1802-20200009 RevB, 2023-09-22

USER GUIDE

ETM DELTABLACK

INDUSTRIAL CELLULAR REMOTE MONITORING, ALARMING & LOGGING SOLUTION

Features:

- **Integrated 7-channel data logger including one relay output**
- **DIN-rail mounted including wall mount bracket**
- **Integrated 2G/3G/4G wireless modem**
- **Customized SMS alerts**
- **LED indicators for cellular signal quality and communication status**
- **Pre-configured for the most common sensor types**
- **Easy access to logged measurements via ETM's IoT Cloud Dashboard (EWO)**
- **Easy integration to PLC, SCADA and telemetry systems**

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INTRODUCTION

Nomenclature

The DeltaBlack incorporates the Cinterion PLS62-W module and is intended for worldwide use (network and regulatory approvals permitting).

Overview

DeltaBlack is an easy to use Cellular 4G/3G/2G remote monitoring and logging solution for use in heavy-duty industrial applications.

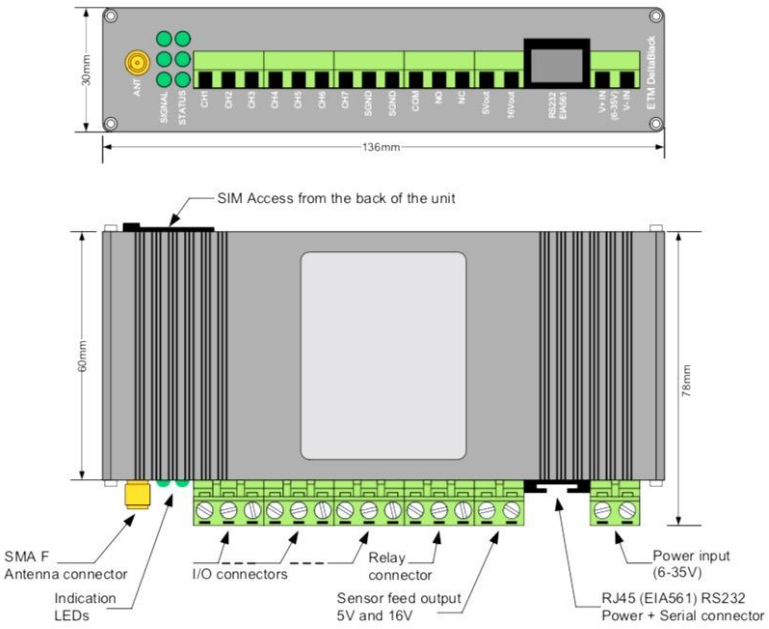
An Industrial IoT edge device designed to work in the cloud with SCADA systems or via simple user-friendly SMS commands.

The DeltaBlack can be delivered with a pre-provision world wide SIM-card. Connect the sensors, turn on the power and log into ETM's IoT Cloud Dashboard (EWO) to remotely manage DeltaBlack and get access to the measured data from anywhere.

A configuration tool is used to read/write to DeltaBlack in order to program specific functionality. It is very important to ensure that the correct version of the tool is used then reading/writing to the modem.

MODEL	PART #	FUNCTIONALITY	MODULE INSTALLED
ETM-Black (DI Heavy)	71614	2G, 3G, 4G	Cinterion PLS63-W
ETM-Black (AI Heavy)	71615	2G, 3G, 4G	Cinterion PLS63-W
ETM-Black (DI Heavy)	71610	2G, 3G, 4G	Cinterion PLS63-W
ETM-Black (AI Heavy)	71611	2G, 3G, 4G	Cinterion PLS63-W

Physical Dimensions



Applications:

Typical applications include:

- **Pump, fan, generator and motor**
- **Refrigeration and freezer systems**
- **Metering, HVAC, indoor climate**
- **Tank measurements**
- **Fire panels and intruder alarms**
- **Data centre monitoring**
- **Agriculture applications**

Specifications

SPECIFICATION	DESCRIPTION	MODEL
Weight	250g / 8.81 oz	
Size	30 x 136 x 87 mm	
Cellular	2G, 3G and 4G LTE: 700, 800, 850, 900, 1700/2100(AWS), 1800, 1900, 2100 and 2600 MHz (bands 1, 2, 3, 4, 5, 7, 8, 12, 18, 19, 20, 28) UMTS: 800, 850, 900, 1700/2100(AWS), 1800, 1900 and 2100 MHz (bands 1, 2, 4, 5, 8, 9, 19) GPRS: 850, 900, 1800 and 1900 MHz	
Casing	Aluminium	

Case

Casing

DeltaBlack features an aluminium casing made for heavy-duty industrial applications.

DIN-rail mount

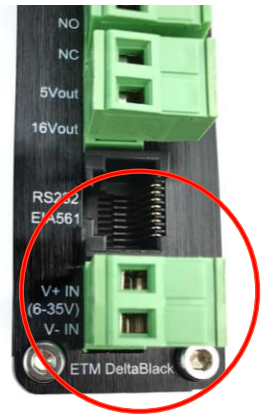
DeltaBlack can be attached to a DIN-rail for easy mounting.

Wall mount

DeltaBlack can also be mounted on a flat surface using the included bracket (e.g. a wall).

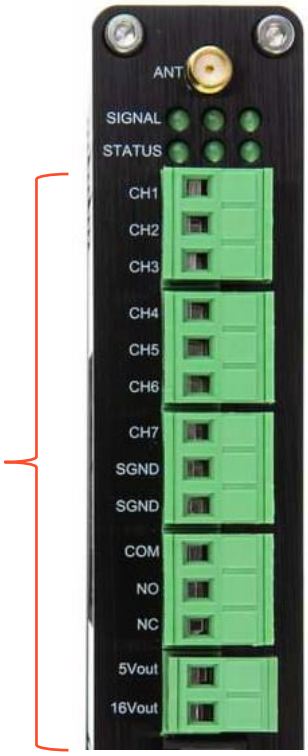
Power Supply

DeltaBlack need to be powered by a separate power supply that connects on the side panel. Power supply is not included. Power supply specifications are shown below.

ITEM	DESCRIPTION	SOCKET
Voltage	• 6-35V	
Power Consumption	• 600 mA (rated) • <150 mA (transmitting) • <35 mA (idle)	

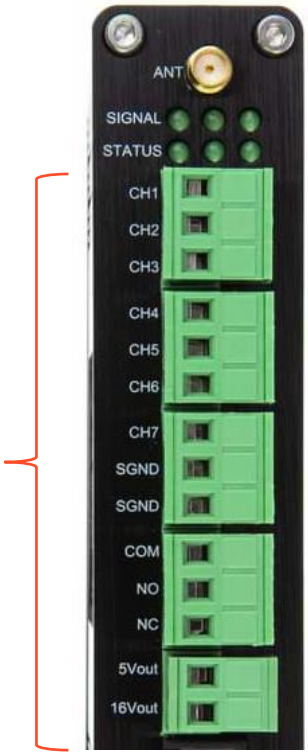
External Connector – ETM DeltaBlack #71614

Seven I/O's including a relay is available through the terminal blocks.
Pin allocations are as shown below. The configuration to set the channel function is done in the configuration tool described on page 15 "Configuration tool".

PIN	CONFIGURABLE FUNCTIONS	TERMINAL BLOCK
CH1	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC	
CH2	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH3	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH4	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH5	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	
CH6	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	**CAUTION** Take care to ensure that only the correct connectors are used or mechanical damage to the pins may result.
CH7	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	
Relay	• COM (Common) • NO (Normally Open) • NC (Normally Closed)	
Sensor Feed	• 5V and 16V max 100mA Note that sensor feed is not always ON, this is configured in the Configuration tool.	

External Connector – ETM DeltaBlack #71615

Seven I/O's including a relay is available through the terminal blocks.
Pin allocations are as shown below. The configuration to set the channel function is done in the configuration tool described on page 15 "Configuration tool".

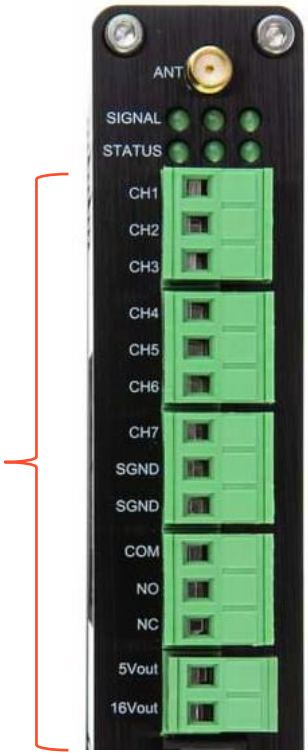
PIN	CONFIGURABLE FUNCTIONS	TERMINAL BLOCK
CH1	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC	
CH2	• Analogue Input: 4-20mA, Max Input 24VDC	
CH3	• Analogue Input: 4-20mA, Max Input 24VDC	
CH4	• Analogue Input: 4-20mA, Max Input 24VDC	
CH5	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	
CH6	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	
CH7	• Analogue Input: 4-20mA, Max Input 24VDC	
Relay	• COM (Common) • NO (Normally Open) • NC (Normally Closed)	
Sensor Feed	• 5V and 16V max 100mA Note that sensor feed is not always ON, this is configured in the Configuration tool.	

CAUTION

Take care to ensure that only the correct connectors are used or mechanical damage to the pins may result.

External Connector – ETM DeltaBlack #71610

Seven I/O's including a relay is available through the terminal blocks.
Pin allocations are as shown below. The configuration to set the channel function is done in the configuration tool described on page 15 "Configuration tool".

PIN	CONFIGURABLE FUNCTIONS	TERMINAL BLOCK
CH1	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC	
CH2	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH3	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH4	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Analogue Input: 0-2.5V, Max Input 24VDC	
CH5	• Analogue Input: 0-5V, Max Input 24VDC	
CH6	• Analogue Input: 0-10V, Max Input 24VDC	
CH7	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Analogue Input: 0-2.5V, Max Input 24VDC	
Relay	• COM (Common) • NO (Normally Open) • NC (Normally Closed)	
Sensor Feed	• 5V and 16V max 100mA Note that sensor feed is not always ON, this is configured in the Configuration tool.	

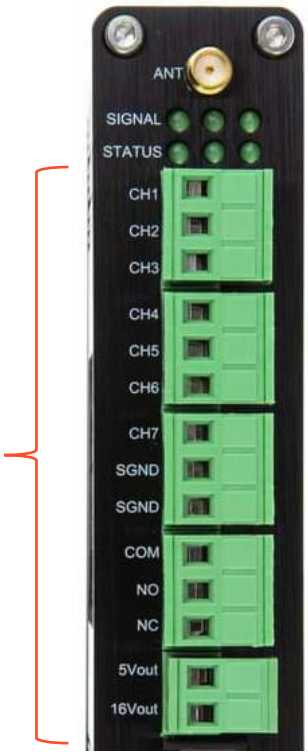
CAUTION

Take care to ensure that only the correct connectors are used or mechanical damage to the pins may result.

External Connector – ETM DeltaBlack #71611

Seven I/O's including a relay is available through the terminal blocks.

Pin allocations are as shown below. The configuration to set the channel function is done in the configuration tool described on page 15 "Configuration tool".

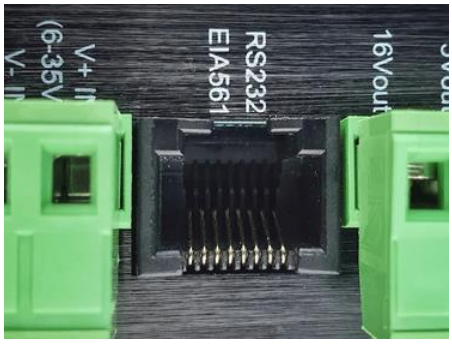
PIN	CONFIGURABLE FUNCTIONS	TERMINAL BLOCK
CH1	• Digital Input: LL<0.5V, HL>2.5V, Max Input 24VDC • Digital Output: LL0V, HL3V, 0.1mA • Pulse Input: LL<0.5V, HL>2.5V, Max Input 24VDC	
CH2	• Analogue Input: 4-20mA, Max Input 24VDC	
CH3	• Analogue Input: 4-20mA, Max Input 24VDC	
CH4	• Analogue Input: 4-20mA, Max Input 24VDC	
CH5	• Analogue Input: 0-5V, Max Input 24VDC	
CH6	• Analogue Input: 0-10V, Max Input 24VDC	
CH7	• Analogue Input: 4-20mA, Max Input 24VDC	
Relay	• COM (Common) • NO (Normally Open) • NC (Normally Closed)	
Sensor Feed	• 5V and 16V max 100mA Note that sensor feed is not always ON, this is configured in the Configuration tool.	

CAUTION

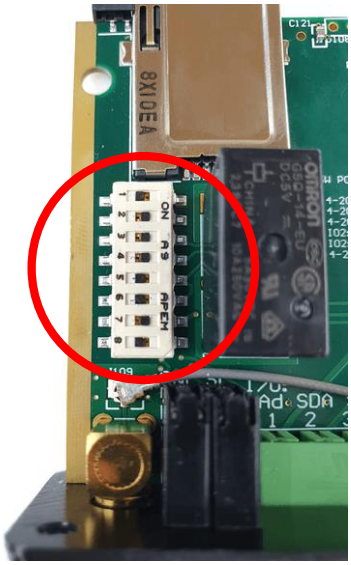
Take care to ensure that only the correct connectors are used or mechanical damage to the pins may result.

Serial (RS232) Port

The RS232 Port is the primary interface for the configuration tool software. ET/AT commands can also be used to communicate with the terminal. The RS232 interface is implemented as an 8-pin RJ45 socket.

PIN	FUNCTION	SOCKET
1	Power Supply (+6 to 35VDC, 400mA @ 12 VDC)	
2	DCD	
3	DTR	
4	GND	
5	RX	
6	TX	
7	CTS	
8	RTS	

Internal Dip Switches

SWITCH	DESCRIPTION	MODULE
SW1	Not used	
SW2	OFF= Ch 2: DI (default high, dry contact to ground or LL<0.5V, HL>2.5V), AI (0 to 2.5V), Pulse in, DO (0 or 3.3V, 10uA) ON= Ch 2: AI 4-20 mA	
SW3	OFF= Ch 3: DI (default high, dry contact to ground or LL<0.5V, HL>2.5V), AI (0 to 2.5V), Pulse in, DO (0 or 3.3V, 10uA) ON= Ch 3: AI 4-20 mA	
SW4	OFF= Ch 4: DI (default high, dry contact to ground or LL<0.5V, HL>2.5V), AI (0 to 2.5V), Pulse in, DO (0 or 3.3V, 10uA) ON= Ch 4: AI 4-20 mA	
SW5	OFF= Ch 2: DI (Default high, dry contact or ground or LL<0.5V, HL>2.5V, AI (0 o 2.5V) Pulse in, DO (0 or 3.3V, 10uA) or AI 4-20 mA depending on SW2 ON= Ch 2 will have extra hard pull up at 10k. SW2 need to be OFF.	
SW6	OFF= Only allowed state. ON= Not allowed, this risk CPU damage!	
SW7	OFF= Ch7: DI (default high, dry contact to ground or LL<0.5V, HL>2.5V), AI (0 to 2.5V), DO (0 or 3.3V, 10uA). ON= Ch 7: AI 4-20 mA	
SW8	Not used	

External ports

The *ETM DeltaBlack* terminal features a standard SMA-F antenna connector.

Note! If you intend to use the external ports, please see (General settings tab) for setup using the configuration tool.

SIM Card

The SIM card connector is located on the outside side panel next to the wall mount bracket. The unit supports both 3V and 1.8V SIMs. Any SIM card used needs to be correctly provisioned for the services and network upon which it is intended to be used.

SIM Pin

If the SIM used has a PIN either:

- The unit can be configured to enter the SIM pin, refer to the configuration tool section

  OR

- The SIM PIN should be deactivated: insert the SIM in a mobile phone and deactivate, then transfer the SIM into the DeltaBlack unit.

CAUTION

Always disconnect the battery before inserting or removing SIM Card.

Care should be taken in inserting and removing the SIM card so as not to damage the SIM holder or cover.

Indicator LED’s

Green signal strength LED’s (Top row)

GREEN LED 1	FUNCTION
Flashing	RSSI < -105 dBm
ON	RSSI ≥ -105 dBm (Poor signal)
OFF	Not registered to mobile network

GREEN LED 2	FUNCTION
ON	RSSI ≥ -89 dBm (Fair signal)
OFF	RSSI < -89 dBm or Not registered to mobile network

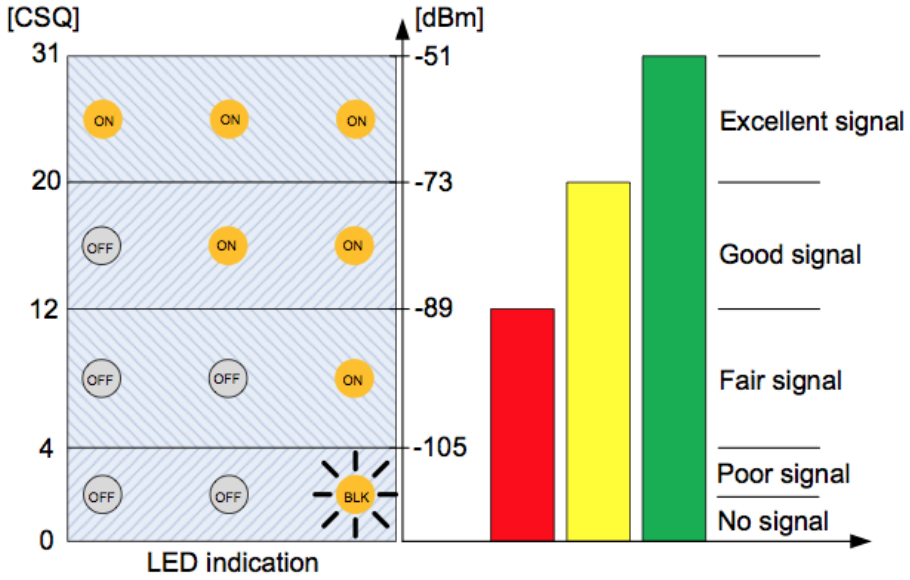
GREEN LED 3	FUNCTION
ON	RSSI ≥ -73dBm (Good signal)
OFF	RSSI < -73dBm or Not registered to mobile network

Green status LED’s (Bottom row)

GREEN LED 1	FUNCTION
Slow Flash 500ms On / 500ms Off	Searching for mobile network
Double Flash 3s Off / 100ms ON / 100ms OFF / 100 ms ON	Active 2G network connection
Triple Flash 3s OFF / 100ms ON / 100ms OFF / 100 ms ON / 100ms OFF / 100ms ON	Active 3G network connection
Four time Flash 3s OFF / 100ms ON / 100ms OFF / 100 ms ON / 100ms OFF / 100ms ON / 100ms OFF / 100 ms ON	Active 4G network connection

GREEN LED 2	FUNCTION
ON	Internet Service Provider connection (Active PDP context and IP address)
OFF	No Internet Service Provider connection

GREEN LED 3	FUNCTION
Rapid Flash	Sending Data
ON	Receiving data from host (turn off after 2 seconds)
OFF	No data transmission occurring



Signal strength levels.

CONFIGURATION TOOL

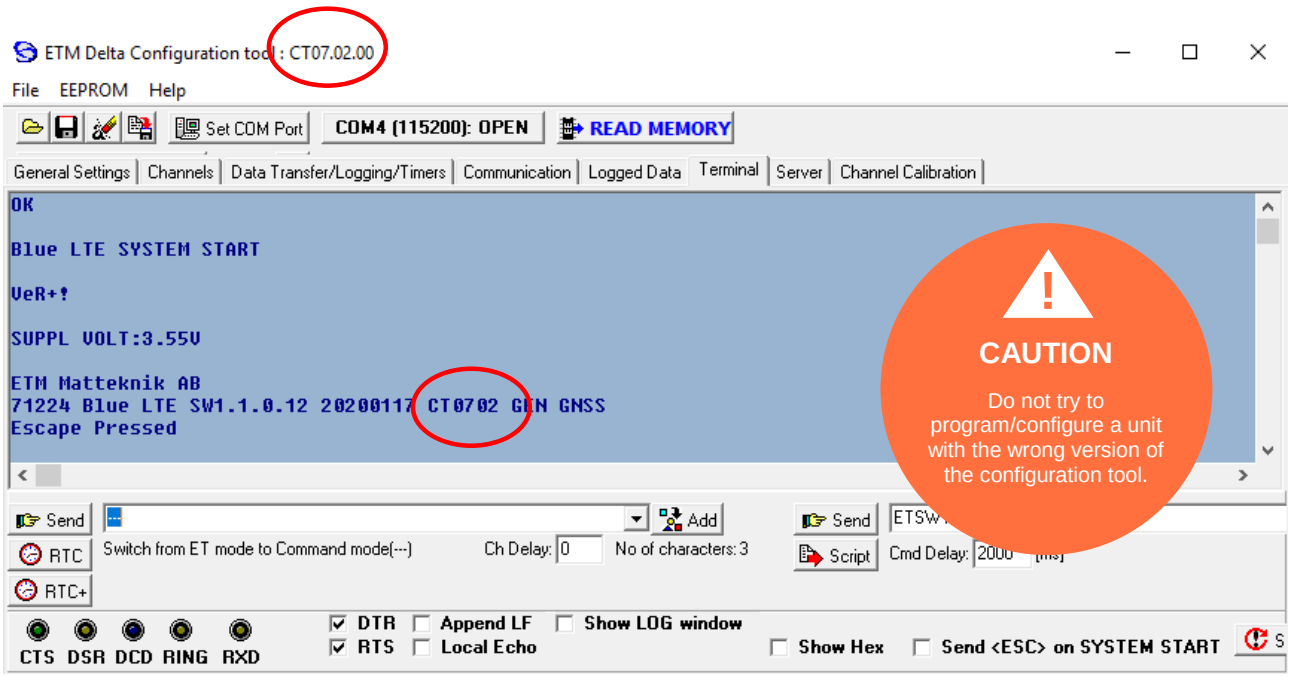
Installation

The Configuration Tool can be copied to any folder on a suitable PC's hard drive. It consists of only one file and does not need to be installed. Depending on your use of the tool there may (over a period of time) be configuration files, with an etx extension, created and these files can be saved in any location. The tool itself may create a single ini file, which should be left in the same directory as the configuration tool for continued easy operation of the tool.

Using the Right Version of the Configuration Tool

When the unit starts up and is connected to a terminal window and Escape is pressed (see below), please check that you have the correct version of the configuration tool. The current version of the configuration tool is shown in the header (0702 being the relevant part in the example below), the correct version for the unit is shown in the terminal window.

If you do not have the correct version of the configuration tool, contact ETM and request the appropriate version or visit ETM's website.



Using the Configuration Tool

When you power up the wireless modem to do any configuration you MUST follow these steps if you are unfamiliar with the operation of the Configuration Tool:

1. Start the configuration tool.
2. Chose the correct communications port (using the Set COM Port button to select a port other than the one chosen by the Configuration Tool) – ensure the port is set for a baud rate of 115200 (it must be at this speed to be programmed in ESC mode).
3. Confirm that the port opens (the indicator MUST show 'OPEN' for your chosen port).
4. Click on the Terminal tab.
5. Click into the terminal window so that you see a flashing cursor.
6. Power up DeltaBlack.
7. Immediately after powering up the modem press the ESC key on the keyboard, you should only need to press it 3 or 4 times, after a short period you should see an 'Escape Pressed' message from the wireless modem – if you don't and instead you see a 'MS:^SYSSTART' message then repeat the process again. Without the 'Escape Pressed' message being displayed you CANNOT perform any configuration on the wireless modem (while it is possible to use the Configuration Tool once the wireless modem has fully started up this may not be possible if the wireless modem has not yet been fully configured).
8. NOTE: You can also check the tick-box 'Send <ESC> on SYSTEM START' (the Configuration Tool to will automatically send an ESC character when it sees the SYSTEM START message) in the bottom right hand corner of the Configuration Tool (but this doesn't work with some USB to Serial adapters) – if you check this remember to uncheck it again when you restart the modem after any programming changes, otherwise you may inadvertently leave the modem in programming mode rather than run mode.
9. You are now ready to use the configuration tool to make changes to the wireless modem.
10. Once you are familiar with the Configuration Tool you can shorten the procedure, if the wireless modem is already live/working, by simply reading and writing the configuration without restarting the wireless modem and pressing the ESC key. Note if any changes are made to the modem you should power cycle or software reset (ET&SR) the modem to ensure that any new mode of operation (based on your configuration changes) comes into effect. If you make no changes, only reading the configuration, you do not need to restart the modem.
11. Settings can be saved to a file on your PC. If you need to configure another DeltaBlack with the same settings this file can be loaded into the configuration tool and written to any additional units that require the same settings.

Details regarding each tab in the configuration tool are provided in the following pages.

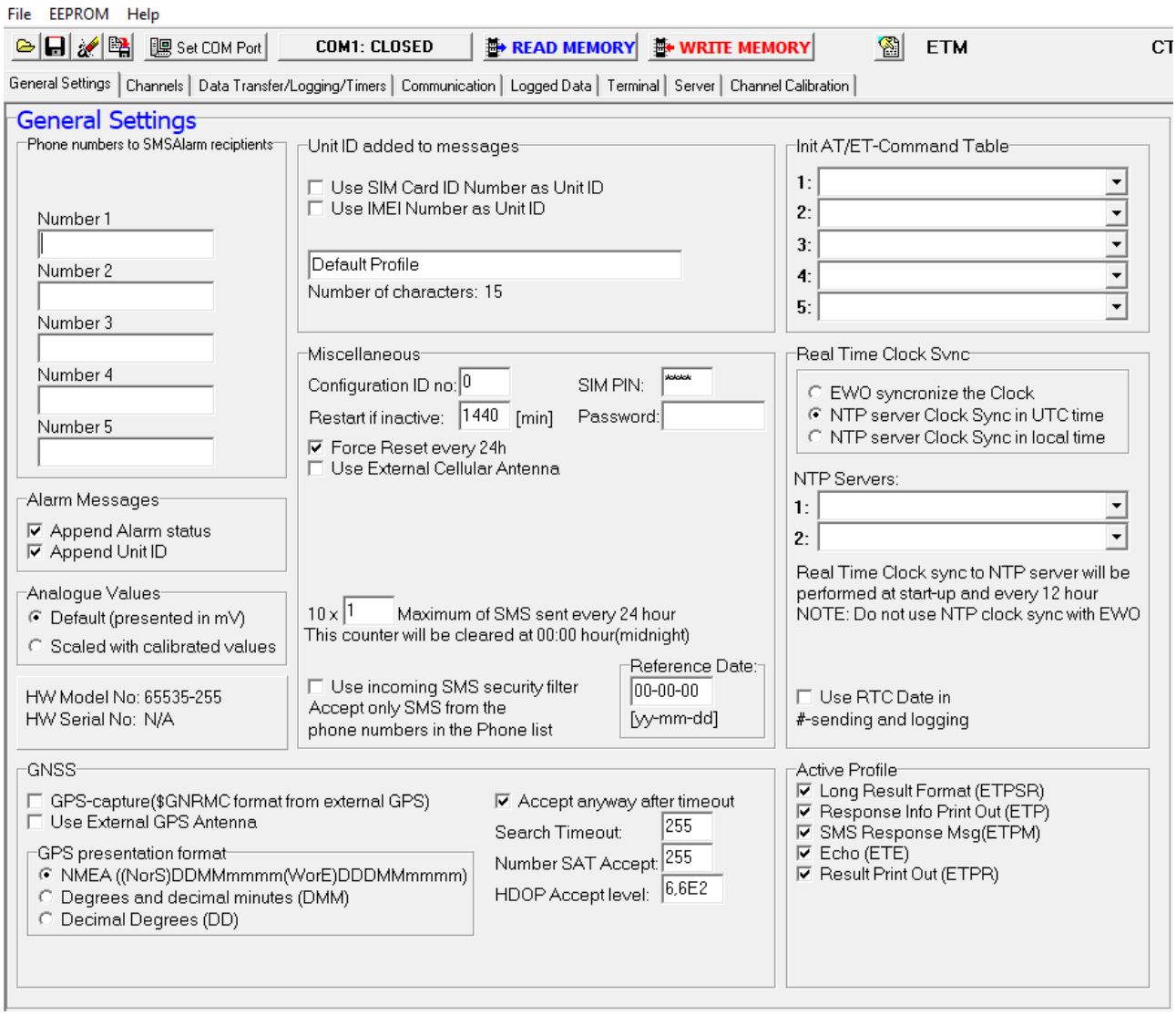
The following configuration examples are provided later in the user guide:

- Basic I/O Control
- Temperature Alarm

Saving, reading and writing configuration files

- To open an existing configuration file, select "File – Open".
- To save a configuration file, select "File – Save". This can be done after you have read an existing configuration from the wireless modem, or when you have manually entered a configuration.
- To read the current settings of the wireless modem, select "READ MEMORY" (the button with blue text).
- To write the current settings of the configuration tool to the wireless modem, select "WRITE MEMORY" (the button with red text).
- Note: You cannot perform a write operation if you have not opened an existing configuration file or performed a read operation.
- The button "Com3 (115200): OPEN" can be used to control whether or not the communications port is opened (you must have the communications port open to connect in any way to the modem).
    - The port open/Close feature allows you to leave the configuration tool open but not connected to the serial port, in case you need to use another communication application.
    - The selected baud rate for the Com port is displayed in brackets when the port is opened.
    - To set which port to use, click the button "Set COM Port".
- Note: If the unit is busy, a read or write may fail and a popup will inform you about the error. This is usually because the unit is in normal/operational mode. You can retry the read or write operation, but if it continues to fail then put the unit into programming/ESC mode (see above).

GENERAL SETTINGS TAB



Phone number to SMS Alarm recipients

- Number 1-5 lists the recipients of the alarm messages. It is our recommendation that you use the full international number in any entry, e.g. +4670xxxxxxx.

Analogue Values

- "Default (presented in mV)" – Analogue values, sent by TCP, UDP or SMS, are presented in mV. The range of each analogue input is 0-2500 mV.
- "Scaled with calibrated values" – Analogue values, sent by TCP, UDP or SMS, are presented as calibrated/scaled values. Refer to section on calibration for more details.

Unit ID added to messages

- If you select "Use SIM Card ID as Unit ID" the ID of the unit will be the ID of the SIM.

- If you select "Use IMEI number as Unit ID" the ID of the unit will be the network ID of the wireless modem.
- If you want to enter a textual ID, enter it into the text box and leave the checkboxes unchecked.
- You have 40 characters available and we suggest that you use the shortest practical ID possible, as there are only 160 characters available in an SMS. If you use 40 characters for the ID this leaves only 120 characters for the content of the SMS, which may limit the information that can be sent.
- When entering a specific ID you should not use punctuation characters – to guarantee that you don't affect the field positioning of any data being sent by the wireless modem you should never use a comma in the Unit ID. If you have a comma in the Device ID you will effectively add a new field to any data sent as the data is delimited with commas by default.

Miscellaneous

- "Configuration ID no" – This is an ID that can be used to further identify a unit configuration, may be used to identify standard configurations for a particular application.
- SIM PIN – Enter PIN for the SIM Card being used, if it's not deactivated.
- "Restart if inactive x min" – If the modem remains inactive for more than x minutes, the unit will restart.
- "Password" –To set a password, use the ET command ETSPW (see Control via ET commands later in this document). This password must then be entered in this field to allow any changes through the configuration tool.
- "Force Reset every 24h" – The unit will be reset every 24 hours.
- "Maximum of SMS sent every 24 hour" – To prevent a large number of SMS being sent due to an invalid configuration or an unstable input/system state you may limit the maximum SMS sent in a single 24-hour period. This 24-hour period resets at midnight (00:00).
  See the Delay and Alarm Restore Delay description (in the Communication tab) for other ways to limit invalid sending.
  If the wireless modem exceeds the maximum allowed SMS in a single 24-hour period then any alert that is triggered will still generate a message and will send a TCP or UDP alert if configured, but no SMS will be sent until the current 24-hour period expires. There is no indication available of when the current 24-hour period expires.
- "Use incoming SMS security filter" – You may restrict the users that can access the unit, users sending SMS to the wireless modem to control configurable options or to return current statuses by selecting "Use incoming SMS security filter". With this setting, only phone numbers in the phone number list will be accepted.
- "Reference Date" – Reference date (typical 05-01-01) is need for the Real Time Clock set by ETM IoT Cloud Dashboard (EWO).

HW Model No - HW Serial No

Here the model number and serial number for the unit are shown.

Init AT/ET-Command Table

Here you may set various AT and/or ET commands that are executed at power up.

Alarm messages

- "Append Alarm status" allows you to choose whether or not to add the status (High or Low) to the alert message. This is enabled by default.
- "Append Unit ID" allows you to choose whether or not to add the Unit ID to the alert message.

Real Time Clock Sync

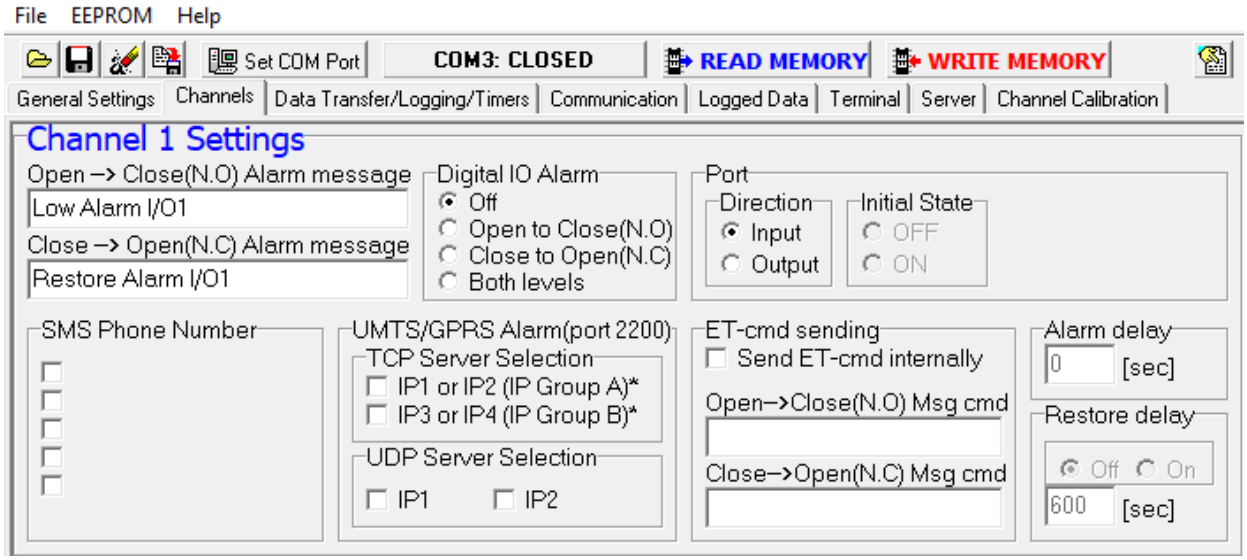
Select how the RTC is synchronized. Automatically sync it to EWO or use NTP Servers. Real Time Clock sync with NTP servers will occur at start-up and every 12 hours.

The unit is using the NIST time information to adjust for time zone and daylight saving if “sync in local time” is used. This may not work in all parts of the world and depends on the telecom operator.

Note: Do not use NTP clock sync with EWO.

CHANNELS TAB

This section has settings for the I/O channels and the corresponding alarms.



For channels 1, we have the following options:

Open→Close(N.O) Alarm Message

This message will be sent when a circuit involving the actual I/O pin changes from open to closed (from not connected to grounded). The I/O is indicating high signal when not connected, pull upped. See later in this document for examples.

Close→Open(N.C) Alarm Message

This message will be sent when a circuit involving the actual I/O pin changes from close to open (from grounded to not connected). The I/O is indicating high signal when not connected, pull upped. See later in this document for examples.

Digital I/O alarm

Set which type of change that will trigger an alarm. The I/O is indicating high signal when not connected, pull upped. See later in this document for examples.

Port

Set the I/O to input or output. In the case of output, set the initial state to ON or OFF.

SMS Phone Number

This setting is used to specify which, if any, phone numbers to use for sending SMS alarms related to this input.

Note: Never tick a blank number as this will cause the wireless mode to try to repeatedly send an alarm to a non-existent number.

Alarm (port 2200)

- "TCP Server Selection" allows for the sending of any alarm via TCP to server address and port specified in the Communication tab.
- "UDP Server Selection" allows for the sending of alarms via UDP.

ET-cmd sending

Allows for internal sending of an ET command, which could be used to change a timer or turn on/off an output as the result of an alarm trigger or an input.

Alarm delay

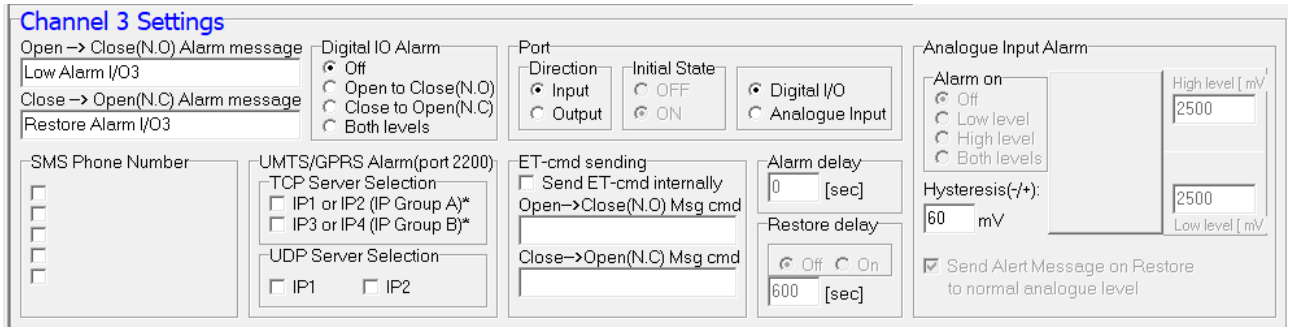
Waits a specified time before the alarm is activated. It is recommended to activate this to reduce the incidence of multiple SMS being sent in the event of chattering/bouncing contacts.

Restore delay

Stops additional alarm messages occurring within a specified time of the original event.

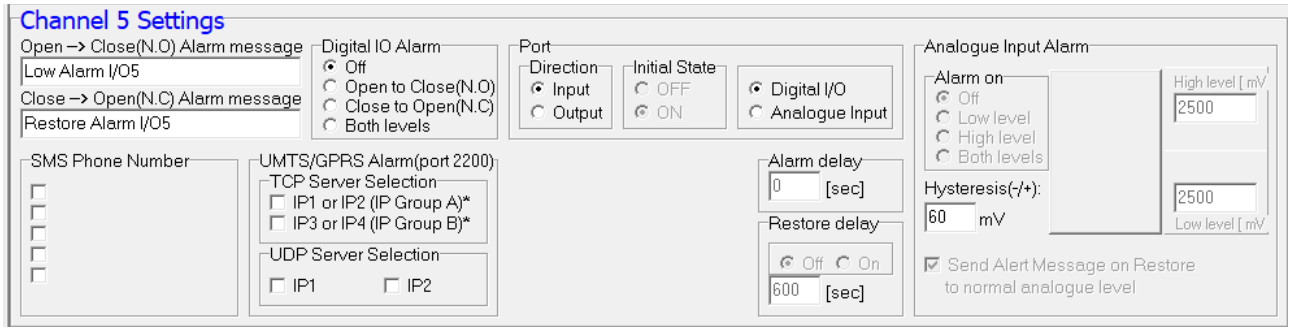
Analogue Input Alarm

Channels 2-7 can also be set to Analogue input.

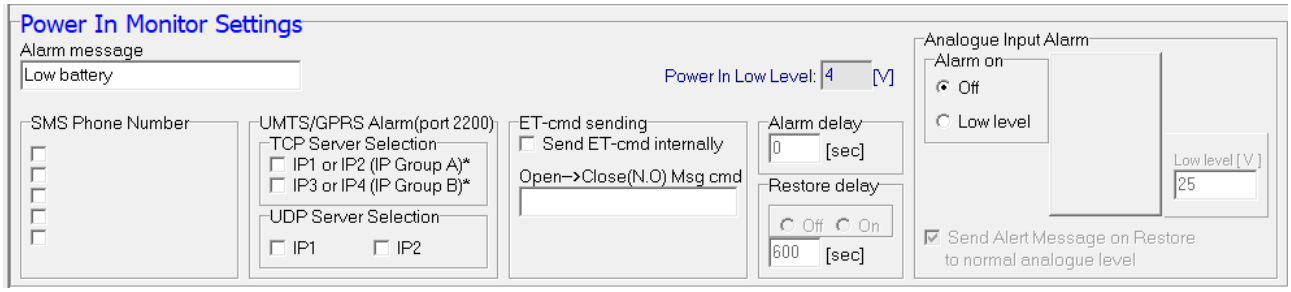


Allows for high level, low level or both, with hysteresis.

Hysteresis can be set; this is useful in eliminating nuisance alarms resulting from analogue values fluctuating above and below the alarm set point, which would otherwise cause multiple alarms to be sent.



For channels 5, 6 and 7 the options for sending ET-commands are not available.



The unit can send an alarm when the unit's supply voltage level has fallen below a specific level. This can be used as a warning for backup battery, solar or mains power failure applications.

For most of the options in this section, refer to previous sections on channels 1-7.

There are however some options that are specific to this section:

Alarm message

Set an alarm message for low battery level.

Power in Low Level

If the supply voltage falls below this value, the unit will turn into shutdown mode. Here, the cellular module will be turned off, and only the processor will be operational.

Analogue Input Alarm

Activate the alarm for low battery level, and specify this level.

DATA TRANSFER / LOGGING / TIMERS TAB

Common settings for all channels

- "Log interval in min" – Input value in minutes to decide logging
- "Pulse Counting Transition" –
- "Analogue Values" – Default (presented in mV) uses the #21 format while "Scaled with calibrated values" uses the #22 format.
- Send to server for logged data
- "Activate and send data to server" – If checked, "connect to ISP at start up" also activates. Also applies if SWT 3 and 4 is activated.

Each part of this tab covers a particular timer (SWT<x>) that controls the sending of certain data types.

The three timers that relate to the sending of data are:

- SWT2 – This timer sends the archived/logged data. The sending port will be 2150.

- SWT3 – This time sends the current values as configured. The sending port will be 2800.
- SWT4 – This time sends the current values as configured. The sending port will be 2880.

The data types are defined in the separate document "ETM Modems TCP UDP Protocol spec". Contact ETM for details.

Setting the SWT timers

Setting the SWT timers is done by entering the interval in minutes in the periodicity area.

Select if the unit shall send the data in periodic interval starting at the unit boot up time or if the data send interval shall be synchronised on the hour change e.g. 02:00, 04:00, 06:00 etc if the interval is set to 120 minutes.

One thing to note about using "Synchronized" is that if the software clock has a time that is past the time entered; the unit will not trigger the timer until the following day.

Data Logging (SWT1)

A limited amount of data can be stored in the memory during periods of network outages or if sleep mode is used.

Data logging

- Off
- On (timed)
- On (Timed/Event on I/O1) – When an alarm event occurs on I/O1 the unit log a value. This function is only available on channel 1.

Pulse Counting Transition

- Low to high – Counts a pulse on transition from closed circuit (<0.5V) to open circuit (>2.5V).
- High to low – Counts a pulse on transition from open circuit (>2.5V) to closed circuit (<0.5V).
- Both – Uses both "Low to high" and "High to low".
- The pulse register can hold a value between 0 – 4294967295.

Periodicity

- Periodic – This works on the configured interval, so that a log will occur every X minutes. There is however no control of what actual time the logging starts, so if you need logging to occur at a certain time you need to use "Synchronized".
- Synchronized – This starts at the nominated time and adds the "Send interval" to that time so the next send is performed at the time required.

- There is one significant issue with the second type of timing for logging/sending, since it depends on the Real Time Clock. If your device is powered off and then powered on again at a later time the Real Time Clock, which is a software and not a hardware clock, will now be out of sync with the real time and your chosen starting times will no longer be accurate.

- The device can have its Real Time Clock and Reference Date reset by connecting to the serial port and sending the correct ET commands, the wireless modem does not need to be

put into command mode but it must also not be asleep. Another way is that when the wireless modem connects by TCP or UDP the server can issue commands to resynchronize the wireless modems Real Time Clock and Reference Date.

Channel selection

Select the channel to be logged and the type of logging required.

Send interval logged data (SWT2)

Causes the archived/logged data in any selected inputs to be sent every X minutes.

The data will be sent to the IP-address and port specified as IP1 or IP2, these are specified in the Communication tab.

[#21] will send logged channel data with timestamps.

[#22] will send logged data scaled according to settings in the Channel Scaling tab.

[#32] will send extra control parameters

Monitoring data (SWT3)

This will send certain types of data through port 2800, depending on your choice:

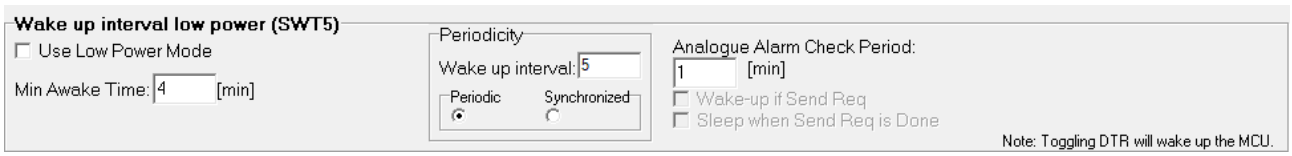
- [#1] format, Info status - current device information
- [#3] format, Unit ID
- [#4] format, Analogue Port status
- [#5] format, Not used for DeltaBlack
- [#6] format, Digital Port status
- [#7] format, Latest logged value
- [#8] format, ET-Command response – this allows the server to interrogate the wireless modem.

These data types are defined in the separate document "ETM Modems TCP UDP Protocol spec". Contact ETM for details.

Monitoring data (SWT4)

This will send certain types of data trough port 2880 (see above for description).

Wake up interval low power (SWT5)



This is used when you wish to operate a unit in sleep mode to conserve power. In sleep mode the unit’s power consumption drops to approximately 0.1 mA. The device digital and

analogue alarms will function in sleep mode; however the delays before an alarm is sent are affected by the analogue alarm check period and the time for the unit to wake up and register – the interaction between these timers need to be carefully considered.

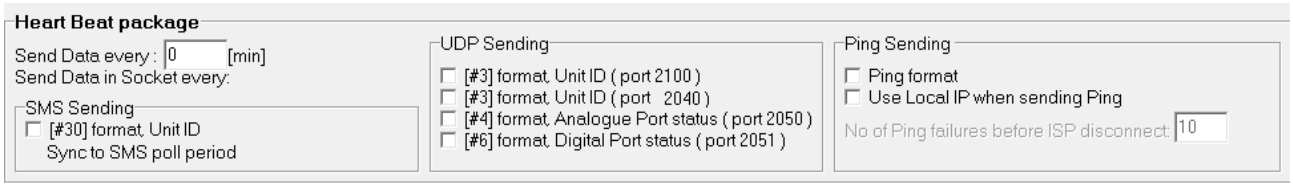
- Use Low Power Mode – Enable or disable Low Power Mode (LPM).
- Min Awake Time – Set the minimum period of time that the wireless modem should stay awake.
- The wireless modem may be busy performing configured operation and therefore exceed the time value entered here, but once the configured interval has expired and the wireless modem has been inactive for a short period it will automatically switch to LPM.
- Our recommendation is that this value should never be less than 4 minutes.
- Periodicity – See description above (under Data Logging (SWT1)).
- Analogue Alarm Check Period – If the wireless modem is in LPM then the scanning interval of the analogue inputs can be set to every X minutes.
- Reducing the scanning frequency can provide power savings as the action of scanning an analogue input requires a small power burden when the analogue inputs are powered up to take a reading. In addition if sensor power is used, then reducing the frequency at which the sensor is turned on will save power.
- Wake-up if Send Req – The unit wakes up if there is a send request trigged by another timer (SWT2, 3 or 4). If not checked, the unit will only wake up according to the SWT5 time interval, and then perform the required tasks.
- Note: Alarm tasks will always wake up the unit.
- Sleep when Send Req is Done – The unit will go back to LPM as soon as the required tasks are performed. If not checked, the unit will stay awake for the time specified under "Min Awake Time".

What you should know about the Low Power Mode

- If the unit operates from a battery and you need to conserve power it can be set to wake up every X minutes, for Y minutes, to send data etc.
- When the wireless modem wakes up it will scan the SWT timers and determine which timers are ready to trigger a data send.
- If an SWT timer is not ready to trigger a data send, and the wireless modem wakes up, then any sending for that timer will be ignored.
- During Low Power Mode operation there is no contact with the network and SMS will be held in the carriers SMS Central, so you cannot guarantee the order in which SMS will be delivered to the wireless modem. This means that you if you send an SMS to configure an option and later send a reset, then there is no guarantee which of the commands that will be executed first. As a reset can cause the wireless modem to restart without consideration of any other activity on the wireless modem, you might find that your second (configuration) command "gets lost" so you need to plan accordingly.

- During Low Power Mode operation a change on a configured I/O that would normally cause an alert to occur will cause the unit to wake up. The I/O's are scanned every X minutes in Low Power Mode, so there is no guarantee that a unit will stay in Low Power Mode for as long as expected.
- You should configure sufficient awake time so that the wireless modem can complete any task that you have set such as delivering #21 or #22 data or accepting commands using a #8 connection.

Heart Beat package



Note: This feature has the potential to cause issues if your carrier does not support short interval sending with minimal data content. Check your carrier's terms of use before you start to use these features.

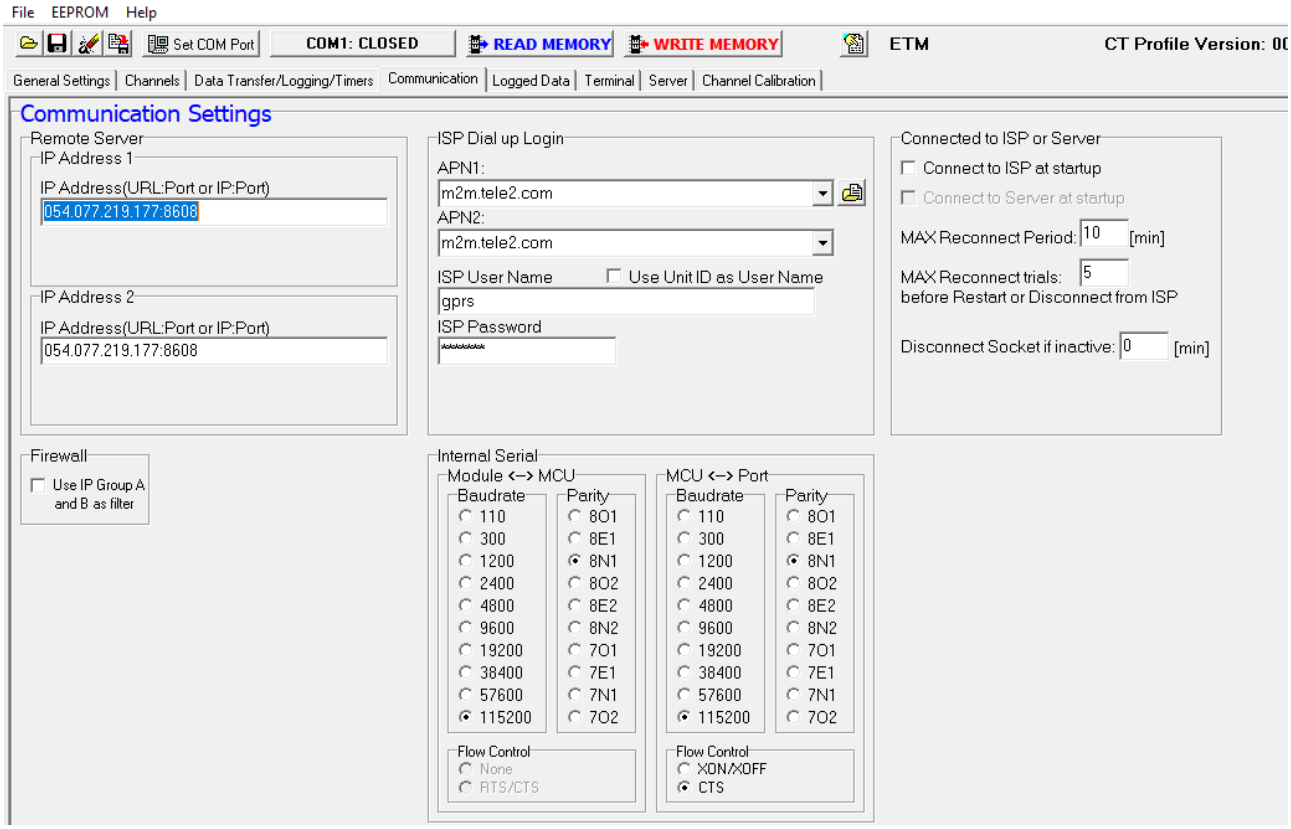
- "Send Data every x [min]" sets the value in minutes for the interval between sends. This value must be equal to or larger than the "SMS Poll Period" under the "General Settings" tab.
- "SMS sending" – "[#30] format, Unit ID" sends an SMS formatted as "#30…." every X minutes to provide an indication that the unit is still "alive".
- UDP sending:
    - [#3] format, Unit ID (port 2100) – This sends the Unit ID from port 2100.
    - [#3] format, Unit ID (port 2040) – This sends the Unit ID from port 2040, this is the same port as the local port specified in the "Communication" tab.
    - [#4] format, Analogue Port status (port 2050) – This sends the current Analogue Port status value from port 2050.
    - [#6] format, Digital Port status (port 2051) – This sends the current Digital Port statuses from port 2051.

      The advantages of sending this data by using UDP, a connectionless protocol, is that transmission costs are reduced compared to TCP.

      The disadvantages of sending this data by using UDP is that because UDP is a connectionless protocol there is no guarantee that the data will be delivered. The wireless modem does not implement any form of delivery success detection on top of UDP.

- Ping Sending:
  - "Ping format" needs to be checked for this feature to function.
  - "No of Ping failures before ISP disconnect" means that if an initial data send cannot be initiated then a "ping failure" is registered. After a configured amount of failures the ISP considered to be disconnected and the wireless modem will attempt to reconnect to the carrier.
  - "Use Local IP when sending Ping" is used to make the wireless modem ping itself in an effort to maintain the ISP connection.

COMMUNICATION TAB



This section has settings which controls how the wireless modem communicates over the internet with a server. There are also settings for the communication with the internal module.

Remote Server

- IP Address 1 or 2 are addresses that can be used in several other parts of the configuration tool. The IP address and port is entered as 54.77.219.177:8608 for IP address 54.77.219.177 and port 8608. Note! Do not enter in the format 054.077.219.177:8608.
- You may need to forward the chosen port to a server behind your firewall.

ISP Dial up Login

- APN sets the Access Point Name to use with the ISP connection
- You can overwrite any of the available APNs if your APN does not exist in the list.
- If you want to create your own list of APNs you need only create a text file with the appropriate APNs and the select the "file open" button to the right of the topmost APN dropdown list to load your chosen list.

- "ISP User Name" and "ISP Password" is the appropriate login information for the service being utilised.

Connected to ISP or Server

- Connect to ISP at startup – When the unit powers up it can automatically connect to the ISP.
- Connect to Server at startup – When the unit powers up and automatically connects to the ISP, the unit will establish a socket to IP1 or IP2.
- Use of this feature will cause some aspects of the capabilities in the "Data Transfer/Logging/Timers" tab to be unavailable. Use of this feature would result in a permanent connection being maintained to the specified server.
- Max Reconnect Period – This is the maximum time a reconnection will be attempted before it is considered a failure. We recommend a value of 10 here.
- Max Reconnect Trials – This is the maximum amount if times a reconnect will be attempted before the device try to select another access technology. The device start to connect via 4G technologies at start up. If the max reconnection trials using 4G have been reach, it will try to connect via 3G. If the max reconnection using 3G trials has been reach, it will try to connect via 2G. If the max reconnection using 2G trials has been reach, it will try to connect via 4G again. If a successful connection has been established, the same access technology will be used the next attempt until a restart of the device is performed. We recommend a value of 5 here.
- Note in relation to the Reconnect Period and Trials:
- If the Low Power Mode (LPM) timer (see Data transfer/Logging/Timers tab) expires before the reconnection period/trials, then the wireless modem will not reset and will instead go into sleep mode (LPM). When the wireless modem comes out of sleep mode (LPM) the previous failures will be ignored and the counters will start again. This allows the wireless modem to continue to perform as a data logger in a situation where there is no signal.
- Disconnect socket if inactive X min – This can be used to disconnect from your server if you don't send data for the specified period (e.g. to save costs).
- After disconnection from the server, you can still send SMS or UDP packages to the unit. To cause it to reconnect if required, the unit must be powered or connected to an ISP (for UDP).
- This feature is not useful if the sleep mode functionality is being used.

Firewall

If you turn on the firewall, only IP-packets coming from the IP-addresses specified in Group A and Group B will be responded to.

Internal Serial – setting the baud rate

The baud rate for the wireless modem can be set in this section. As default the unit is set to a baud rate of 115200.

- Module ←→ MCU should match MCU ←→ Port.
- MCU ←→ Port sets the serial port on the device and should be adjusted to suit your device connected to the port.
- For "Flow Control", currently only CTS is supported.

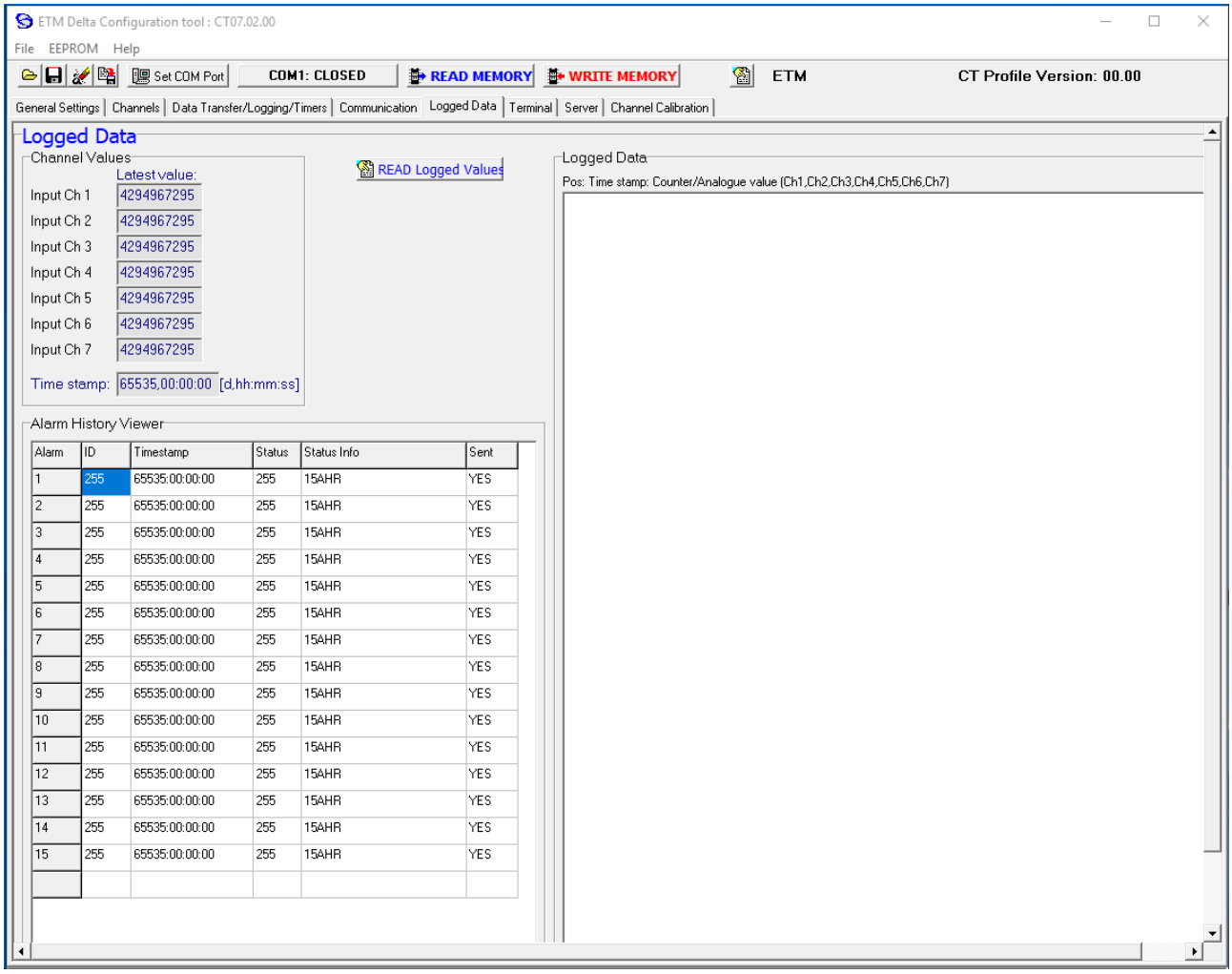
For a baud rate of 9600, 57600 or 115200, the MCU will use a feature called "auto baud" to adjust to the correct baud rate. For other baud rates, the internal module must be reconfigured manually.

To adjust the baud rate manually for the internal engine/module (PLS62-W), use the AT+IPR command:

- Send ETSC1 in the terminal window to change to AT-command mode.
- Send AT+IPR=xxx, where xxx is the desired baud rate (e.g. AT+IPR=115200).
- Send --- to return to ET-command mode and continue programming the unit.

LOGGED DATA TAB

A limited amount of data can be stored in the memory during periods of network outages or if sleep mode is used.



Channel values

Latest value for all input channels.

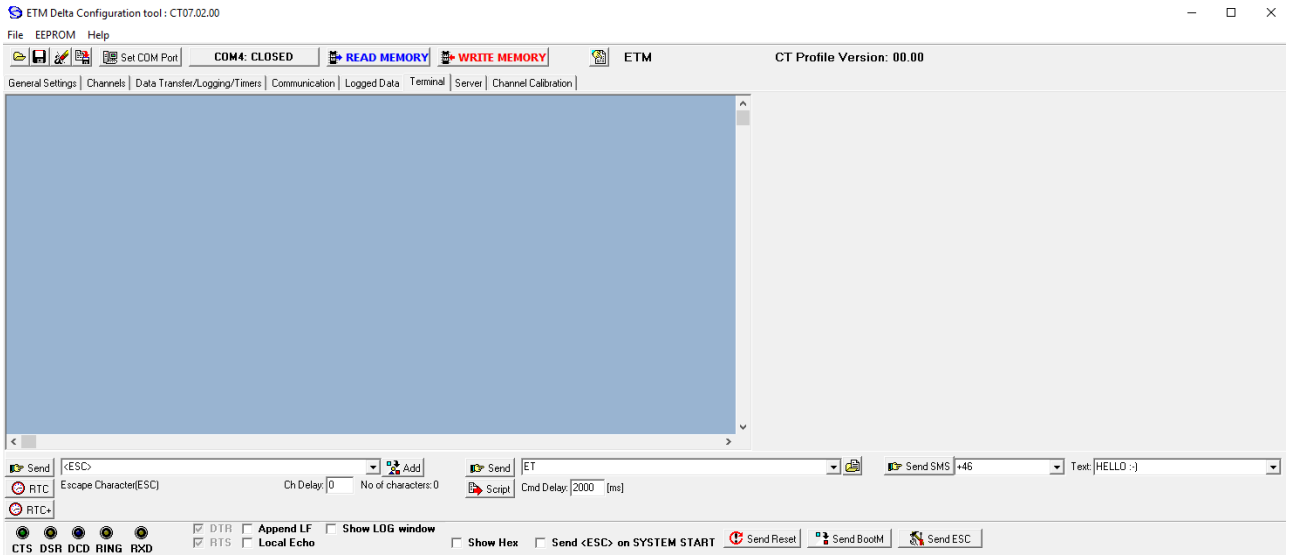
Alarm History Viewer

List of alarms sent by the wireless modem.

Logged data

This area shows the data as it is retrieved from the wireless modem.

TERMINAL TAB



In the terminal window you can see the output from the unit and type commands to the unit.

Note: Remember to place the cursor inside the window before you type any commands.

Entering command mode

Place the cursor inside the window and press "escape" (or have "Send ESC on SYSTEM START" checked) to stop the start up sequence and put the unit into ESC mode. You may also issue ET commands when in normal operation mode but the unit might be busy and fail to execute the command (wait and try again).

Make sure to set the baud rate to 115200 for the escape sequence to work. You do that by clicking the "Set COM Port" button, and choose 115200 in the dropdown menu under "Baud Rate".

Send buttons

- You can select a number of predefined commands by using the dropdown menu to the left. Each command has a short description, for details refer to "Control Via ET Commands" later in this document.
- The dropdown menu on the right has previously used commands, to make sending a command repeatedly easier.
- "Send Reset" – Software reset.
- "Send BootM" – Jumps from main program to boot program.
- "Send ESC" – Sends the command "ESC" to the module, which puts the module in programmable mode.

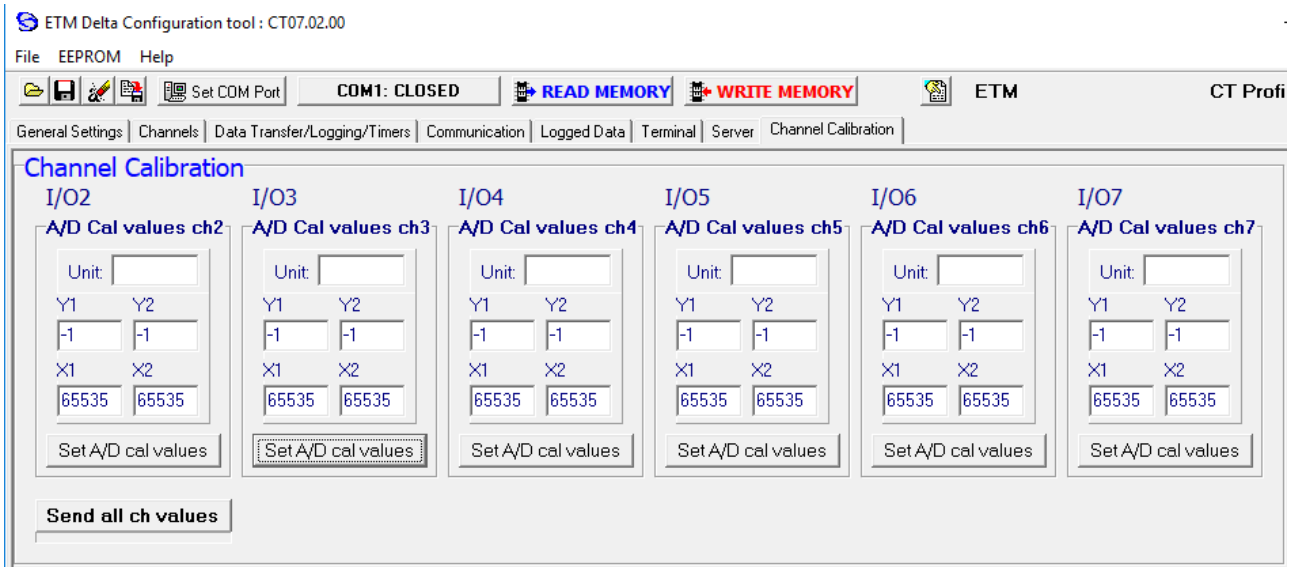
Set RTC

This button is used to set the Reference Date and Time.

Reprogram using CSD

If your SIM has been provisioned for Circuit Switched Data, then it is possible to dial into the unit from the terminal window and re-program the unit remotely.

CHANNEL SCALING TAB



This tab shows the current calibration/scaling parameters for the input.

Each analogue channel has the resolution of 4096 steps.

Example:

We have a temperature sensor, specified to give 1000 mV at 10 °C and 2000 mV at 20 °C. If we are using an analogue channel configured for 0-2500 mV, this corresponds to the steps 0-4095.

We therefore have:

10 °C -> 1000 mV -> step 1638

20 °C -> 2000 mV -> step 3276

Set the calibration parameters:

- Unit = degC
- Y1 = 10
- Y2 = 20
- X1 = 1638
- X2 = 3276

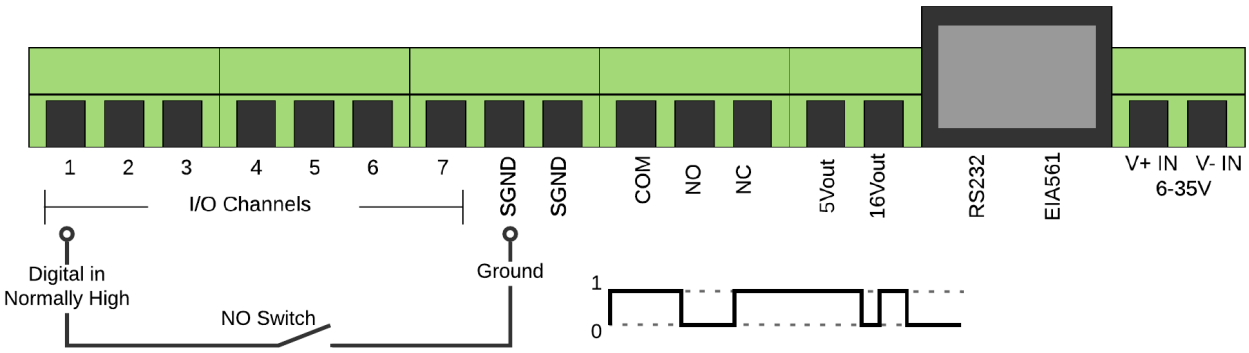
Apply these settings by clicking "Set A/D cal values".

APPLICATION EXAMPLES

This section includes a few examples of how the devices can be electronically wired as well as a couple of software configurations for different types of common applications.

BASIC I/O CONTROL

Wiring Diagram



DeltaBlack (P/N: 71610)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

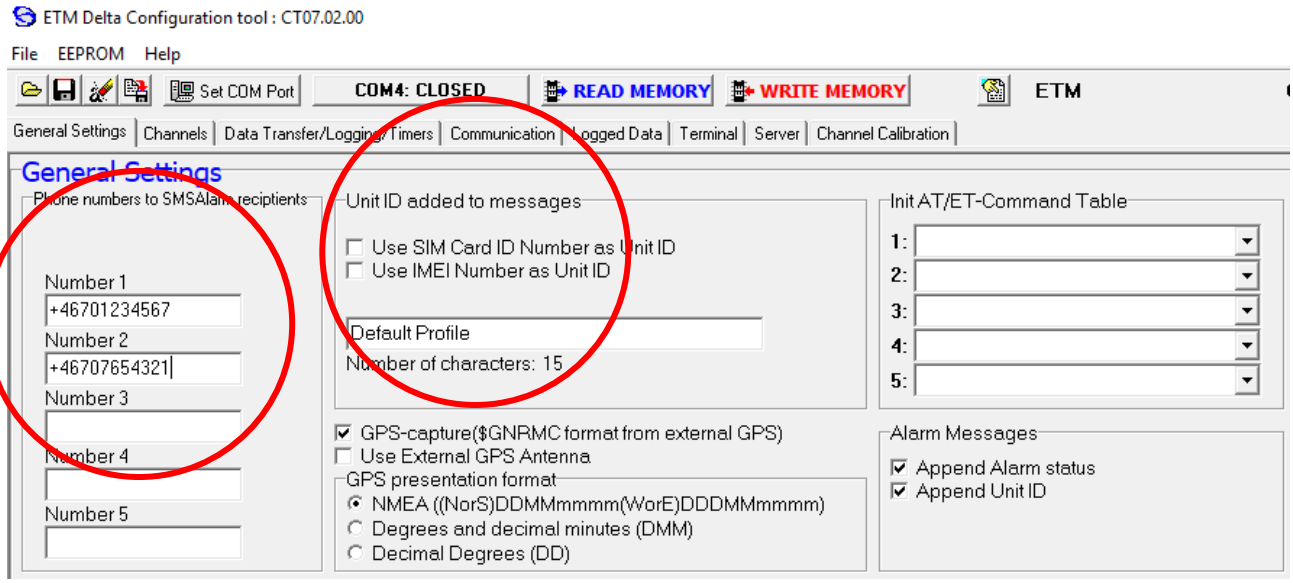
DeltaBlack (P/N: 71611)

Channel Description

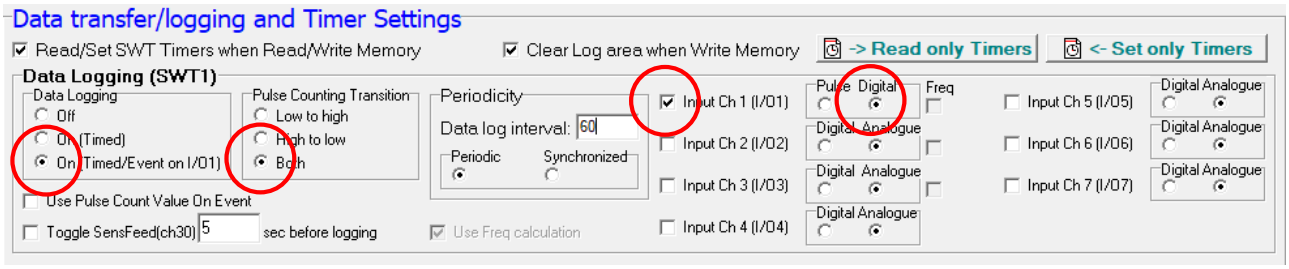
- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

Configuration Tool Settings

1. Enter Phone Numbers and Unit ID in the General Settings tab.

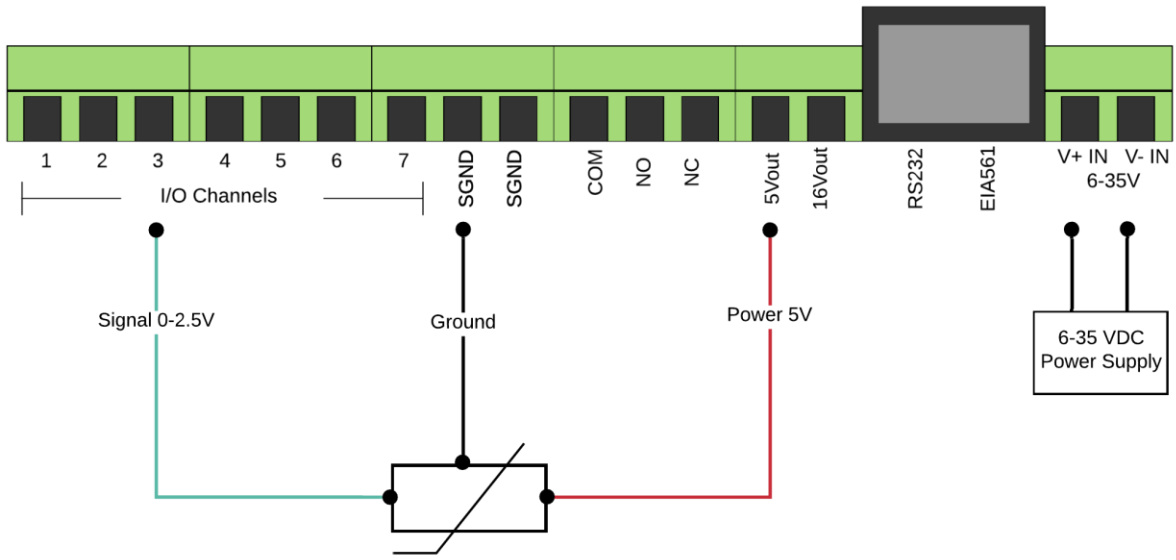


2. In Data Transfer/Logging/Times, Set "Data Logging" to "On(Timed/Event on I/O1)" and "both" checked under "Pulse Counting Transition". Check "Input Ch 1 (I/O1)" and make sure that it's set to digital.



TEMPERATURE ALARM

Wiring Diagram



DeltaBlack (P/N: 71610)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

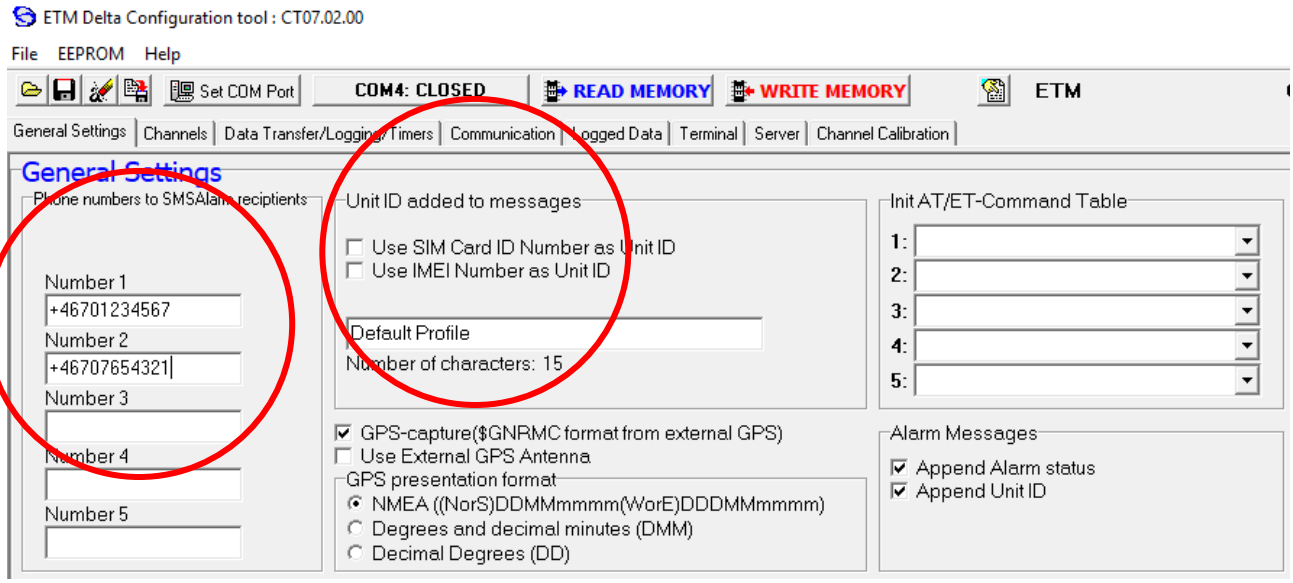
DeltaBlack (P/N: 71611)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

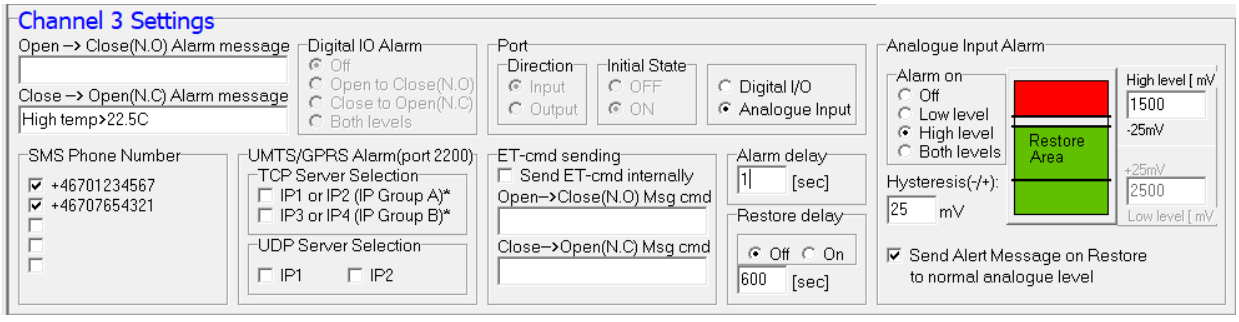
Configuration Tool Settings

1. Enter Phone Numbers and Unit ID in the General Settings tab.



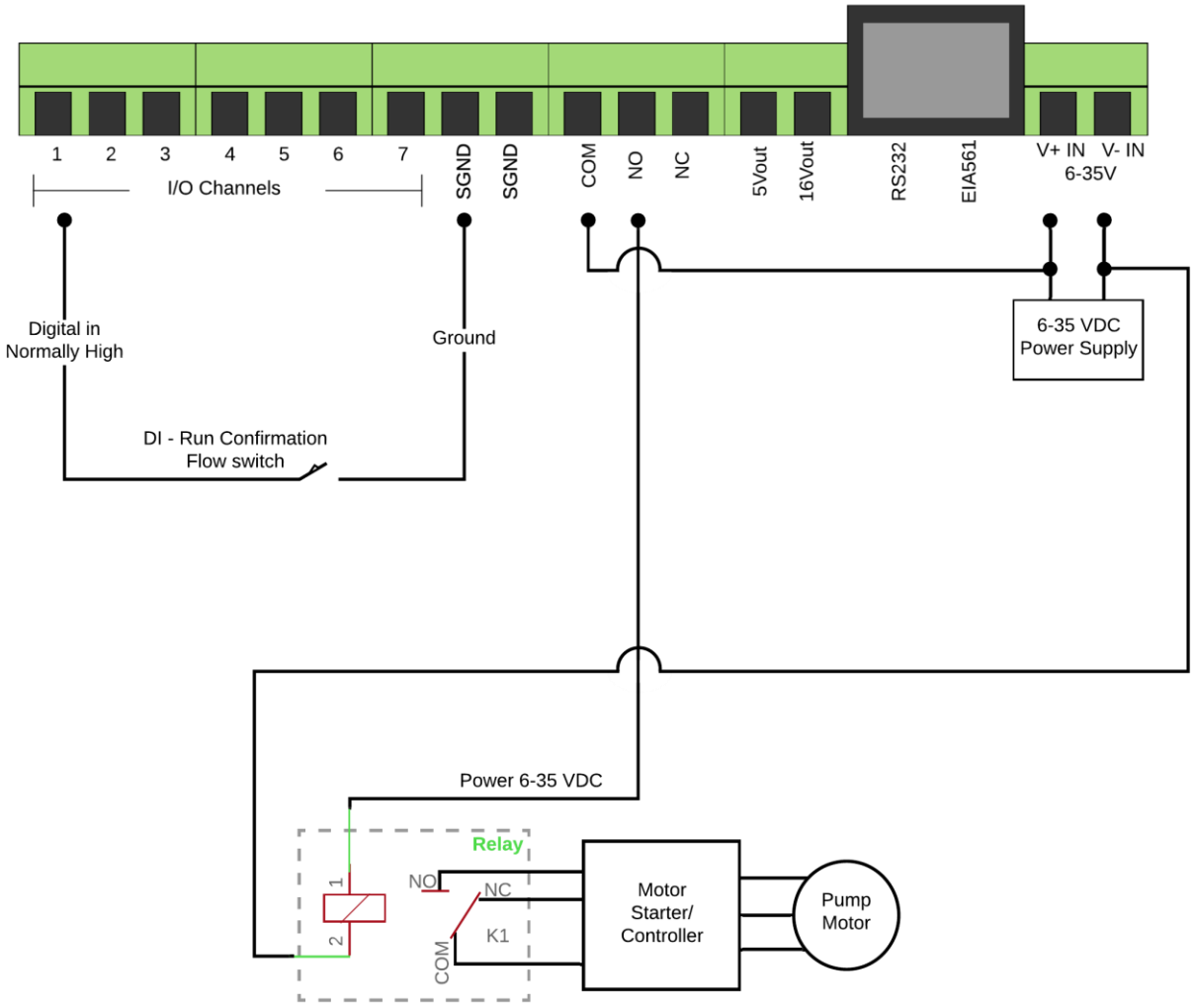
2. Set I/O3 as Analogue, and tick the phone numbers that are valid for this alarm. In this case 4mA represents -40 °C which corresponds to 500mV and 20mA represents 85 °C which corresponds to 2500mV. Therefore the 1500mV trip point equates to 22.5 °C, in the example below a restore message will be sent when the temperature drops back below 22.5 °C.

Note: contact ETM for more information on how to correctly set and calibrate analogue inputs.



Hysteresis can be set; this is useful in eliminating nuisance alarms resulting from analogue values fluctuating above and below the alarm setpoint causing multiple alarms to be sent. In this example 25mV hysteresis equates to approx. 1.5 degrees.

PUMP CONTROL



DeltaBlack (P/N: 71610)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

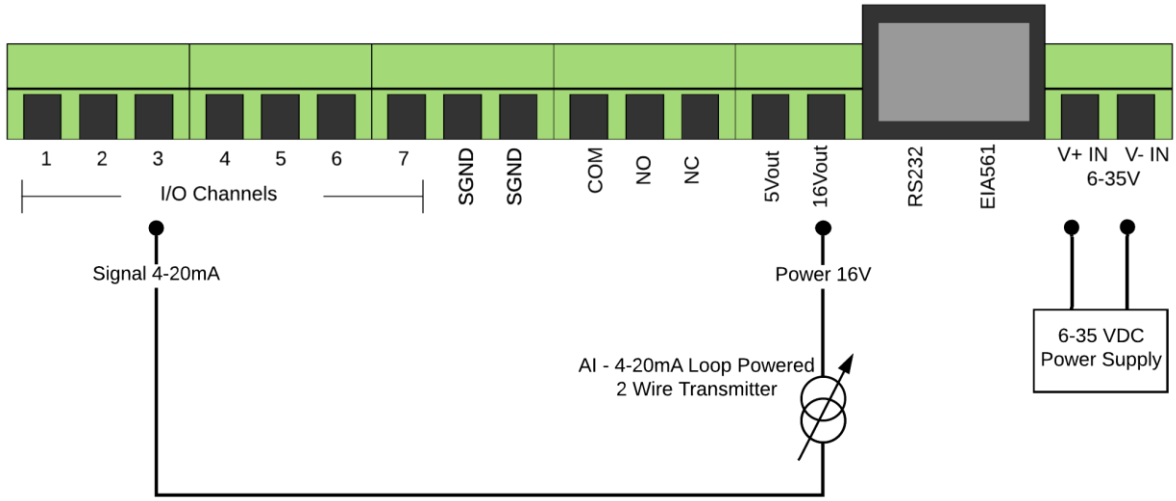
DeltaBlack (P/N: 71611)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

TANK LEVEL MONITORING WITH 4-20mA SENSOR

Wiring Diagram



DeltaBlack (P/N: 71610)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

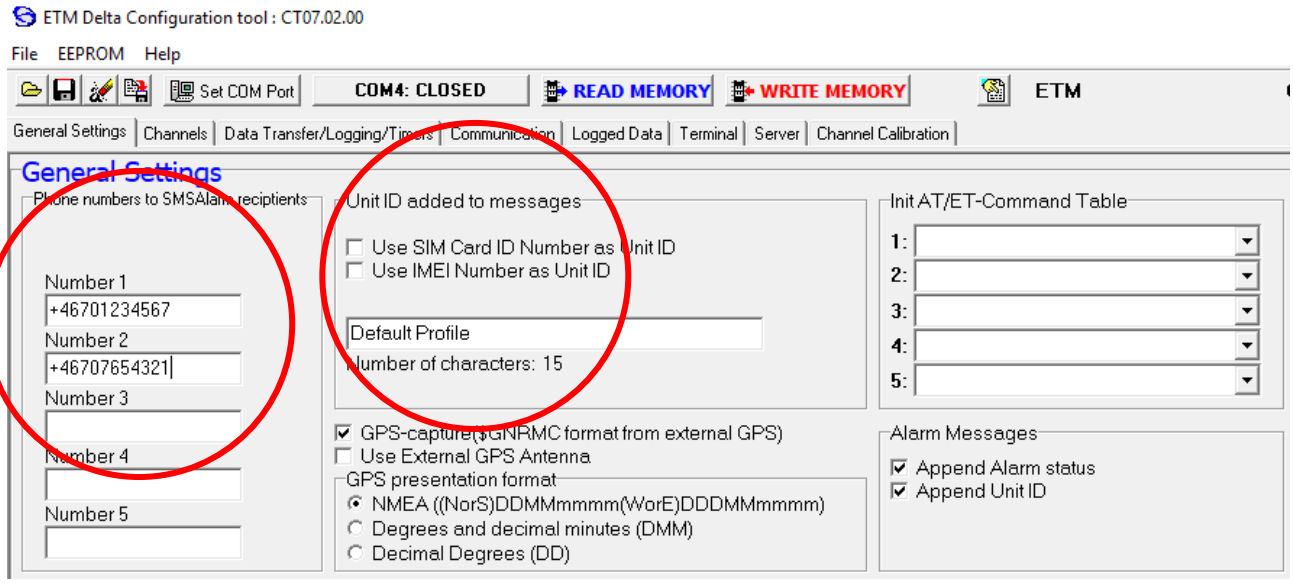
DeltaBlack (P/N: 71611)

Channel Description

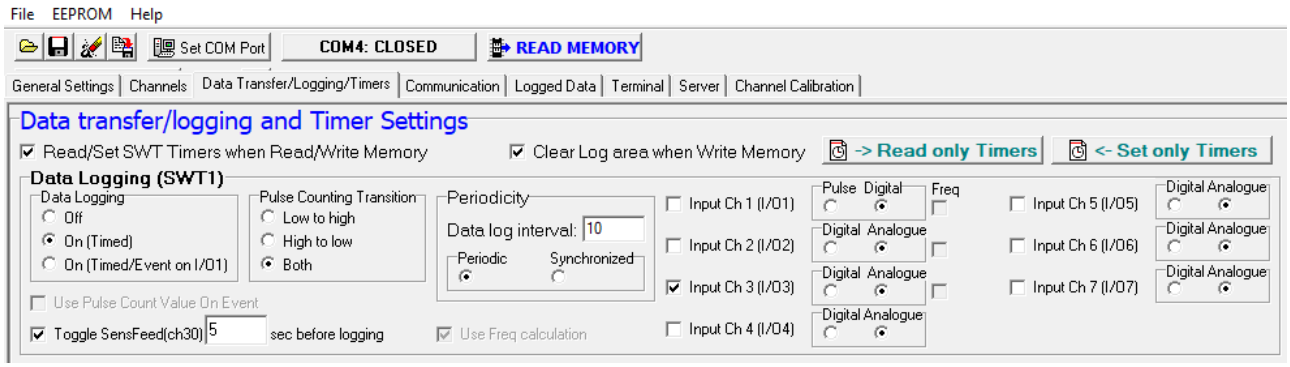
- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

Configuration Tool Settings

1. Enter Phone Numbers and Unit ID in the General Settings tab.

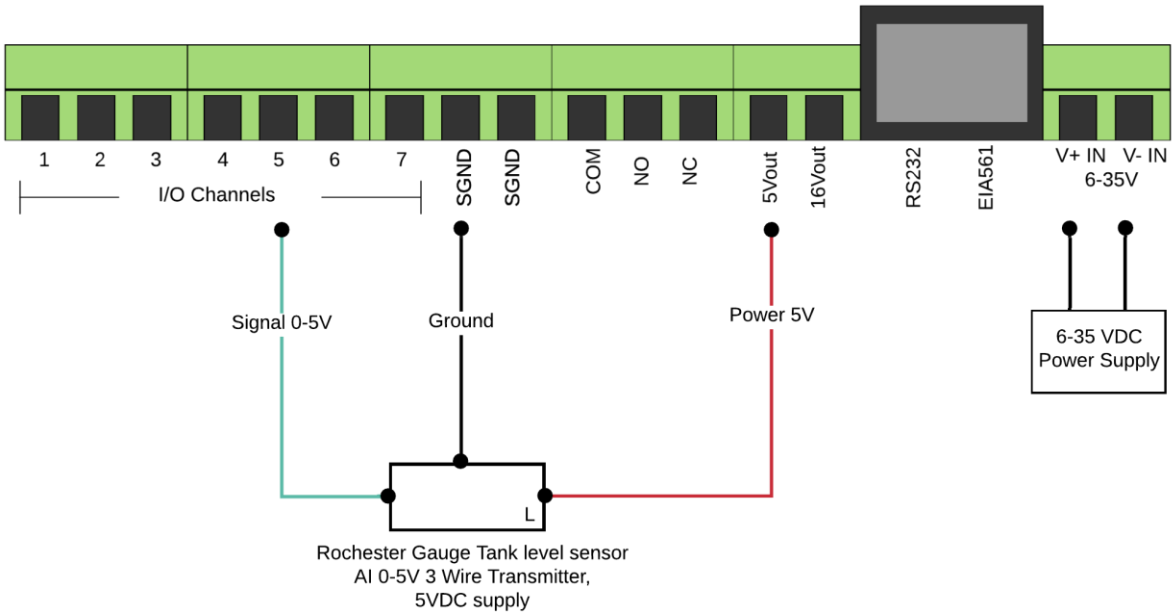


2. In Data Transfer/Logging/Times, Set "Data Logging" to "On(Timed)" and check the box "Toggle SensFeed(ch30)". Check "Input Ch 3 (I/O3)" and make sure that it's set to Analogue.



Note: Contact ETM for more information on how to correctly set and calibrate analogue inputs.

TANK LEVEL MONITORING WITH ROCHESTER GAUGE



DeltaBlack (P/N: 71610)

Channel Description

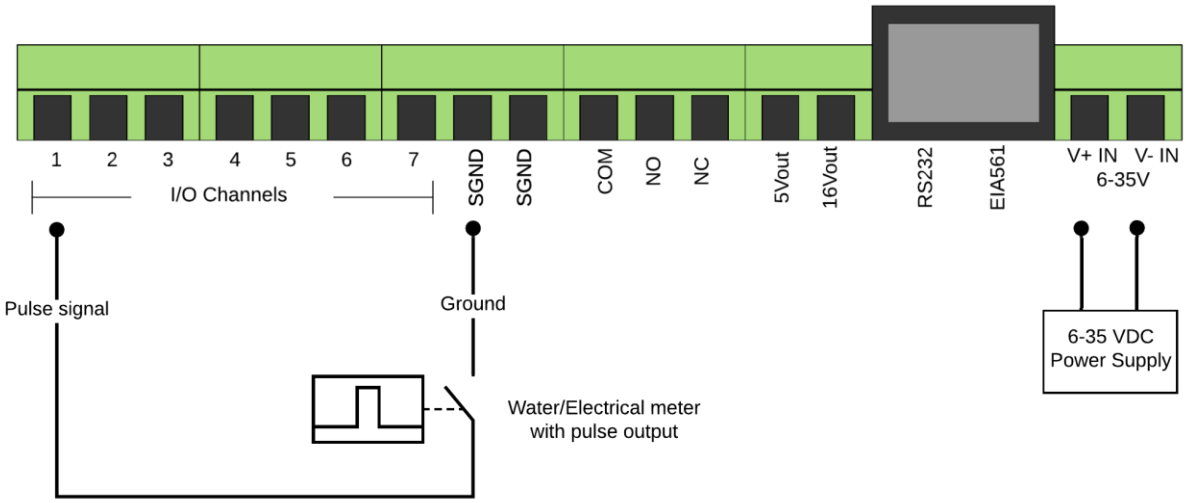
- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

DeltaBlack (P/N: 71611)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

WATER/ELECTRICAL METER MEASUREMENT



DeltaBlack (P/N: 71610)

Channel Description

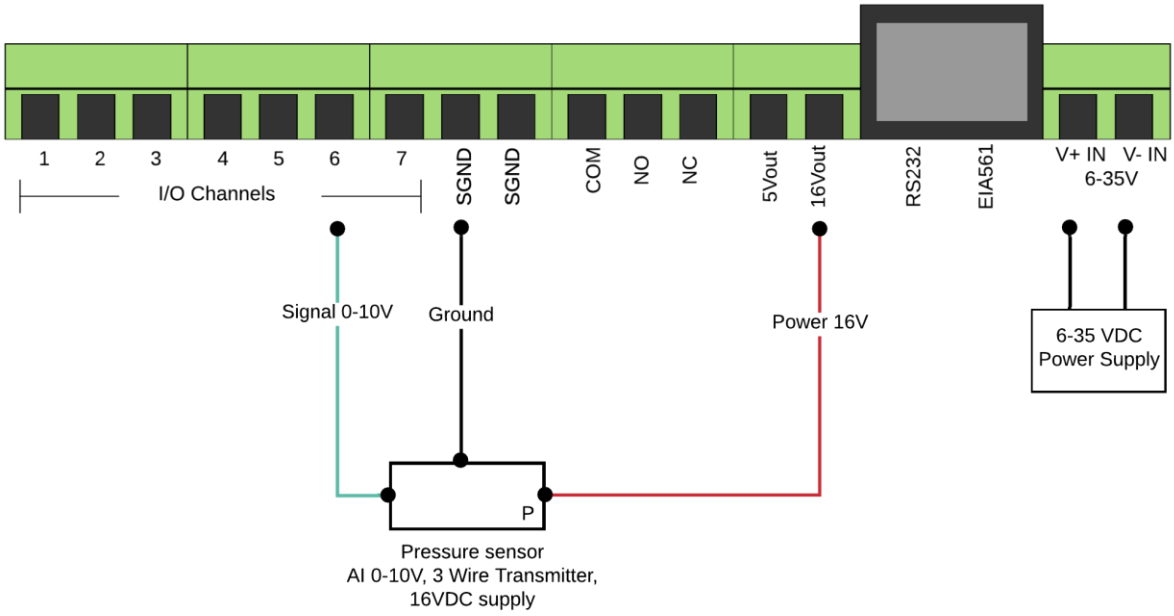
- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

DeltaBlack (P/N: 71611)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

PRESSURE SENSOR



DeltaBlack (P/N: 71610)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** DI/DO, Pulse, AI 0-2.5V
- **CH3:** DI/DO, Pulse, AI 0-2.5V
- **CH4:** DI/DO, Pulse, AI 0-2.5V
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** DI/DO, AI 0-2.5V
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

DeltaBlack (P/N: 71611)

Channel Description

- **CH1:** DI/DO, Pulse
- **CH2:** AI 4-20mA
- **CH3:** AI 4-20mA
- **CH4:** AI 4-20mA
- **CH5:** AI 0-5V
- **CH6:** AI 0-10V
- **CH7:** AI 4-20mA
- **Relay:** COM/NO/NC
- **Sensor Feed:** 5V and 16V

CONTROL VIA ET COMMANDS

As default the DeltaBlack is set to ET Command Mode. ET Commands are specific to ETM terminals and allow for control, configuration and information requests to be sent to and from the terminal. In ET command mode AT commands cannot be sent to the unit.

ET commands can be sent via SMS or from the configuration tool when directly connected or via an IP or CSD connection. It is recommended that more complex settings such as changing messages or phone numbers are made using the configuration tool.

General commands

COMMAND	ACTION	RESPONSE/NOTES
- - -	Switch to ET-command mode	Can also be used to abort if another command has locked the terminal.
ETI	Send DeltaBlack information	ID: "ID string" RTC: Real Time Clock (Date and Time) REFDATE: Reference date, Day counter TOTAL: Total time since start RSTIN: Time to SW reset RC SW: PU: Reset counter SW / Power Up SW#: Software number HW#: Model No*Serial No (e.g. 71500*xxxxxx) SIGNAL: n MIN: MAX: Signal strength real / min / max SUPPL VOLT: Supply voltage (V) CHANN: BCCH/PSC/Band: LAC: CELL: - Cell information MTemp: Module Temperature (degC) CID: Configuration ID IMEI#: International Mobile Equipment Identity number BAT VOLT: Battery voltage (V) MOD VOLT: Module voltage (V)
ET&SR	Software Reset MCU System	May be useful if it is suspected the unit has locked up or communications between modem and external device have stalled
ETSRTC= dd:hh:mm:ss	Set Real Time Clock	d=day, h=hour, m=minute, s=second
ETSRD=yy-mm-dd	Set reference date	y=year, m=month, d=day
ETCSC	Clear Software and Hardware Reset, Socket and Receive/Transmit Counters	
ETSEND=AT…	Sends one AT command to the module	

ETSC1	Change to AT-command mode	
ETSPW=xxxxxxx	Set a password for the configuration tool	Use up to 7 characters.
ETPW=xxxxxxx	Enter the password	The unit will be ready for configuration. It is locked again after 10 minutes, and at reset.

I/O commands

COMMAND	ACTION	RESPONSE/NOTES
ETRIS	Show status/value of each I/O	1:DI,1 = I/O 1 digital input 2:DI,1 = I/O 1 digital input 3:DO,1 = I/O 3 digital output, level 1 (high, see below) etc.
ETRAIX	Read A/D input	X is AI No, ETRAI3 reads analogue input 3. If configured for scaled values, this will return scaled value otherwise raw voltage input
ETRAIA	Read all analogue inputs	
ETS(X:AI)	Set I/O pin No X to analogue input	Several pins can be combined, i.e. ETS(3:AI,4:DI) etc.
ETS(X:DI)	Set I/O pin No X to digital input	
ETS(X:DO=0)	Set I/O pin No X to digital output, set pin level (0=low, 1=high)	Low DO status is <0.5V 0.1mA, High DO Status is >2.5V 0.1mA. External Circuitry capable of detecting these signals is required to switch external devices ON/OFF.
ETS(X:DO=0)TAY	Set I/O pin No X to digital output, set pin level for a specified time period.	Time specified as Y seconds, after this the level reverts to the other option (low/high).
ETSAC= n,p1,p2,timeout,unit	Set A/D calibrating parameters	n = A/D channel number p1 = 1st input point p2 = 2nd input point timeout in seconds, default 10 s unit = mV, V, M, dgC, mA, A etc., default mV

SMS commands

COMMAND	ACTION	RESPONSE/NOTES
ET-SSP=PhNo1, PhNo2,…,PhNo5	Set SMS Alarm Phone Numbers	All numbers must be entered, if less than 5 numbers enter ,'s with no spaces between until all 5 slots are completed e.g. ET-SSP=XXXXXXXXXX,,,, Note: you cannot add/or remove phone numbers to the unit in this manner as the unit will not necessarily have the correct corresponding entry in the individual I/O settings. Only use to change existing phone list, so if three number in an already existing list then replace with 3 numbers
ET-SL=10	Set SMS sending limit	

Pulse input commands

COMMAND	ACTION	RESPONSE/NOTES
ETSPI=0,0	Set pulse values to 0 and reset all logged channels.	
ET&P	Show pulse status	

Internet commands

COMMAND	ACTION	RESPONSE/NOTES
ET-IC	Connect to an ISP	
ET-IP1=ip:port	Set Internet Service Parameters	ip = remote server IP-address port = remote port 1 for IP-address 1, 2 for IP-address 2 etc.
ET-IDC	Disconnect to Internet and the Socket server	
ET-ILP=port	Local port No	
ET-ISC	Close a Socket	
ET-ITP	Internet Transparent mode	

ET-IS?	Get the current Socket status	
ET-ISO or **ET-ISO=IP1**	Perform an ActiveOpen and establish a Socket	Connect to an ISP if not connected.
ET-I&IP	Get network connection status profile	
ET-IAPN1	Set APN	
ET-I&LIP	Get local IP address	

Other commands

COMMAND	ACTION	RESPONSE/NOTES
ETSWT=n,hh:mm,p	Set wakeup timer for each task	N=task number (max 5), hh = wakeup hour, mm = wakeup minute, p = periodicity (min)
ETSWT?	Show wakeup timers and tasks	
ETSUI=xxx	Set User ID	Max 40 characters
ETSC1	Set communication direction	0 = shutdown com device (low power mode) 1 = open communication Modem<->PC
ETLPP	Low power mode period time	ETLPP=0,0 – Low power mode is off ETLPP=1,10 Wake up on the SWT 5 timer and stay awake min 10 min
ET&V	Show active profile	
ET&W	Save active profile	
ET&BSL	Enter into Boot Strap Loader	
ET&MB	Jump from main program to boot program	
ETE0	Echo On/Off	0=Off, 1=On
ETP0	Print Info Response	0=Off, 1=On
ETPR0	Print Result	0=Off, 1=On
ETPM0	Print Message	0=Off, 1=On
ETRSL	Run Check signal level 255 times or until "ESC" key is pressed	

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