ComTroll® 333 RTU

Remote Terminal Unit with GSM Communication

User Manual

ComTroll®

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FIND FAULTS FAST

This document describes the Installation- and setup procedure for CᴏᴍTRᴏʟʟ 333 Remote Terminal Unit with GSM Communication.

Contents

1. Introduction

ComTroll® 333 Remote Terminal Unit (RTU) is designed for remote control and monitoring of overhead line– and cable switchgear in the MV distribution network.
The unit it is also suitable as a general communication interface to other applications for fault-detection and management such as earth-fault and short-circuit indicators and line protection equipment.
ComTroll 333 communicates with the SCADA system through the ComTroll 120 GSM LON Router using GSM Data (CSD) or SMS.
NorTroll offers a complete SCADA solution with NetTroll MicroSCADA Plug-in module for configuration, control, monitoring and automation of the ComTroll 333 Terminals.

System overview
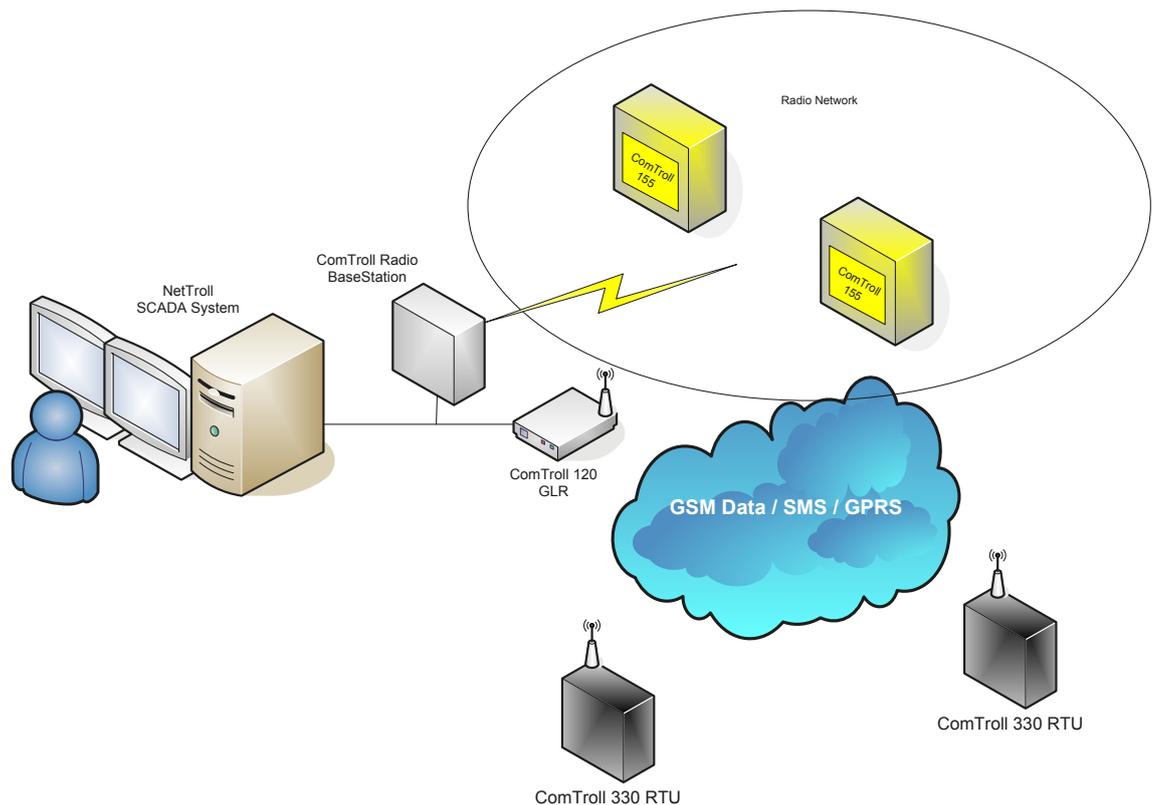
Figure 1; ComTroll System overview.

Control and monitoring

ComTroll 333 RTU must be programmed with a receiver number before it can dial up or send any SMS messages. This is done during configuration and set-up.
Only one receiver number can be programmed into the device. This number is usually the ComTrol 120 GLR telephone number.
ComTroll 120 GLR interfaces all GSM RTU devices in the network to the NetTroll microSCADA system.

A status request can be sent to the ComTroll 333 RTU from a different number than the primary receiver number (central unit) e.g. from a cell-phone providing a correct password. In this case, the status will be sent back to the sender of the status request as well as the primary receiver number.

By default, commands such as OPEN and CLOSE can only be executed on a GSM Data (CSD) connection from NetTroll MicroSCADA. It is however possible to execute these commands using SMS, but this feature must be activated in the configuration properties first and incorporates a select-before-execute algorithm.

Commands (e.g. OPEN/CLOSE Switch) can only be done from the same number programmed as the receiver number in the RTU. Any attempt to control from any other numbers will be discarded even if the password is correct.

The ComTroll 333 RTU will periodically send its analog and digital status in a configurable time interval. This mechanism is also called Heartbeat. If the heartbeat messages are not received by the NetTroll microSCADA, an alarm will be raised to indicate a faulty device or a bad communication link.
Any status change on the connected device (digital status) will be reported back to the central unit without any polling/status request sent from the central. (Report-by-exception). Analog status will be sent upon request from the central (or cell-phone providing a correct password) or periodically (heartbeat).
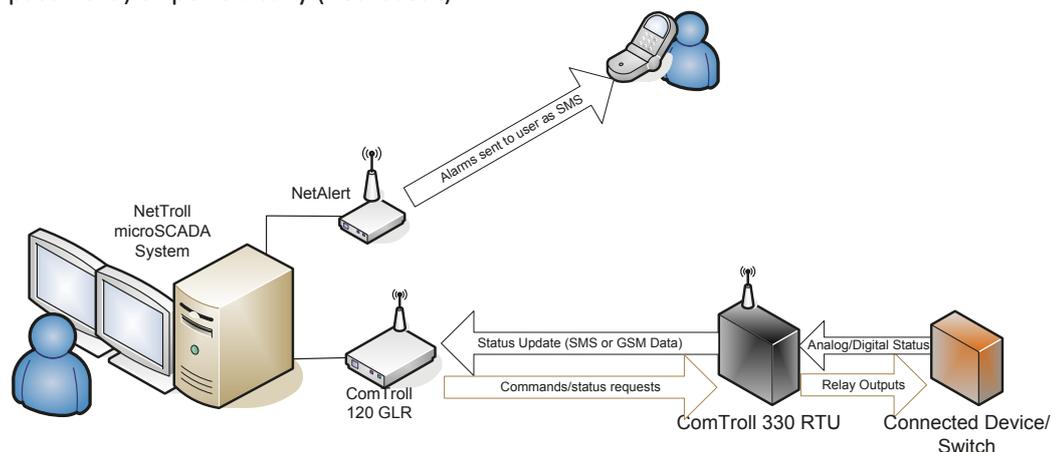
2. Hardware description

Local controls and indications

The following controls and indications are available on the ComTroll 333 front panel.
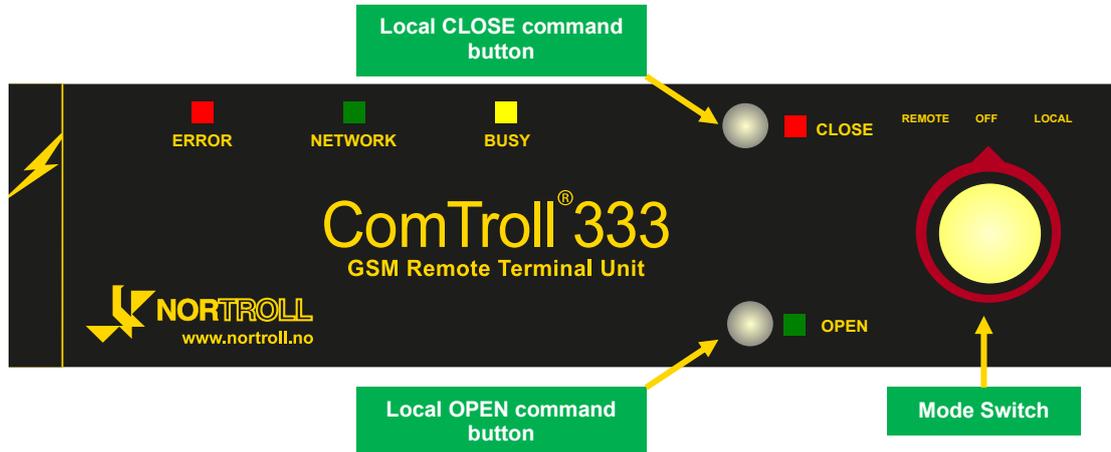
Figure 2; ComTroll 333 RTU front view.

LED Indications

Error	Network	Busy	Close	Open	
ON	Flash Green	X	X	X	The SIM card is missing or PIN is activated
ON	Flash Red	X	X	X	No connection between CPU and GSM Module
OFF	Flash Green	X	X	X	Good GSM signal
OFF	Flash Red/Gr.	X	X	X	Medium GSM signal
OFF	Flash Red	X	X	X	Bad or no GSM signal
X	X	ON	X	X	sending / receiving GSM Data or SMS
X	X	X	ON	OFF	Switch position is CLOSED
X	X	X	OFF	ON	Switch position is OPEN
X	ON	X	X	X	Mode selector is in Local position
X	X	X	Disable	Disable	Mode selector is in Remote position

The OPEN and CLOSE indications are disabled when the Mode selector switch is in the REMOTE position in order to minimize the current consumption.

Mode Selector

REMOTE: Local commands and indications are deactivated. Commands are only executed when sent from the central unit.

OFF: Internal relays are disabled. No commands, either remote- or local are executed.

LOCAL   Local command buttons and LED indications are activated. Commands are only executed when using the command buttons. Remote operation is deactivated.

Communication is not affected by the position of the Mode Switch. It will therefore be possible to send status requests and new configuration settings even if the Mode Switch is in the OFF or Local position. Any change on the digital and analog status will also be sent back to the central in OFF or Local position.

The Mode Switch must be in one of the three positions for more than 2 seconds before an SMS is sent with the new position. E.g. if the Mode Switch is switched from REMOTE to LOCAL, and the switch is in the OFF position less than 2 seconds, only the LOCAL position message are sent.

Local Command buttons

The command buttons 'Open' and 'Close' are activated only when Mode Switch is in the LOCAL mode. The buttons must be pressed more than 1 sec to execute the OPEN or CLOSE command. The new status will be reported back to the central unit either as a SMS or CSD connection dependent upon the configuration setting.

Hardware Setup

Preparing the SIM Card

The PIN code must be deactivated before inserting it in the SIM card socket. Insert it into a cell-phone and follow the procedure explained in the cell-phone manual.
If the PIN code is activated when powering the ComTroll 333 RTU, the red ERROR LED will be ON and the green NETWORK LED will flash. Normally, SIM cards can be provided without PIN codes from the network operator.

Selecting the correct type of SIM card/subscription

We strongly recommend disabling voice feature on the SIM cards. Also, pre-paid SIM cards should not be used for this application.

The SIM cards must be supporting CSD communication (GSM Data, 9600bps) and SMS. As the telephone numbers are used as identification of the devices in the network, the Caller ID (CLIP) service must be activated.

Inserting the SIM Card

Picuture 1; Mounting SIM-card and antenna.

The SIM card is inserted as shown in the picture above. **Do not insert the SIM card when the 12Vdc power is connected.**

Connecting the antenna:

The type of external antenna will vary upon the application and the mounting site. External antenna must be ordered separately. The ComTroll 333 RTU comes with a short interface cable that is fitted directly into the connector on the telephone module as shown in Picture 1.

ComTroll 333 RTU Inputs and Outputs:

5
1: Relay 4a
2: Relay 4b
3: Relay 3a
4: Relay 3b
5: CLOSE a
6: CLOSE b
7: OPEN a
8: OPEN b

6
RS-485 port

7
1: +12Vdc Input
2: GND

ERROR   NETWORK   BUSY

ComTroll® 333
GSM Remote Terminal Unit

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www.nortroll.no

CLOSE   REMOTE   OFF   LOCAL
OPEN

Ai_1 Ai_2 Ai_3 Ai_4

1
4xAnalog inputs
Settings:
ON: 4 – 20mA
OFF: 0 – 10V

2
1: Low Battery Input
2: Analog Input 4
3: Analog Input 3
4: Analog Input 2
5: Analog Input 1
6: GND

3
1: Digital Input 1
2: Digital Input 2
3: Digital Input 3
4: Digital Input 4
5: Digital Input 5
6: Digital Input 6
7: OPEN
8: CLOSED
9: Input Common

4
1: Relay 5a
2: Relay 5b
3: Relay 6a
4: Relay 6b
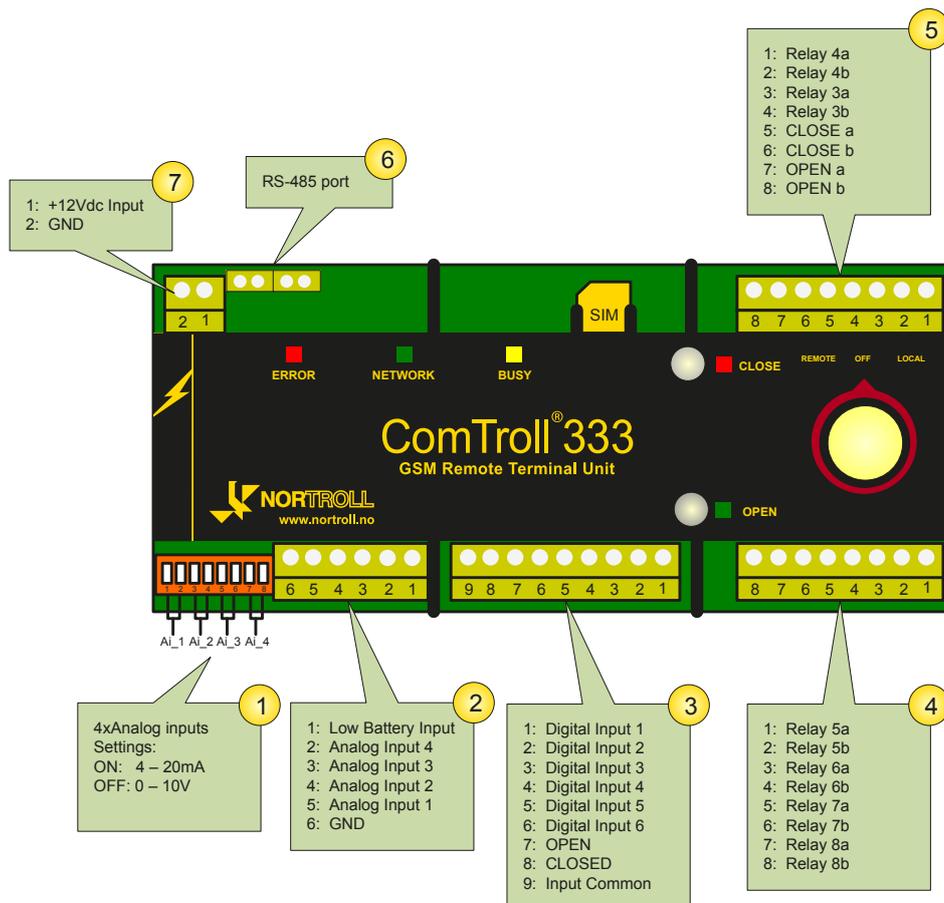5: Relay 7a
6: Relay 7b
7: Relay 8a
8: Relay 8b

Figure 3; Connectors and DIP Switches on ComTroll 333 RTU

1:      The ComTroll 333 provides 4 analog inputs. The four unipolar analog inputs offer 10 bit resolution, and may be individually programmed according to the incoming signal. It can be set to 0 – 10V (see note below for analog input 4) or 4 – 20mA. The inputs are read when the user executes a status request or when the ComTroll 333 sends any other message, e.g heartbeat.

Important notice
When the analog input 4 is set to read voltage, the range will be 0 -14,6V. This means the battery voltage can be directly connected to this input to monitor the battery voltage from the central unit. When the analog input 4 is set to current reading, the range is 4-20mA. This means if analog input shall be used for other measurements than battery voltage, 4-20mA setting must be used.

2:      The Low Battery Input is a digital input that activates a warning message when the input is shorted to GND. Please note that an external voltage relay must be used as this is a digital input. This can also be used to monitor charging failure by connecting a voltage relay with a signal contact to this input. The Low Battery warning is always sent as an SMS to the central unit. To avoid warnings upon short voltage drops, the SMS is delayed 60 sec.
If the normal battery voltage is restored within 60 seconds (or external charging is restored) no message will be sent.

Figure 4; Low Battery Input

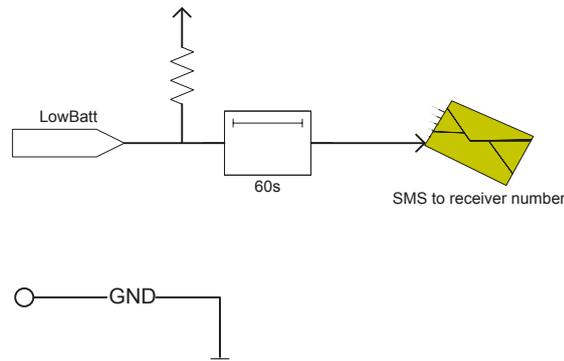3:   All of the 8 bipolar digital inputs are opto isolated and have the same physical layout. However, the CLOSED and OPEN inputs have been assigned special functions in the software, to make the unit suitable as a MV switchgear Terminal.
The user can define in the CONFIG command whether changes on the inputs are sent as SMS or GSM Data, as well as sending updates on one or both transitions.
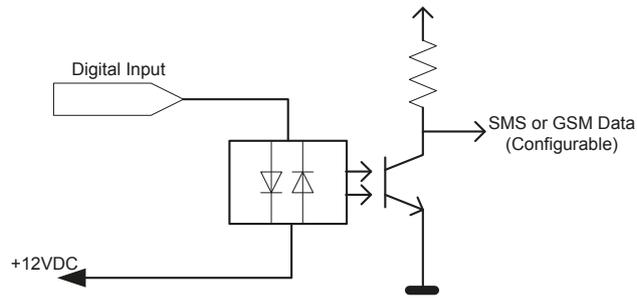
Figure 5; Digital input circuitry

All inputs are *Active Low*, meaning the inputs are activated when shorting between the digital input and ground.

4 & 5: The normally open Relay 1 (OPEN) and Relay 2 (CLOSE) are dedicated to operation of actuator relays. Relay 3 to 8 are general purpose normally open relays. The closing time can be set by the configuration command. Maximum switching voltage/current: 200V/1A (AC and DC)

6: The serial port with RS 485 interface can be used to connect external secondary equipment on the MODBUS protocol. Please note that not all versions of the ComTroll 333 RTU have this feature implemented in software. Please contact NORTROLL AS for details.

7: 12Vdc supply for the powering the ComTroll 333 RTU. (MAX 15Vdc)

3. Functional Description

Configuration

There are several parameters that need to be set before the ComTroll 333 RTU can be put into operation.

- ✓ Set the receiver phone number.
- ✓ Set operation mode
- ✓ Set the heartbeat interval
- ✓ Change the default password
- ✓ Set relay timeout
- ✓ Define the ITU standard
- ✓ Activate two or four analog inputs.

Please keep in mind that changing the heartbeat interval to a short interval will increase the operation costs due to the increasing number of SMS.

The configuration commands can be sent from any device that is capable of sending SMS providing the password is correct. It is also possible to configure the ComTroll 333 on a GSM Data connection using e.g. HyperTerminal in Windows. The communication settings should be as follows:
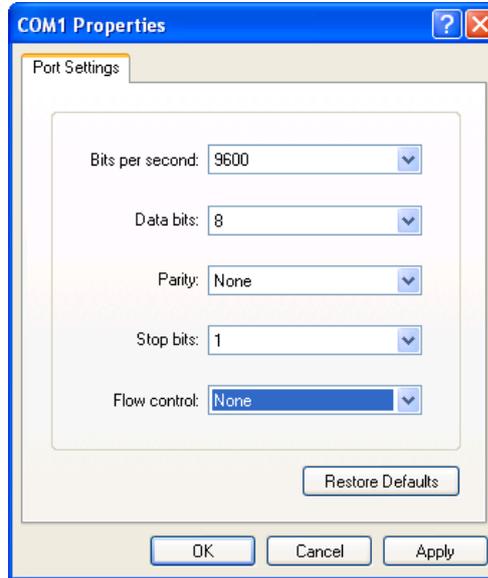
When using the NetTroll MicroSCADA system, the configuration can be executed from the Network View. Please refer to the *Installation in NetTroll* chapter.

Set the receiver phone number.

Command	Set receiver phone number
Description	Defines which phone number the device will use when sending alarms and messages. The phone number can be maximum 14 characters long. An error will be returned if the ComTroll 333 RTU is unable to extract a valid number from the command. T is a number from 1 to 9 that is added to the command to identify the response from the device. The response will return the same T as sent in the command.
Format	Password 0 phonenumber T
Normal response	3 0 0 1 T
Error response	3 0 0 0 T

Configuration settings

Char A: The digital inputs 1 to 6 can issue an alarm or message on both activation and deactivation of the input (0 → 1 and 1 → 0).
When there is a short pulse that activates the input, the deactivation message must be switched off, sending on 0 → 1 transitions only.
Default is 0 → 1.

Char B: Messages issued by the digital inputs 1 to 6 can be sent as either SMS or by GSM Data.
Default is GSM Data.

Char C: Normally, commands sent to the ComTroll 333 should only be allowed when a GSM Data connection is established. In some cases it could be necessary to allow for commands send by SMS.
Default is Dial–up.

Char D: By default, ComTroll 333 RTU is set up to send two analog values. Setting Char D to '1', it configures the unit to read and send four analog values upon a status request. Presentation of four analog values from one ComTroll 333 RTU is only available in NetTroll versions 4.1 and newer.

Command	Configuration settings
Description	Sets configurable 5 character flag in ComTroll 333. CharA: 0 = Send alarms when input 1 – 6 changes from 0→ 1. CharA: 1 = Send alarms when input 1 – 6 changes from 0→ 1 and from 1→ 0. CharB: Send messages on SMS. 1 = SMS, 0 = DialUp CharC: Allow SMS Control: 0= Disable, 1 = Enable CharD: Send two or four analog values. 0=2; 1=4. CharE: Future Options NOTE! All 5 characters must be sent.
Format	Password 1 EDCBA T
Normal response	3 1 EDCBA 1 T
Error response	3 1 0 0 T

Recommendations for configuration settings:

The default configuration setting is EDCBA = 00000.

In most cases, a message on bot activation and deactivation of the digital inputs is desirable. Therefore CharA is changed to 1 in most installations.
Sending SMS on changes on digital input 1 to 6 will in most cases take shorter time than setting up a CSD connection. Therefore we recommend setting CharB to 1.
Normally, SMS control of the OPEN/CLOSE command is not wanted. We recommend switching this feature off. For NetTroll ver 3.6 or older, CharD must be set to send two analog values. Version 4.0 or newer accepts four analog values. CharE can be set to anything.

Recommended setting for NetTroll 4.0 or newer: EDCBA = 01011.
For older versions: EDCBA = 00011.

Set the heartbeat interval

ComTroll 333 RTU will send a heartbeat message to the central unit in intervals which can be set by the user. The heartbeat message can be switched off by setting the time to 0000 hours.

Default time interval is 72h. Please keep in mind that setting low values for the heartbeat interval will increase the operation costs.

Command	Set HeartBeat Intervall
Description	Set the heartbeat interval in the range of 0000 and 9999 hours. Send always 4 characters in TIME variable. 0000 means heartbeat is switched OFF. Default value is 0072 hours.
Format	Password 2 TIME T
Normal response	3 2 TIME 1 T
Error response	3 2 0 0 T

Change the default password

Default password is 1234.

Command	Set new password
Description	ComTroll 333 RTU will set the new password. The new password will be made effective immediately. An error will be returned if the CmT333 RTU is unable to extract a valid password. The password must be exactly 4 characters long and include both numbers and letters. (Case sensitive).
Format	Password 8 NewPassword T
Normal response	3 8 **** 1 T
Error response	3 8 0 0 T

For setting the password back to its default value, contact your local distributor or NORTROLLL AS

Set timer values

Both the timeout value for the relays for OPEN/CLOSE and relay 3 to 8 are configurable.
Default timeout for OPEN / CLOSE relays: 30 sec. (30000 ms)
Default timeout for relay 3 – 8: 1 sec. (01000 ms)

Command	Set timer values
Description	Set the timeout value in for the OPEN and CLOSE relay and relay 3 – 8 set in milliseconds. **K = 1** ; Set relay timeout for OPEN/CLOSE relays**.** **K = 2** ; Set relay timeout for relay 3 – 8. XXXXX = Time in milliseconds (E.g. 00500 = 500ms) Please note that 5 characters must always be entered. **K = 3**; SOT timer. Should not be changed without support from Nortroll. Set with 5 char in millisec, where only the seconds are used. (e.g. 07345 = 7 sec) **K = 4**; SELECT Timer. Set with 1- 3 characters in seconds in the range of 5 – 180 sec. Default = 35 sec.
Format	Password 4 K XXXXX T
Normal response	3 4 K xxxxx 1 T
Error response	3 4 K xxxxx 0 T

Deactivate individual Inputs

It is possible to deactivate individual digital inputs. If the corresponding flag is set, the input will not respond to status changes on the input and therefore not send any alarms to the receiver. This command is implemented in case the connected equipment fails, and the unit starts to send messages continuously.

Command	Deactivate individual Inputs
Description	Sets configurable 8 character flag in ComTroll 333 RTU. Each character corresponds with one of the eight digital inputs: Char H: Closed Char G: Open Char F: Digital input 6 Char E: Digital Input 5 Char D: Digital Input 4 Char C: Digital Input 3 Char B: Digital Input 2 Char A: Digital Input 1 All 8 characters must always be sent. Char x = 0 --> Input sends alarm upon status change Char x = 1 --> Input will not send alarms upon status change. DEFAULT VALUE: 00000000 [HGFEDCBA]
Format	Password 7 HGFEDCBA T
Normal response	3 1 HGFEDCBA 1 T
Error response	3 1 0 0 T

ITU standard

Different network providers uses different ITU standards in the in the interface between the communication module and the network. ComTroll 333 RTU can be set to use V.32 and V.110.
Default setting: V.32

Please refer to the local network provider for details.

Command	Select CSD Line Type (ITU standard)
Description	Sets the CSD Line Type used by the communication module in ComTroll 333 RTU. X= 0 → V.32 X= 1 → V.110
Format	Password 9 1 X T
Normal response	3 9 1 X T
Error response	N/A

Commands and status messages

There are two commands available in ComTroll 333 RTU.

- ✓ Request for status
- ✓ Set one of 8 relay outputs.

The status request can be sent both as SMS and on a dial-up GSM data connection. A command such as OPEN/CLOSE is normally executed through a GSM Data connection. It is however possible to use SMS to execute OPEN/CLESE commands but certain settings must be done first. (RTU software ver4.0 or later only). All additional relays are possible to command directly by SMS or GSM Data.

Request status.

Command	Request Status.
Description	Request status on digital inputs, internal mode status and the analog inputs.
Format	Password 5 T
Normal response (Two analog inputs)	A Status1 Status2 Analog1 Analog2 T
Normal response (Four analog inputs)	A Status1 Status2 Analog1 Analog2 Analog3 Analog4 T
Error response	N/A

Commanding a new switch position and the auxiliary relays.

Command	COMMAND Switch and Relays
Description	Commands the actuator relays and the auxiliary relays. The command is a number from 1 to 9 as follows: 1: OPEN command 2: CLOSE command 3: Set Relay 3 4: Set Relay 4 5: Set Relay 5 6: Set Relay 6 7: Set Relay 7 8: Set Relay 8 9: SELECT (see chapter 'Sending commands by SMS')
Format	PASS 6 Command T
Normal response	A Status1 Status2 Analog1 Analog2 T (New Status)
Error response	A Status1 Status2 Analog1 Analog2 T (Old Status)

Request configuration command

It can sometimes be useful to check how a ComTroll 333 RTU is set up. A special command *NORT* is implemented which can be sent from any cell phone even without knowing the password. (The command cannot be sent from NetTroll)
Type 'NORT' in a SMS and send it to the device. Please note that capital letters is required.

The ComTroll 333 RTU will return the following information:

PW:1234	The current password set in the device
PV:0301	Program version
HW: CmT333RTU	Hardware version/type
MD:V32	The configured ITU standard
CNF:11011	The configuration setting stored in the device
TLF:99403721	The programmed receiver telephone number
HB:24h	The heartbeat interval
T1:30000ms	Relay time-out for OPEN/CLOSE relays
T2:1000ms	Relay time-out for relay 3 to 8.
T3:10s	SOT-timer
T4:35s	Select timer
RSSI:xxxdBm	Signal level in dBm

Resetting the password back to default

If the password for the device is changed and it is necessary to change it back to its default value (1234) send the following command to the device:
'NORTXX'
The password will be set back to '1234'. The command must be sent from a cell-phone and cannot be sent from NetTroll.

Status Message Definition

The format of the GSM Data message and the SMS content follow the same definition.
When the ComTroll 333 RTU is monitored from NetTroll microSCADA the messages are converted into messages defined by the user.
In cases where the ComTroll 333 RTU is controlled by a cell-phone or another GSM device it is necessary to know the message format definition.

A status1 status2 analog1 analog2

Or with four analog inputs:

A status1 status2 analog1 analog2 analog3 analog4

'A' is a Message Identifier and will always be added to a message from the RTU.

'Status1' is a decimal value representing the open and close indication together with the ModeSwitch Status. The bit used as a SELECT confirmation is also located in Status1.

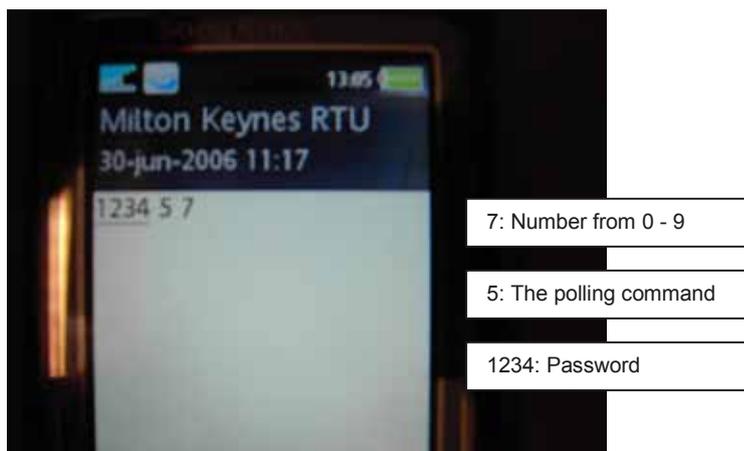'Status2' represents Digital Input 1 – 6 plus Low Battery and RTU Restart messages.

'Analog1' and 'Analog2' is the 10 bit raw decimal value. The conversion of the analog values is done in NetTroll. When all four analog inputs are activated the string follows the same structure as shown above. (Raw value = 0 to 1024).
Status 1 and Status2 is a decimal number based on the following table:

BitNo	ComTroll 333	
Bit 0	Switch is Closed	Status 1
Bit 1	Switch is OPEN	
Bit 2	Remote	
Bit 3	Local	
Bit 4	Not used [0]	
Bit 5	Not used [0]	
Bit 6	Not used [0]	
Bit 7	SELECTED	
Bit 8	Di_1	Status 2
Bit 9	Di_2	
Bit 10	Di_3	
Bit 11	Di_4	
Bit 12	Di_5	
Bit 13	Di_6	
Bit 14	Low Battery	
Bit 15	RTU Restarted	

Table 1; Status1 and Status2

Example; Sending status request message from a cellphone.

Milton Keynes RTU
30-jun-2006 11:17

1234 5 7

7: Number from 0 - 9

5: The polling command

1234: Password

Example; Receiving a message from the ComTroll 333
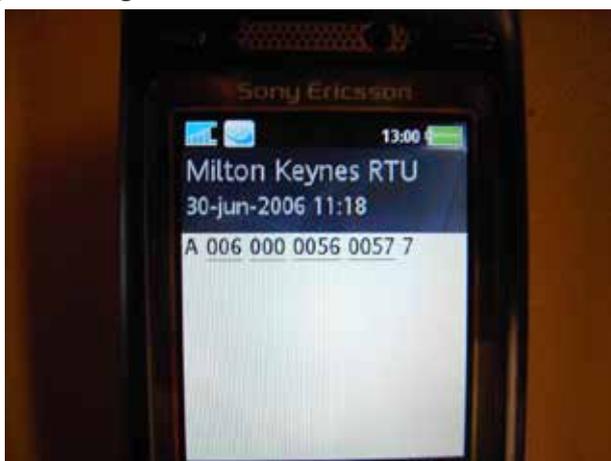
See table 1:
Status 1= 006 → 00000110

        Bit1 and bit2 is '1', gives Switch is Open and in Remote Mode.

Status 2 = 000 → 00000000

        All digital Inputs are deactivated.

Analog 1:   Raw value 0056 dec. [0 – 1023]

Analog 2:   Raw value 0057 dec. [0 – 1023]

T: The number '7' is the transaction number and derived from the polling command.

Sending commands by SMS

In ComTroll 333 RTU software version 4.0 or later, it is possible to safely operate a switch object with SMS. In versions prior to version 4.0 it is not recommended to execute any critical operations such as OPEN/CLOSE by SMS. This software version requires NetTroll 4.1 or later.

Please note that commands will only be executed if the telephone number from where the command is sent is programmed as the receiver number in the RTU.

Before a command (OPEN or CLOSE) is sent to the RTU, a Select-SMS must be sent first (see the list of commands in the commands and indications chapter).
When the RTU receive the Select-SMS, the Select-timer (configurable in the range of 5 – 180s) starts. The RTU sends its complete status message back, with the SELECT bit SET. (Bit 7 in Status1).
If the RTU receives the command OPEN/CLOSE before the select timer expires, the command is executed.

Commands for relay 3 to 8 can be executed without Select-SMS.

Installation in NetTroll

The ComTroll 333 RTU can be installed in NetTroll version 3.6.7 or later. By default the GSM feature is disabled. To activate NetTroll for installation of GSM devices, select *View | Options* from the main menu. In the *General* tab, the item 'Disable GSM' must be de-selected.
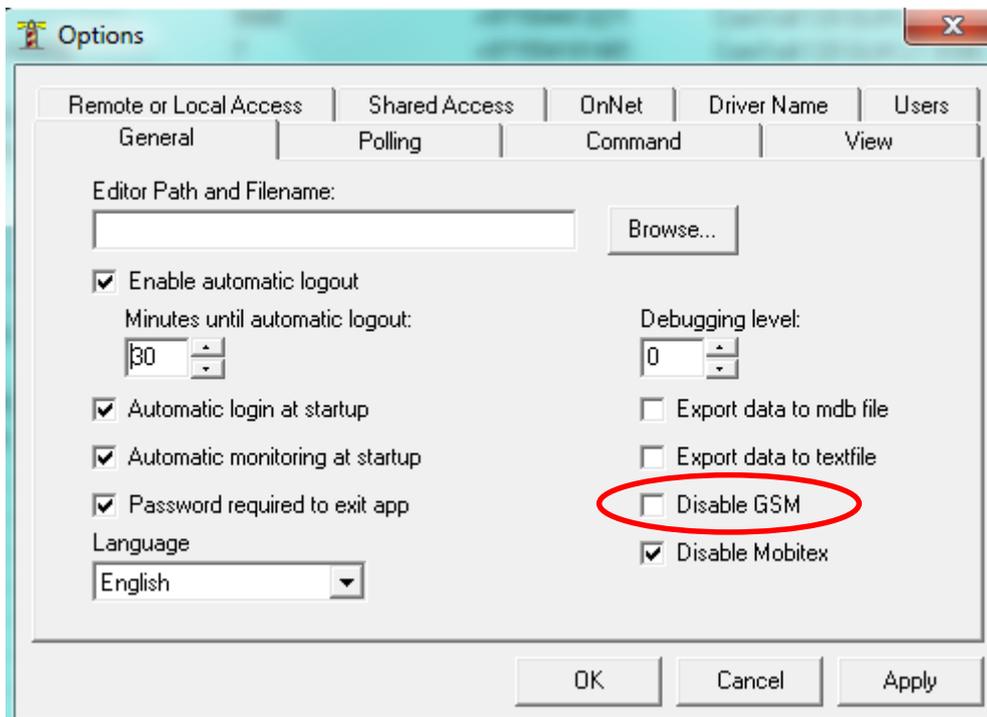

A GSM LON Router is required to convert alarm and control signals from NetTroll to GSM and vice versa.

The GSM LON Router.

The ComTroll 120 GLR must be installed before any GSM Devices can be added into NetTroll Database. This unit is installed in the same way as other devices using the LonWorks technology, e.g. ComTroll 155 RTU with radio communication.
Detailed information about the ComTroll 120 GLR can be found in separate documentation.

All ComTroll GSM field devices are installed in the same Subsystem, called "GSM Devices". The procedure for creating new networks and subsystems in NetTroll can be found in the NetTroll User Manual.
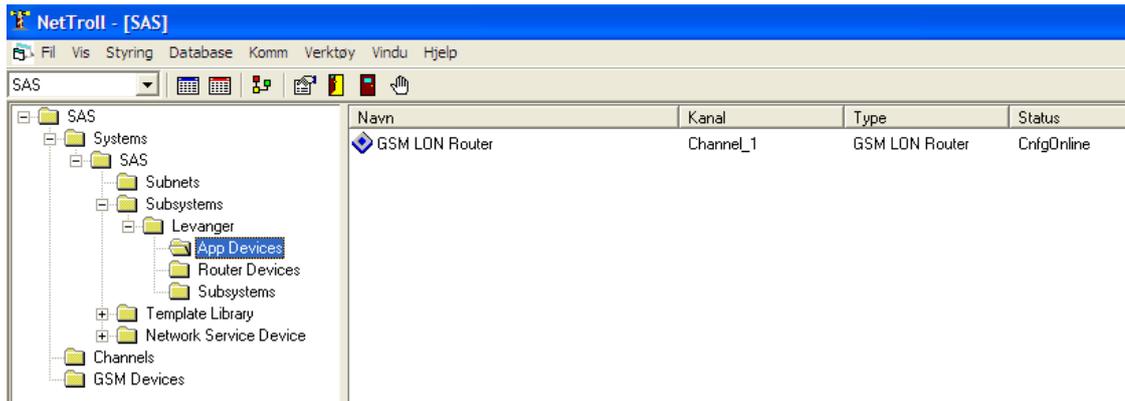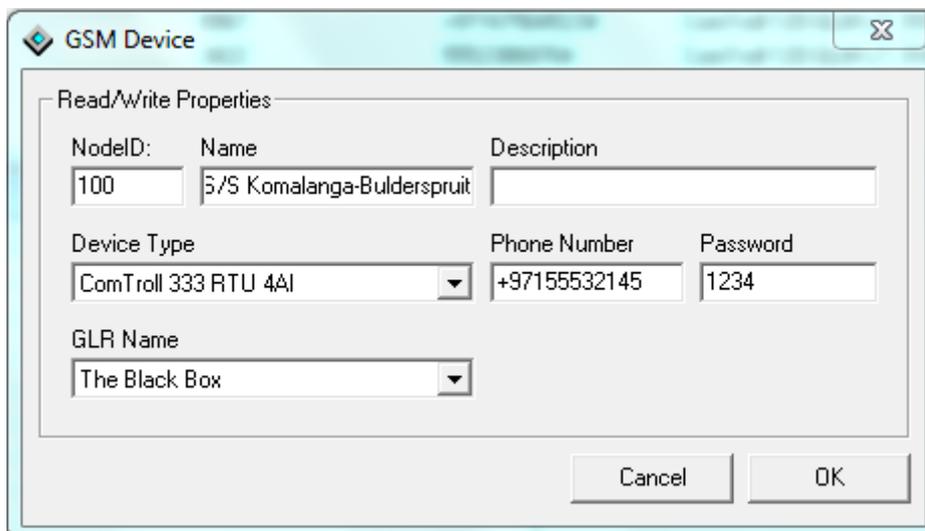
Creating an image of ComTroll 333 RTU in the database

Right-click the GSM Devices folder and the following menu appears:
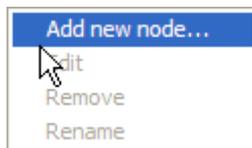
Select *Add new node*.

NodeID is number between 1 and 9999. Install the first RTU with NodeID= 1, the next NodeID=2 and so on.

The information typed in the window above, will be stored in the NetTroll Database. Upon installation of a new device, the default password '1234' must always be used.

Select the Device Type you have created for this device. The default Device Type is 'ComTroll 333 RTU 4Ai'. (4Ai = four analog inputs).

See the NetTroll manual for details about creating device types.

Select the name of the ComTroll 120 GLR device you want the ComTroll 333 RTU to be bound to. In large systems (more than 300 units) it may be better to install several GLR devices in parallel to increase response time.

The receiver phone number should always be entered using the country-code.
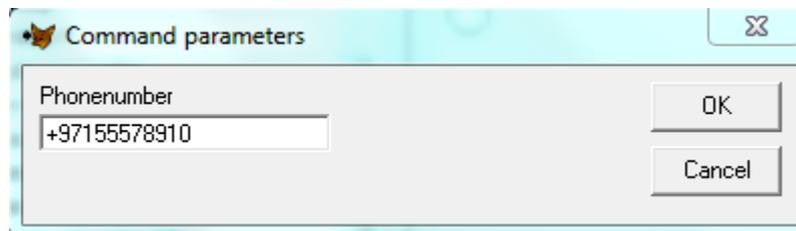
No information is sent to the ComTroll 333 RTU device from this window. The device will appear as a new device in the network view the selected name as identifier.

Setting the Device Properties.

Select the device name you are about to configure.
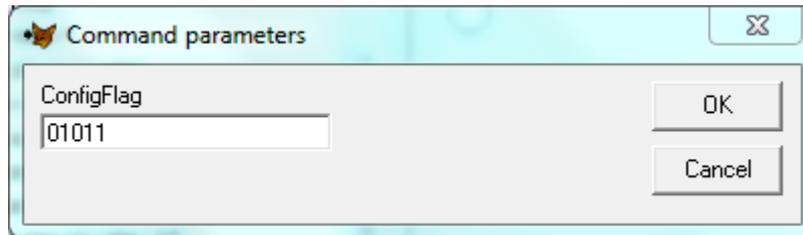Enter the *Advanced* Tab.
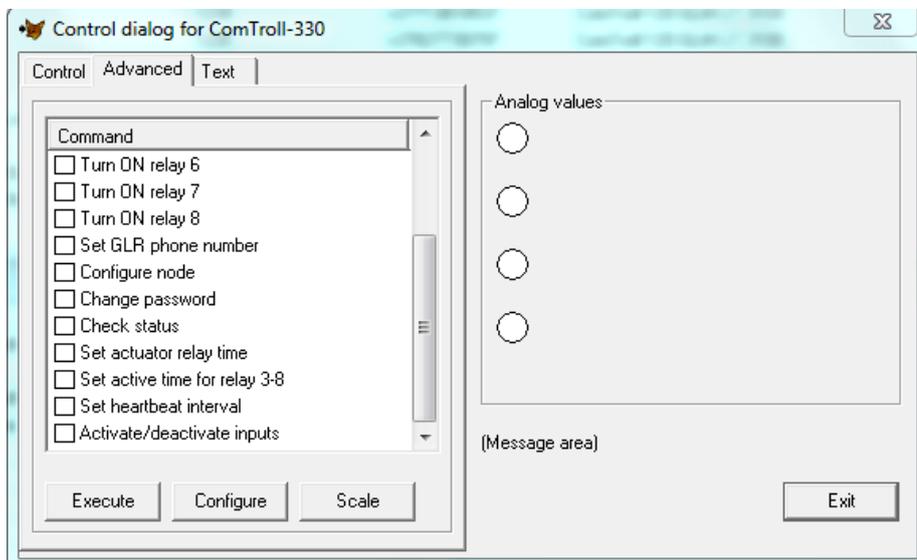
1:    **Set GLR Phone Number:**

Type the telephone number for the ComTroll 120 GLR device. Always use the country-code.

2:   Configure node:

Note! All 5 characters must be typed. See also chapter 3 for details

The meaning of each character as follows:

| E	D	C	B	A	Meaning
x	x	x	X	0	Sends alarms on changes from Non-active to Active Di_1 to Di_6
X	X	X	X	1	Sends alarms both on changes from Non-active to Active and from Active to Non-active Di_1 to Di_6
X	X	X	0	X	Dial up alarms when Di_1 to Di_6 changes
X	X	X	1	X	SMS alarms when Di_1 to Di_6 changes
X	X	0	X	X	Disable SMS Control of switchgear status
X	X	1	X	X	Enable SMS Control of switchgear status
X	0	X	X	X	Use 2 analog inputs
X	1	X	X	X	Use 4 analog inputs

3:   Set Actuator relay timeout:

Different types of actuators and switches require different relay timeout. Please set a value appropriate for the switchgear to which your ComTroll 333 RTU is connected. The time can be set in milliseconds in the range from 200 ms to 64000 ms.
5 numbers must be typed, as in the example below, where relay timeout is set to 500ms.
Default value is 30000ms.
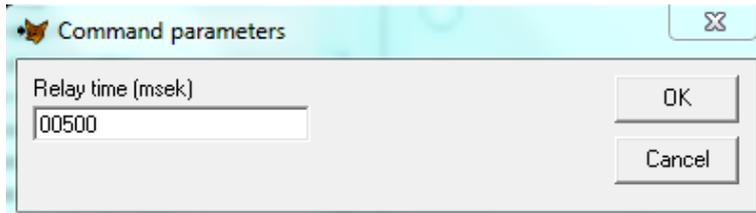
4: **Set active relay time for relay 3 to 8.**

The time can be set in milliseconds in the range from 200 ms to 64000 ms.
5 numbers must be typed, as in the example below, where relay timeout on relay 3 to 8 is set to 2000ms.
Default value is 1000ms.
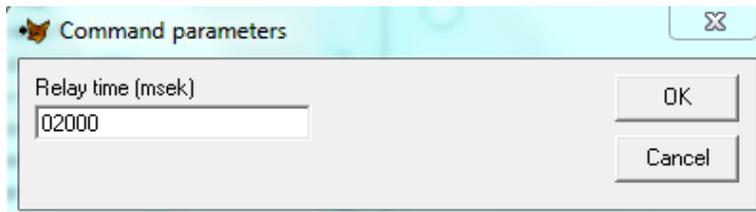

5: **Set Heartbeat Interval**

Each ComTroll 333 RTU will send a heartbeat message within a specified time interval. If NetTroll is missing two consecutive heartbeats, an alarm will be raised. The heartbeat can be switched OFF by setting 0000 hours. 4 characters must always be sent.
The example below gives a heartbeat message every 6th 24-hour period.
Default heartbeat is 72hours.
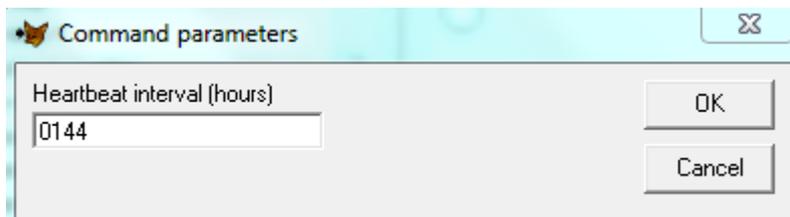

5: **Change password:**

The default password should be changed to a user defined password before installing it in a live system. The password must be exactly 4 characters long. Both numbers and letters (case sensitive) can be used.
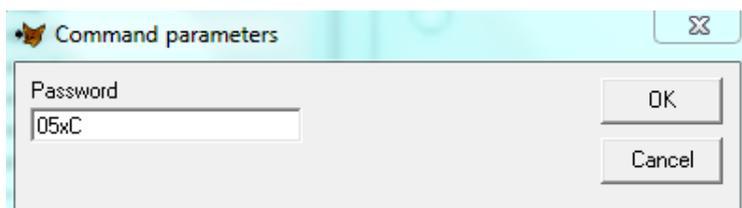
Setting the analog input properties in NetTroll.

All four analog inputs can be set up to accommodate 0-10V or 4-20mA individually. See figure 3 for DIP switch settings.
All inputs have a 10-bits resolution. The raw value can be in the range between 0 and 1023. These settings are done selecting the SCALE-button:
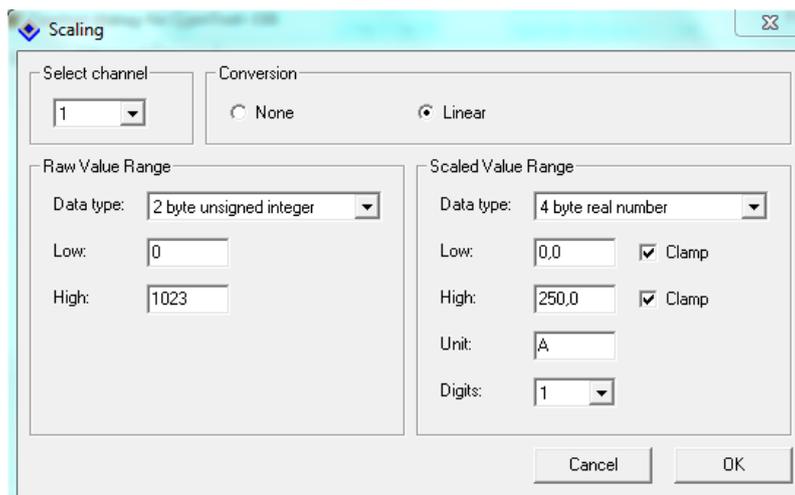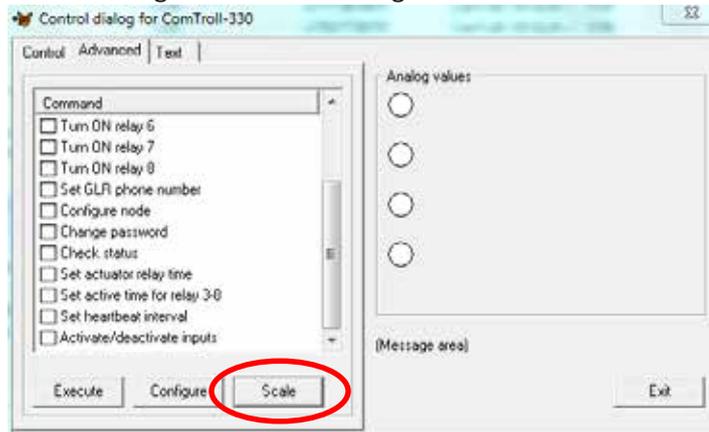
|	
Select Channel:	Select which analog Input (1 – 4) the settings will be done for. In the above example it is Analog Input 1.
Conversion:	Use always Linear.
Raw Value Range:	Use always 2 byte unsigned integer, Low value = 0 and high value = 1023.
Scaled Value Range:	Data type should always be 4 byte real number.
	Low = the displayed value when the raw value received from the RTU is 0.
	High = the displayed value when the raw value received from the RTU is 1023. Clamp should always be selected.
	Unit = the measured value unit.
	Digits = number of decimals

If analog input 4 is set to measure voltage, it is by default set to measure battery voltage between 0V and 14,6V.

The settings in NetTroll should be as follows:
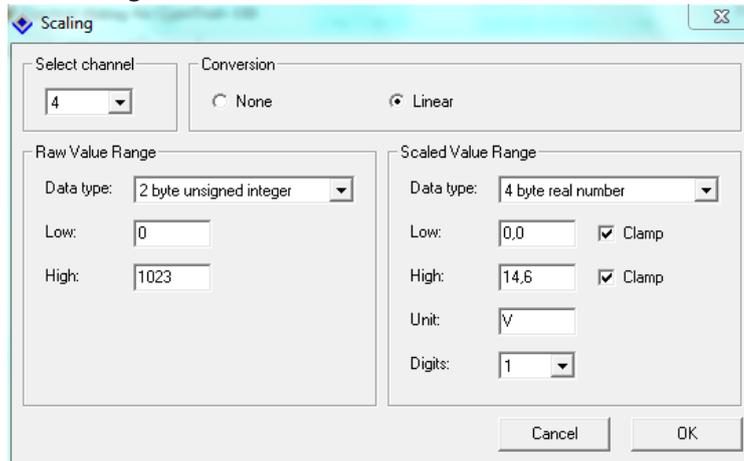
For details about setting analog input properties in NetTroll, refer to the NetTroll manual and Release Notes.

Device configuration.

The device configuration in NetTroll allows the user to set specific massages and message properties for each installed ComTroll 333 RTU device. These settings are only local settings (in NetTroll) and the settings are not sent to the RTU device but are only stored in the database.
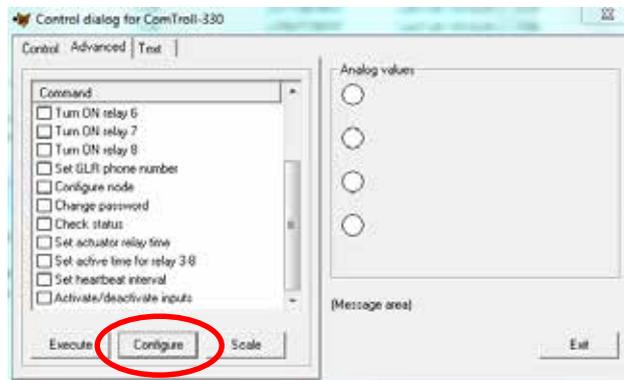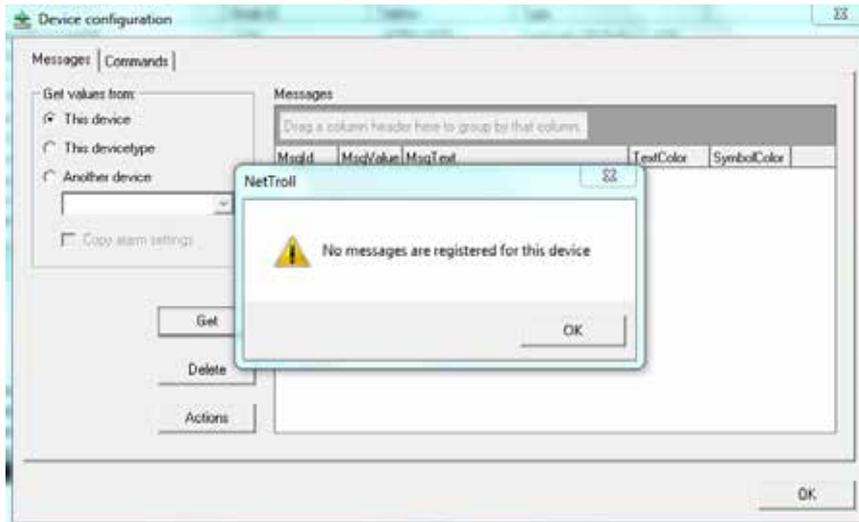
First time the device configuration is entered for a specific device, pressing the *Get* button when the *Get values from* is set to *This Device*, NetTroll will return a message as shown above.

The default values must therefore be uploaded from the database first, so the *This Devicetype* must be selected, then press *Get*.
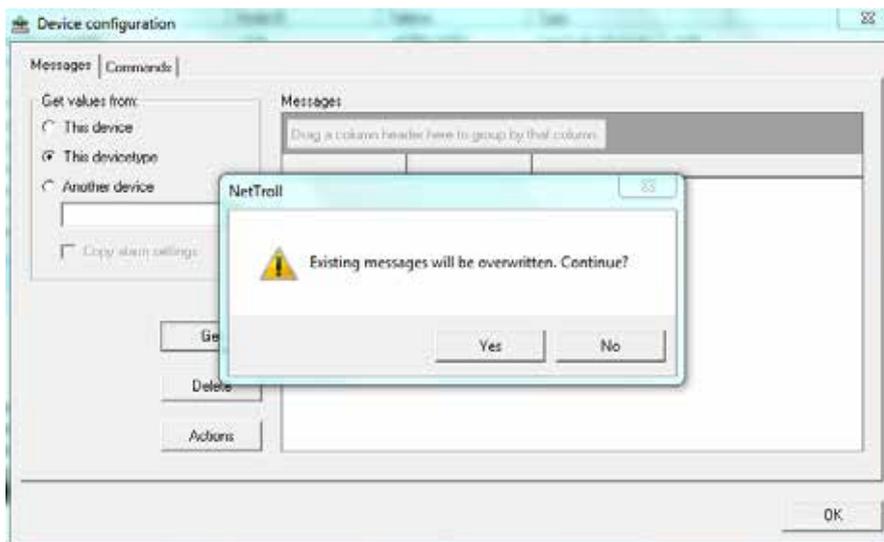
Press 'Yes' to continue uploading default values.

Then all message texts and alarm properties can be set for each individual device. For details about these settings, please refer to the NetTroll 4.0/4.1 Release Notes documents.

When more than one ComTroll 333 RTU device shall have the same configuration, settings can be copied from a device with the desirable settings.

Using the *Another device* selection, all settings will be copied from the device selected in the drop-down window. If alarm settings also shall be copied, select the *Copy alarm settings* option.

Please note:

If configuration settings are changed from the default values for a specific ComTroll 333 RTU device, the configuration values should only be opened using the *This Device* or *Another device* option.

If *This Devicetype* is selected, all settings will be set back to the default values specified in the database.

4. Technical Specifications

Application:	Remote Terminal Unit with GSM communication.
GSM Module:	Wavecom Q64. Quad Band (800/900/1800/1900 MHz)
Inputs:	Open and close status from the end contacts of the switchgear. 6 general optic isolated digital inputs. 4 analog inputs (0-10V or 4-20mA). Maximum input voltage: 50V dc.
Outputs	Open and close of the switchgear. (Operated remotely or locally) 6 user specified Normally Open relays. Maximum switching voltage/current = 200V/1A (AC/DC)
Power supply:	Min: 10Vdc Max: 15Vdc
Power Consumption:	8mA in idle. 80mA when connected to the GSM Network. This will vary upon signal strength.
Type test:	EN 1000-4-2, EN 1000-4-3 ROHS compliant
Mounting:	Snap-on DIN-rail
Temperature range:	-25 to + 70 deg Centigrade operational.
Dimension:	160 x 90 x 80 mm
Weight:	315g

Ordering Information

Product nr: **02-0333-01**   **ComTroll 333 RTU Kit**
                                        (Includes external antenna)

Related products:
Product nr: 02-0120-00   ComTroll 120 GLR Router Kit for NetTroll.
Product nr: 15-7540-51   NetTroll 4.1 MicroSCADA Software
Product nr: 15-7500-04   NetAlert 3.5 SMS-Alarm Module w/ GSM modem
Product nr: 15-7500-40   NetTRoll SCADA Gateway