"  

"0.001"  

"1"  

37279.138889,20.000,1.167,T057006722.000,T000002743.000  

37279.145833,18.333,1.167,T057006733.000,T000002743.700  

37279.152778,18.333,1.167,T057006744.000,T000002744.400  

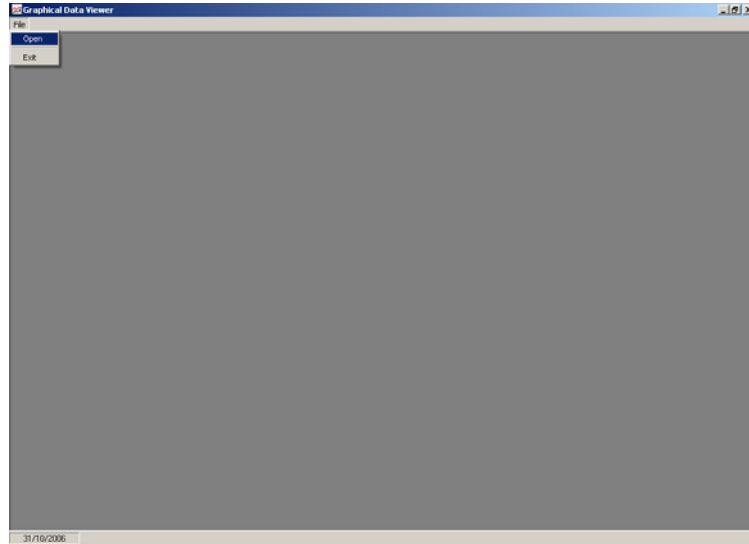
37279.159722,20.000,1.167,T057006756.000,T000002745.100
```

10.0 Data Viewer (PC only)

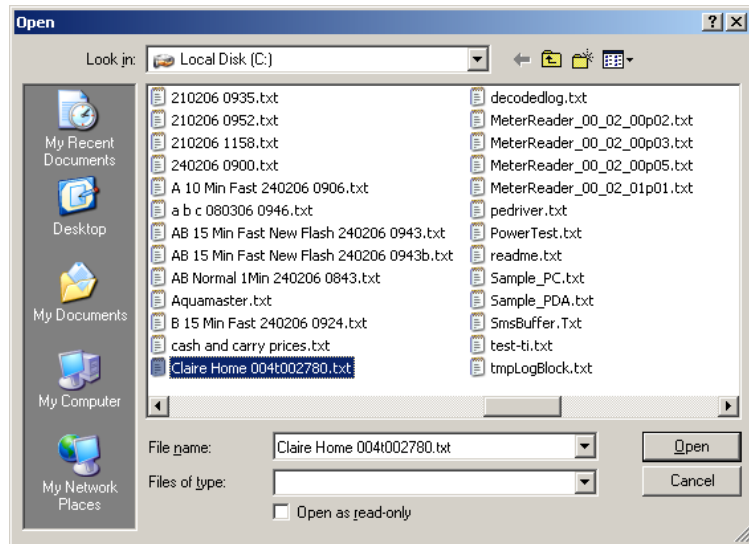
Load "Graph viewer"



- From the **Graph viewer** Screen use the 'file' followed by the 'open' command



- Select the file to be opened



- The Nightflowreader data Can be viewed as channel A, Channel B or the summed data of channels A & B by clicking the appropriate box
- Right click on the graph for scaling options

