

CCM 164

Communication and Control Module



CCM 164 is a control and monitoring module with analog and digital inputs and relay outputs. All inputs and outputs can be monitored and controlled via SMS (Short Message Service) or via a smartphone app. The network is defined by the service provider's SIM card.

- An analog 4-20 mA input.
- Six digital (12-24 VDC) or analog (0-10 V) inputs.
- Four relay outputs - 2 power relays and 2 switching relays.
- Two power supply versions, 240Vac and 24VDC

The User Manual can be retrieved from www.selektro.dk/ccm under Manuals.

This manual complies from firmware version 2.1.x.

This manual complies from hardware version 5 and forward.

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Warning

The module is not suited for monitoring sensitive factories or time-critical processes. GSM network failures or disruptions in net power can affect safety and monitoring reliability. Do not use OFF outputs to implement safety-related functions for systems/machines.



Warning

Persons with reduced physical capability, sensory or mental status, must not use this product unless under appropriate direct supervision or have been instructed by a person responsible for their safety. Minors must not use or play with this product.



Warning

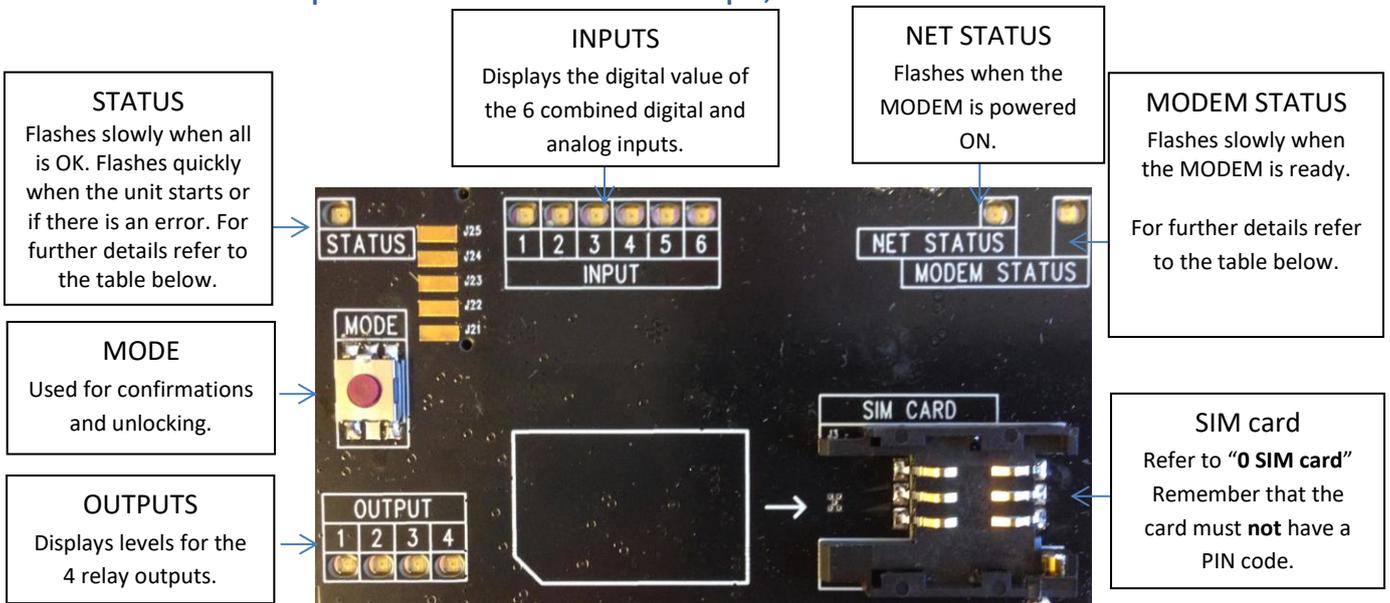
Always read this User Manual prior to installation. Installation and use must be in accordance with applicable rules and good practice.



Warning

The module must not be placed in a dangerous explosive area or in close proximity to medical equipment.

1. Description of the control lamps, buttons and SIM card



Control

STATUS	Constantly on	on off	Module recently connected to the power supply and backup battery is charging.
	Slow long flashing	on off	Module is initializing.
	Slow flashing	on off	Module is ready and everything is OK.
	Quick flashing	on off	There is an error. Refer to MODEM STATUS.
	50% on 50% flashing	on off	EEPROM Error.
	Turned off	on off	No supply voltage. If MODEM STATUS is flashing the module is using the backup.
NET STATUS	Slow flashing	on off	MODEM is operational (GSM version)
	Slow long flashing	on off	MODEM is operational (IoT and 4G version)
	Fast flashing	on off	Network not accessible.
	Turned off	on off	MODEM is turned off.
MODEM STATUS	Slow long flashing	on off	MODEM is initializing.
	Slow short flashing	on off	Module is using backup. MODEM STATUS LED is turned off.
	Slow flashing	on off	MODEM is ready with NET connection.
	Two quick flashes	on off	SIM card error.
	Quick flashing	on off	Network error.
	Turned off	on off	MODEM is turned off.
	50% on/off flashing	on off	Modem transmitting

Button

The MODE button beneath the cover can be used to unlock the module. Refer to “**11.2. Manually unlocking the configuration**”.

SIM card

Newer versions of the CCM 164 hardware (V2) uses SIM card Nano 12.3 x 8.8 mm type and is compatible with 1.8V and 3V SIM cards.

Older versions of the CCM 164 hardware (V1) uses SIM card Mini 85.6 x 53.98 mm type and is compatible with 1.8V and 3V SIM cards.

Note : There must not be a PIN code on the SIM card.

Refer to “**11.1. Removing a PIN code from a SIM card**”.

Accessories



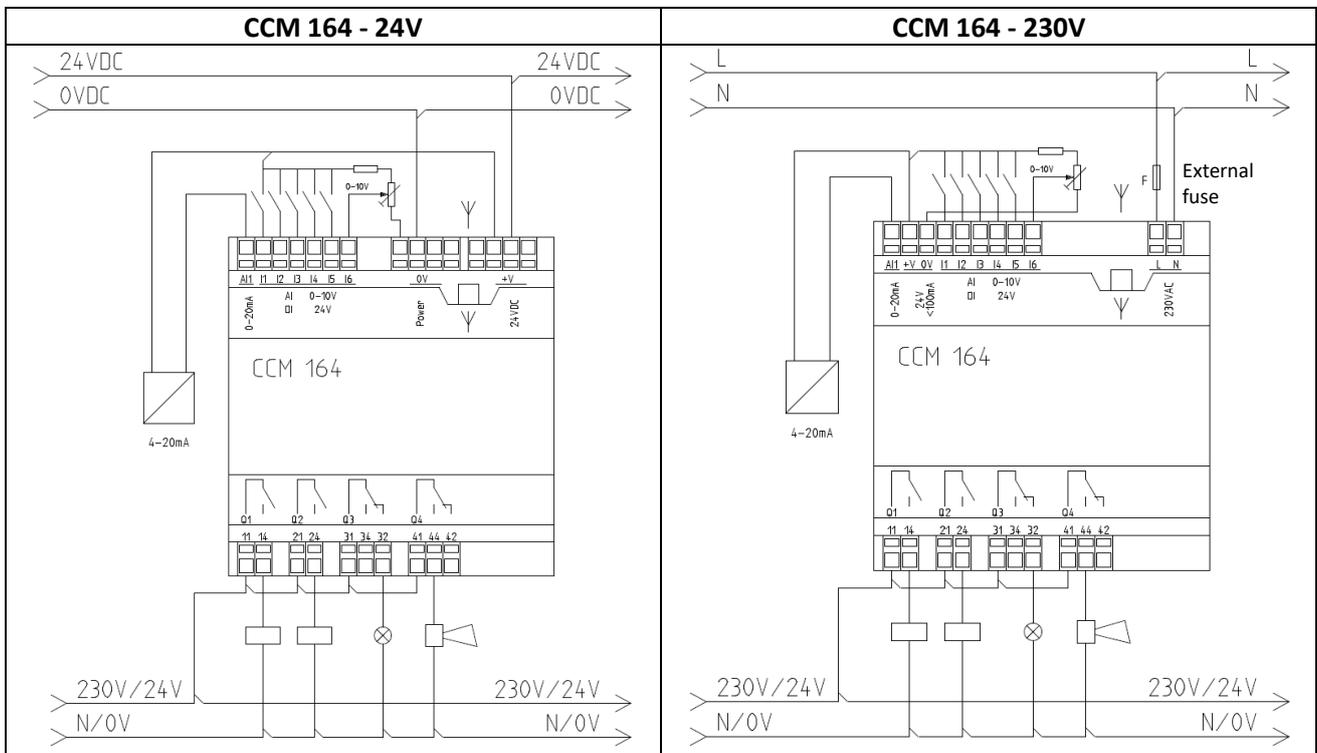
Stub antenna



Planar antenna

- Stub antenna, order number: 0991-70010001
- Planar antenna, order number: 0991-70010003

2. Connection



CCM 164 - 24VDC		CCM 164 - 230VAC	
Supplyterminal	+V og 0 V	Supplyterminaler	L og N
		DC- Supply output	+V
		Outout Supply	20-24 V DC @ 100 mA

GSM	IoT	4G
Simcard must support: - GSM/EDGE	Simcard must either support: - LTE-M/CAT 1 - GSM/EDGE	Simcard must support: - LTE

- AI1 Current input 4-20mA, reference in relation to 0V.
- I1 – I6 These inputs are per default configured as digital inputs (12-24V), they can be configured as analog inputs (0-10V). When the inputs are configured for digital, the input resistance is approx. 3 kΩ and the analog approx. 20 kΩ.
- Q1 Relay contact set 1, terminal 11 – 14 is closure (NO).
- Q2 Relay contact set 2, terminal 21 – 24 is closure (NO).
- Q3 Relay contact set 3, terminal 31 – 34 is closure (NO) and 31 – 32 is break (NC).
- Q4 Relay contact set 4, terminal 41 – 44 is closure (NO) and 41 – 42 is break (NC).

For further technical details refer to “16. Electrical specifications”.

3. Getting started

- 1) Mount the module as described in “**2. Connection**” and in accordance with the specifications in “**16. Electrical specifications**”.
- 2) Insert a SIM card into the holder beneath the cover. Note that the SIM card must not have a PIN code. Refer to “**11.1. Removing a PIN code from a SIM card**”.
- 3) Turn on the power supply and wait 30 seconds until the internal backup battery has charged. The module is ready when the STATUS lamp flashes slowly. 
Please refer to “**1. Description of the control lamps, buttons and SIM card**”

In case of EEPROM error, indicated with the STATUS LED. 

Send an SMS to the telephone number of the SIM card inserted in the module: “#Sys Defaults”
The SMS is answered with “OK: Sys Defaults” in the case of updated firmware,
Otherwise refer to “**12.h) SMS module returns “ERROR in EEPROM”**”

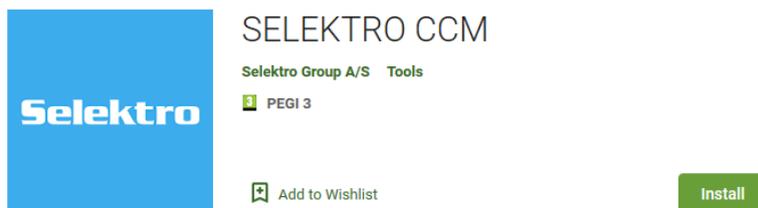
- 4) Send an SMS to the telephone number of the SIM card inserted in the module: “Sys info”

If an information message is received, then the module is good to go.

Example: “Randersvej 44. 0d 00:01:04. CCM164 - GSM-230 V FW &v2.1.0& EN. mem:78/1100
Log:8/27 F=0000 - Lock0 (User) Clock:09:30D3”

IMPORTANT: if the response displays *Log:0/27*, please send “#sys defaults” again.

- 5) You can now configure/read values/set values via an SMS or the App.
 - a) See section “**4. Configuration**” for a detailed description of SMS commands.
Or go to “**13. Overview of commands (short form)**” for an overview of SMS commands.
 - b) Selektro CCM is available in both the *Google Play Store* (Android) and the *App Store* (IOS)



- 6) To update to the latest firmware version, go to “**14. Firmware update**”.

4. Configuration

4.1. Module name

When using several controllers, each with their own CCM 164 module, a module name can be added which is the first thing that appears in SMS messages sent from the module.

#N (<name>)

<name> is the name of the module

Maximum 40 characters

Refrain from using # [] () *

Example: Configure/change the module name.

#N (Module 12)

OK: N defined

4.2. Language

CCM 164 supports the following languages: Danish, English, German, Russian, French and Spanish. From the factory, the language is set to English. The language can be changed using the command below.

#LANG <language>

<language> is the module's language

Options:

DA, EN, DE, RU, FR, ES

NB: Russian, French and Spanish use Unicode (for sending special characters), i.e. SMSs are getting slower and the App can't be used for large configurations (see section 11.4 for more info regarding this). When changing language, please check the setup as special characters may be corrupted.

Example: Change language setting to Danish.

#LANG DA

OK: LANG defined

Typical errors:

#LANG Danish

Error command unknown: DANISH

NB: May only contain the options: DA, EN, DE, RU, FR, ES

4.3. Phone book

CCM 164 has a phone book which contains a list of up to 8 phone numbers [P1..P8]. These phone numbers can be configured to receive messages from the module. P8 is the place for the administrator, and can only be changed in *lock 0* mode (the module is unlocked).

#Pn <countrycode><phonenumber>

n is the place number in the phone book

Options: 1,2,3...8

<countrycode> is the country code

Contains only numbers and the '+' sign

<phonenumber> is the phone number

Contains only numbers

Example: Place 1 in the phone book is a Danish phone number 10101010.

Place 3 in the phone book is a Danish phone number 20202020. The country code for both is therefore +45.

#P1 +4510101010

OK: P1 defined

#P3 +4520202020

OK: P3 defined

Typical errors:

#P2 +45 20202020

Error command unknown:
#P2 + 45 20202020

#P1 +4510101010 #P2 +4520202020

Error command unknown:
#P1 +4510101010
#P2 +4520202020

NB: There may not be any spaces between <countrycode> and <phonenumber>. Each command needs to be written in its own message.

4.4. Locking (Security)

The module can be locked at 5 different lock levels, depending on who you want to have access to the module. The module has 3 access levels. The command can only be written by the phone number P8.

#LOCK <x>

<x> are different lock levels that change what the different access levels have access to

Options: 0,1,2,3,4
(Default: Lock 0)

Admin: Full control

Advanced: Read inputs and outputs, change outputs, change phone numbers

User: Send message input/macro (see "5.4 Message Inputs/Macros" for more info regarding this)

	Admin	Advanced	User
For Lock 0	Anyone	Anyone	Anyone
For Lock 1	P8	Anyone	Anyone
For Lock 2	P8	P1...8	Anyone
For Lock 3	P8	P1...8	P1...8
For Lock 4	P8	P8	P1...8

Example: Configures the module to Lock 3, such that only P8 (admin) can change the configuration and only phone numbers from the phone book can read input and output values, change outputs and send message inputs/macros.

#LOCK 3

OK: Access control enabled
Admin: P8
Advanced: P1...8
User: P1...P8

Example: Configures the module to Lock 0, such that everyone has access to all functions

#LOCK 0

OK: Access control disabled
Admin: ALL
Advanced: ALL
User: ALL

#UNLOCK

Temporary unlocking of the module for 60 minutes.
P8 gets unlocked to Lock 0.
P1...7 get unlocked to Lock 1 (only in Lock 2 and 3).

#LOCK

Locks back to the previous configuration.
Has to be done within the 60 minutes.

Examples:

- Admin (phone number P8) sets Lock 3.
- The Unlock function unlocks the module to Lock 0 for 60 minutes.
- The Lock function locks the module back to Lock 3.
- Advanced user (P1) sends Unlock and unlocks the module to Lock 1 for 60 minutes.

#LOCK 3
(P8)

***OK: Access control enabled
Admin: P8
Advanced: P1...8
User: P1...P8***

#UNLOCK
(P8)

***OK: Access control disabled
(60min)
Admin: ALL
Advanced: ALL
User: ALL***

#LOCK
(P8)

***OK: Access control enabled
Admin: P8
Advanced: P1...8
User: P1...P8***

NB: #Lock changes back to the previous definition

#UNLOCK
(P1)

***OK: Access control enabled
(60min)
Admin: P8
Advanced: ALL
User: ALL***

5. Input and Output Definition

5.1. Current input

CCM164 has one 4-20 mA power input. For configuring different types of sensors with different measuring ranges, use the following command:

#AI <i>n</i> (<txt>) R<resolution> U<unit> L<low> H<high>	
n is the power input's number	Options: 1
<txt> the name of the input	May not be empty Maximum 16 characters Refrain from using # [] () *
<resolution> how many decimal numbers are used	Options: 1, 0.1, 0.01, 0.001
<unit> Unit text up to 5 characters	E.g. "Bar" for the unit of pressure
<low> Low value at 4 mA	Options: -99999...99999
<high> High value at 20 mA	Options: -99999...99999

Example: Configure power input as a 0-10 m water level.

```
#AI1 (Waterlevel) R0.1 Um L0.0 H10.0
```

OK: AI1 defined

Typical errors:

```
#AI1 R0.1 Um L0.0 H10.0
```

Error command unknown:
#AI1 R0.1 Um L0.0 H10.0

NB: the text field may not be empty

5.2. Voltage input

CCM164 has 6 inputs, each of which can be configured to either analogue or digital. By default, all 6 inputs are digital. The following should be used to configure an analogue voltage input:

#In (<txt>) R<resolution> U<unit> L<low> H<high>	
n is the input's number	Options: 1,2...6
<Txt> the name of the input	May not be empty Maximum 16 characters Refrain from using # [] () *
<resolution> how many decimal numbers are used	Options: 1, 0.1, 0.01, 0.001
<unit> Unit text up to 5 characters	E.g. "Bar" for the unit of pressure
<low> Low value at 0V	Options: -99999...99999
<high> High value at 10V	Options: -99999...99999

Example: Configure voltage input to 0-10 bars of pressure.

```
#I1 (Pressure) R0.01 Ubar L0.00 H10.00
```

OK: I1 defined

Example: Configure voltage input at a -5m to 5m water level.

```
#I2 (Waterlevel) R1 Um L-5 H5
```

OK: I2 defined

5.3. Digital input

CCM164 has 6 inputs, each of which can be configured to either analogue or digital. By default, all 6 inputs are digital. The following should be used to configure an input as digital:

#In (<txt>) D

n is the power input's number

Options: 1,2...6

<txt> the name of the input

May not be empty

Maximum 16 characters

*Refrain from using # [] () **

Example: Configure Input 3 to be a digital start button.

#I3 (Start) D

OK: I3 defined

Example: Configure Input 4 to be a digital stop button.

#I4 (Stop) D

OK: I4 defined

5.4. Relay output

CCM164 has 4 relay outputs. By default, the outputs are named Q1, Q2.. Q4. These can be changed with the command:

#Qn (<txt>)

n is the output's number

Options: 1,2...4

<Txt> the name of the output

May not be empty

Maximum 16 characters

*Refrain from using # [] () **

Example: Let Output 3 be called "motor"

#Q3 (motor)

OK: Q3 defined

5.5. Bit Register

CCM164 has 8 internal bit registers which can be used in rules (see section "6.5 Relationship between several Rules" for more info regarding this). By default, the bit registers are named B1, B2...8. These can be changed with the command:

#Bn (<txt>)

n is the bit register's number

Options: 1,2...8

<Txt> the name of the bit register

May not be empty

Maximum 16 characters

*Refrain from using # [] () **

Example: Let Bit Register 3 be called "Reaction3"

#B3 (Reaction3)

OK: B3 defined

5.6. Clock module

CCM164 has a built-in clock module with 4 individual time settings. W1...4 are all high/low based on a defined time and day of the week. The following explains how to configure when they are set as high (ON) and when they are set as low (OFF).

#Wn (<txt>) ON:<hh>:<mm><dd> OFF:<hh>:<mm><dd>	
n is the input's number	<i>Options: 1,2...4</i>
<Txt> the name of the input	<i>May not be empty Maximum 16 characters Refrain from using # [] () *</i>
<hh> are the hours of the time	<i>Options: 00,01...23</i>
<mm> are the minutes of the time	<i>Options: 00,01...59</i>
<dd> is on which days of the week	<i>Options: D1...7 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday Empty corresponds to D1234567</i>

NB: The time in the module is continuously retrieved from the network of the module's SIM card. It is possible to make a time shift in relation to the network's time zone (for more info on this, see the "#sys offset" section 10.5).

NB: The time will not be updated if the SIM card is removed. If the module is started without a network connection, the time will be invalid.

Example: Configure the W2 value as high, every day between 17:00 to 22:00

#W2 (evening) ON:17:00 OFF:22:00

OK: W2 defined

Example: Configure the W2 value as high, every night until a weekday, and then as low again the next morning.

**#W1 (night) ON:22:00D71234
OFF:06:00D12345**

OK: W1 defined

Example: Configure the W2 value as high, from Friday at 16:00 to Monday morning at 8.00

**#W3 (Weekend) ON:16:00D5
OFF:08:00D1**

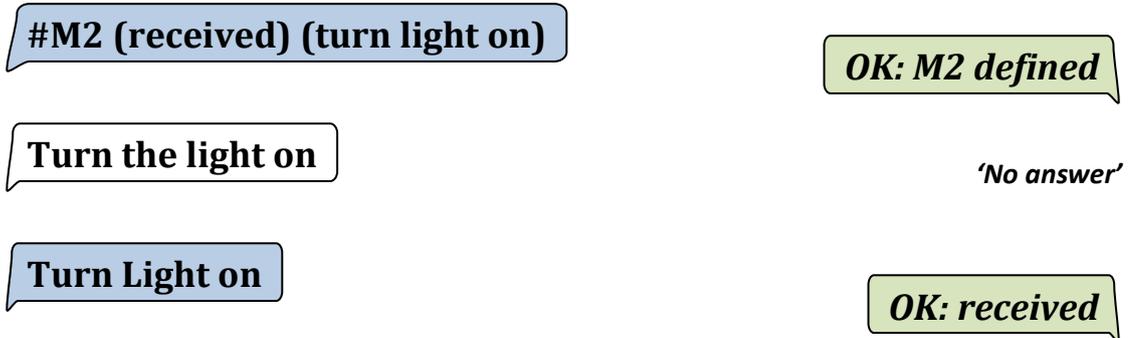
OK: W1 defined

5.7. Message Inputs/Macros

CCM164 can receive messages from the user that are seen as an input. The message can also be used as an output, seeing as it saves the number from the phone that last sent the command. The value of the message is high until it is used, after which it becomes low again. When and who sent correct messages to the module can also be saved in a history. Regarding how to read the history, see 7.1 Message Input/Macro histories.

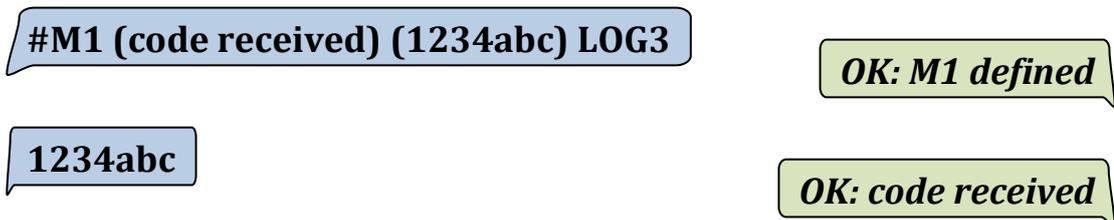
#Mn (<txt>) (<input>) LOGm	
n is the message's number	<i>Options: 1,2...8</i>
<Txt> the name of the message's function. This is also the reply text when the message is sent	<i>May not be empty Maximum 16 characters Refrain from using # [] () *</i>
<input> the command text written to set the input as high	<i>May not be empty Maximum 20 characters Refrain from using # [] () * Refrain from using special characters You may not start with spaces Not dependent on caps or spaces</i>
m max number of Macros saved in the history	<i>Options: 1,2...21 Empty, LOGm corresponds to LOG1</i>

Example: Message to turn the lights on



*NB: If the input is incorrect, the message will not be responded to.
It doesn't matter if the input has uppercase/lowercase letters and spaces.*

Example: Code for activating M1



6. Rules between inputs and outputs

CCM164 has 16 programme lines which hereinafter will be referred to as 'rules', and called A1, A2,..A16. The rules define how the module should react if a particular action takes place. The rules are therefore the most significant factor involved when it comes to controlling the module. The first points in the section 6 show simple examples of rules, and then the examples become more advanced.

#An (<txt>) <condition> <action>	
n the place number of the rule	<i>Options: 1,2,3...16</i>
<txt> the name of the rule and the text sent in the SMS message.	<i>Maximum 40 characters recommended Refrain from using # [] () *</i>
<condition> an expression that needs to be true before <action> is performed	<i>Options: AIn, In, Mn, Bn, An, !AIn, !In, !Mn !Bn, !An</i>
<action> The action performed when a <condition> is true	<i>Options: Qn, Bn, P12...8, M12...8, !Qn, !Bn, May be empty</i>

Example: When Digital Input 1 is high, Output 1 is set to high.

#A1 (On) I1 Q1

OK: A1 defined

Example: When Digital Input 1 is low, Output 1 is set to low.

#A1 (Off) !I1 !Q1

OK: A1 defined

Example: When Digital Input 1 goes high, a message is sent with the name of the module to tel.no. P1.

#A1 (Motor On) I1 P1

OK: A1 defined

I1 = low → high

Module 12: Motor On

Example: When Digital Input 1 goes high, a message is sent to tel.nos. P2, P4 and P7.

#A1 (Alarm started) I1 P247

OK: A1 defined

Example: When <input> to M1 is received, Output 1 is set to high.

#A1 (On) M1 Q1

OK: A1 defined

6.1. Reaction rate for rules

Each rule line has its own reaction rate. The reaction rate determines how quickly the rule's input condition gets responded to.

#Zn <RT> <RF> <RD>		
n	the place number of the rule	Options: 1,2,3...16 or empty
<RT>	seconds <condition> is true before <action> applies/is performed	0...3600 (Default: 1)
<RF>	seconds <condition> is false before <action> doesn't apply	0...3600 (Default: 1)
<RD>	seconds <condition> is true before text messages are sent	1...3600 (Default: 120)

NB: 0 performs <action> as fast as possible, but in no faster time than 20 ms.

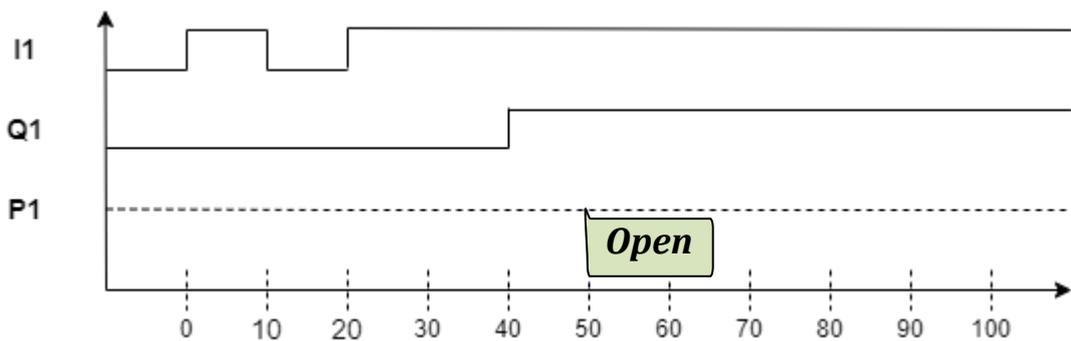
Example: When Digital Input 1 is high, Output 1 is set to high and P1 receives a message.

#A1 (Open) I1 Q1 P1

OK: A1 defined

#Z1 20 10 30

OK: Z1 = 20 10 30



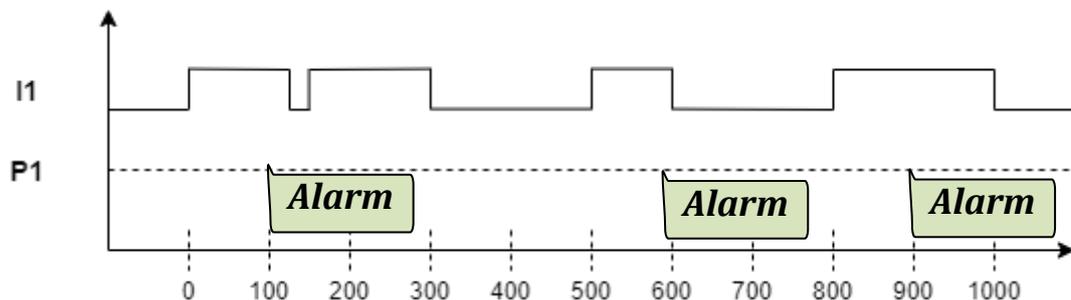
Example: When Voltage Input 1 is high for too long, a message is sent to P1.

#A1 (Alarm) I1>4 P1

OK: A1 defined

#Z1 1 100 100

OK: Z1 = 1 100 100



NB: Messages are only sent again if <condition> is false in time <RF>

Example: Configure the reaction rate of all rules to the same value.

#Z 1 1 5

OK: Z = 1 1 5

6.2. Extension of <condition> for rules

Extension of <condition>	<con1><op><con2>
<con1> an input	Options: AIn, In, Mn, Bn, An, !AIn, !In, !Mn, !Bn, !An
<op> the relation between the 2 inputs	Options: < (less than), > (greater than), & (and), + (or)
<con2> an input	Options: AIn, In, Mn, Bn, An, !AIn, !In, !Mn, !Bn, !An

Example: When Digital Inputs 1 and 2 are high (the expression is true), Output 1 is set to high.

#A1 (On) I1&I2 Q1

OK: A1 defined

Example: If the value of Voltage Input 1 is greater than the value 10, Output 1 is set to low.

#A1 (Larger than) I1>10 !Q1

OK: A1 defined

Example: If the value of Voltage Input 1 is less than the value of Voltage Input 2, Output 1 is set to low.

#A1 (Less than) I1<I2 !Q1

OK: A1 defined

Example: If Voltage Input 1 or Voltage Input 2 goes low, a message is sent to tel.no. P1.

#A1 (thermal error) !I1+!I2 P1

OK: A1 defined

I1 = high and I2 = high →
low

thermal error

Typical errors:

#A1 (Open) I1<I2<I3 !Q1

Error in command parameters:
I1<I2<I3

#A1 (Open) I1 &I2 Q1

Error in command parameters: &I2

*NB: <condition> can only have 2 inputs and one operator.
There may not be any spaces in the <condition> expression.*

6.3. Extension of <Action> number for rules

Number of <action>	<act1>	<act2>	<act3>	<act4>
<act1>, <act2>, <act3>, <act4>				
	Options: Qn, Bn, P1...8, M12...8, !Qn, !Bn, May be empty			

Example: When Digital Input 1 is high, Output 1, 2 and Bit 1 are set to high, the message “open” is sent to tel.nos. P4 and P5.

#A1 (Open) I1 Q1 Q2 B3 P45

OK: A1 defined

Typical errors:

#A1 (Open) I1 Q1 B3 P45 Q2 !Q3

Error command unknown:
#A1 (Open) I1 Q1 B3 P45 Q2 !Q3

#A1 (Open) I1 Q124 B3 P45

Error in command parameters: Q124

NB: Max 4 actions. Q and B can't have more outputs like P and M can.

6.4. Extension of <Action> options for Q and B

Options for Qn and Bn

=Qn the value of <condition> becomes Qn
 !=Qn the opposite value of <condition> becomes Qn
 TQn changes the Qn value once
 QnDt sets Qn to high for 't' seconds
 !QnDt sets Qn to low for 't' seconds

=Bn the value of <condition> becomes Bn
 !=Bn the opposite value of <condition> becomes Bn
 TBn changes the Bn value once
 BnDt sets Bn to high for 't' seconds
 !BnDt sets Bn to low for 't' seconds

Example: When Voltage Input 1 is high, Output 1 is high. When Voltage Input 1 is low, Output 1 is low

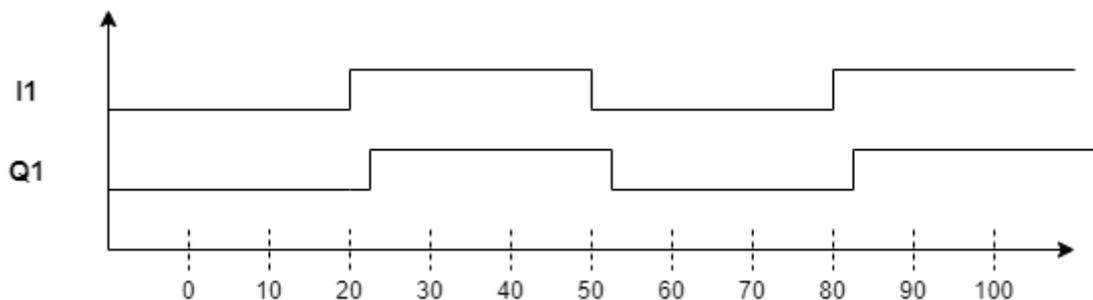
#A1 (on/off) I1 =Q1

OK: A1 defined

#Z1 1 1 1

OK: Z1 = 1 1 1

NB: =Qn and !=Qn are the only actions that respond to a false <condition>



Example: When Voltage Input 1 goes high, Output 1 goes high for 10 seconds.

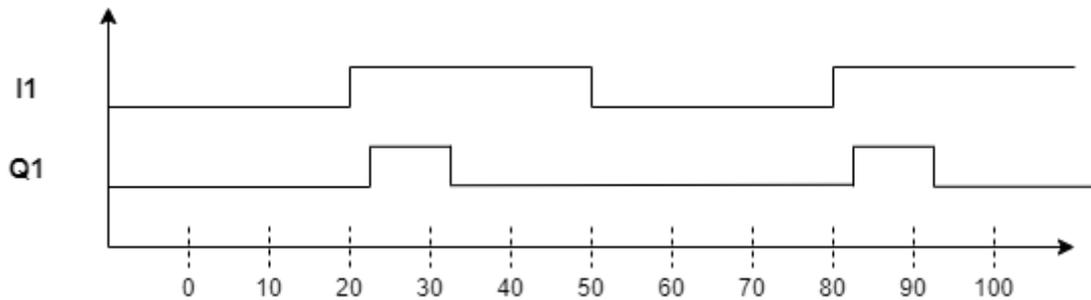
#A1 (Open) I1 Q1D10

OK: A1 defined

#Z1 1 1 1

OK: Z1 = 1 1 120

NB: Only one QnDt or !QnDt with the same n can be defined.



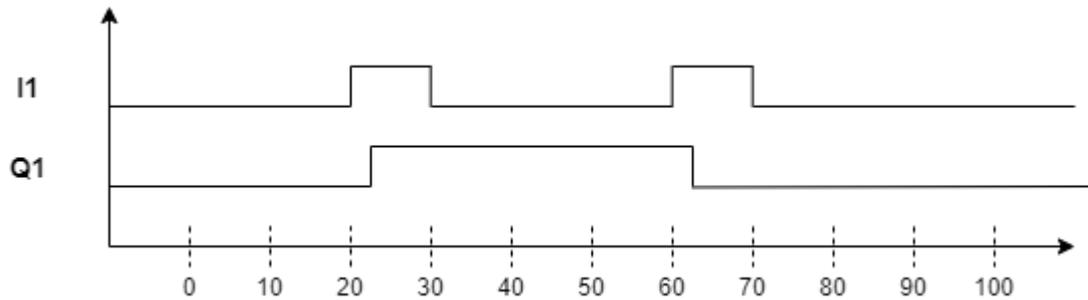
Example: When Digital Input 1 goes high, toggle Output 1. (tilt lighting)

#A1 (Toggle Light) I1 TQ1

OK: A1 defined

#Z1 1 1 1

OK: Z1 = 1 1 1



6.5. Relationships between several rules

Prioritisation Highest rule no. <n> determines value for output (Qn/Bn)

Example: 2 rules with different priorities (Here it can be seen that the highest rule no. has the highest priority).

#A1 (Start Button) I1 Q1

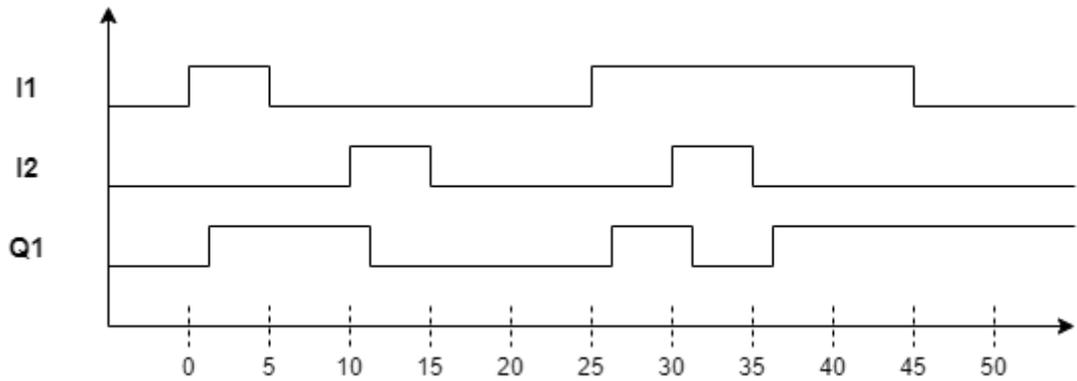
OK: A1 defined

#A2 (Stop button) I2 !Q1

OK: A2 defined

#Z 1 1 1

OK: Z = 1 1 1



Additional options with multiple rules

Bn A digital bit register that's internal to the module.
Can be used in both <condition> and <action>.
n = 1,2,3...8

An Transfers <condition> from another rule.
Can only be used in <condition>.
n = 1,2,3...16

Mn Sends to the phone number that last activated it.
n = 123...8

Example: The reaction rate when using Bn and An

#A1 (Door is open) I1 B1

OK: A1 defined

#A2 (Turn off ventilation) B1 Q1

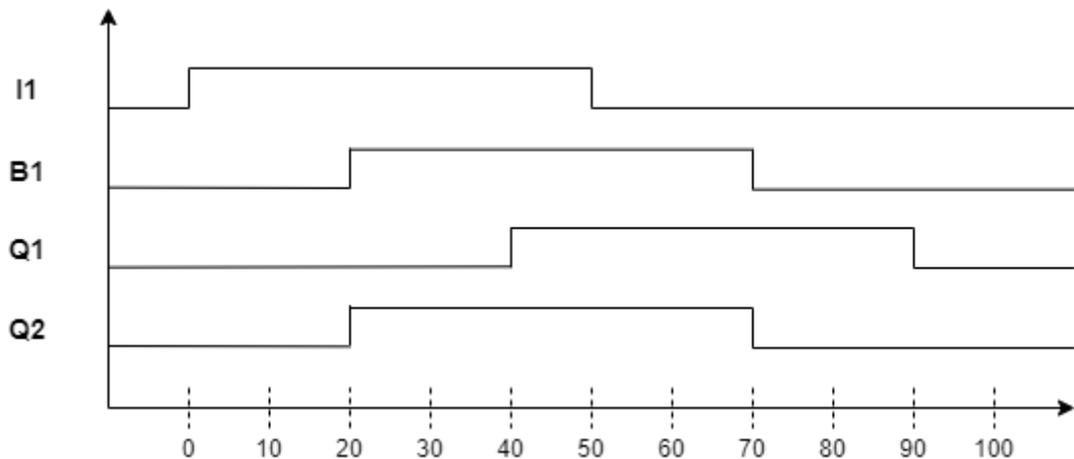
OK: A2 defined

#A3 (Turn on signal lamp) A1 Q2

OK: A3 defined

#Z 20 20 20

OK: Z = 20 20 20



NB: Reaction rate for: A2 (Q1) is equal to A1 (20s) + A2 (20s) = 40s

A3 (Q2) is equal to A1 (0s) + A3 (20s) = 20s

Extra delays between rules are avoided when using a rule as an input condition.

Example: An can be used as an extension of <condition>

#A1 (Windows open) I1&I2

OK: A1 defined

#A2 (Doors open) I3&I4

OK: A2 defined

#A3 (Everything open) A1&A2 Q1

OK: A3 defined

NB: A3's input condition is read as (I1&I2)&(I3&I4).

Example: Defining a guard message.

#M1 (You're on Guard) (1234 Vagt)

OK: M1 defined

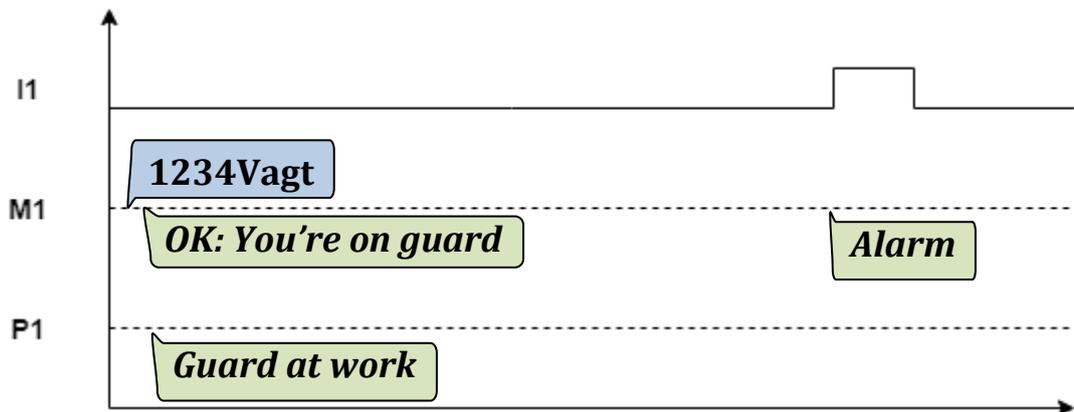
#A1 (Guard at work) M1 P1

OK: A1 defined

#A2 (Alarm) I1 M1

OK: A2 defined

NB: The phone number from the last sent message "1234Vagt" is saved as M1's phone number.



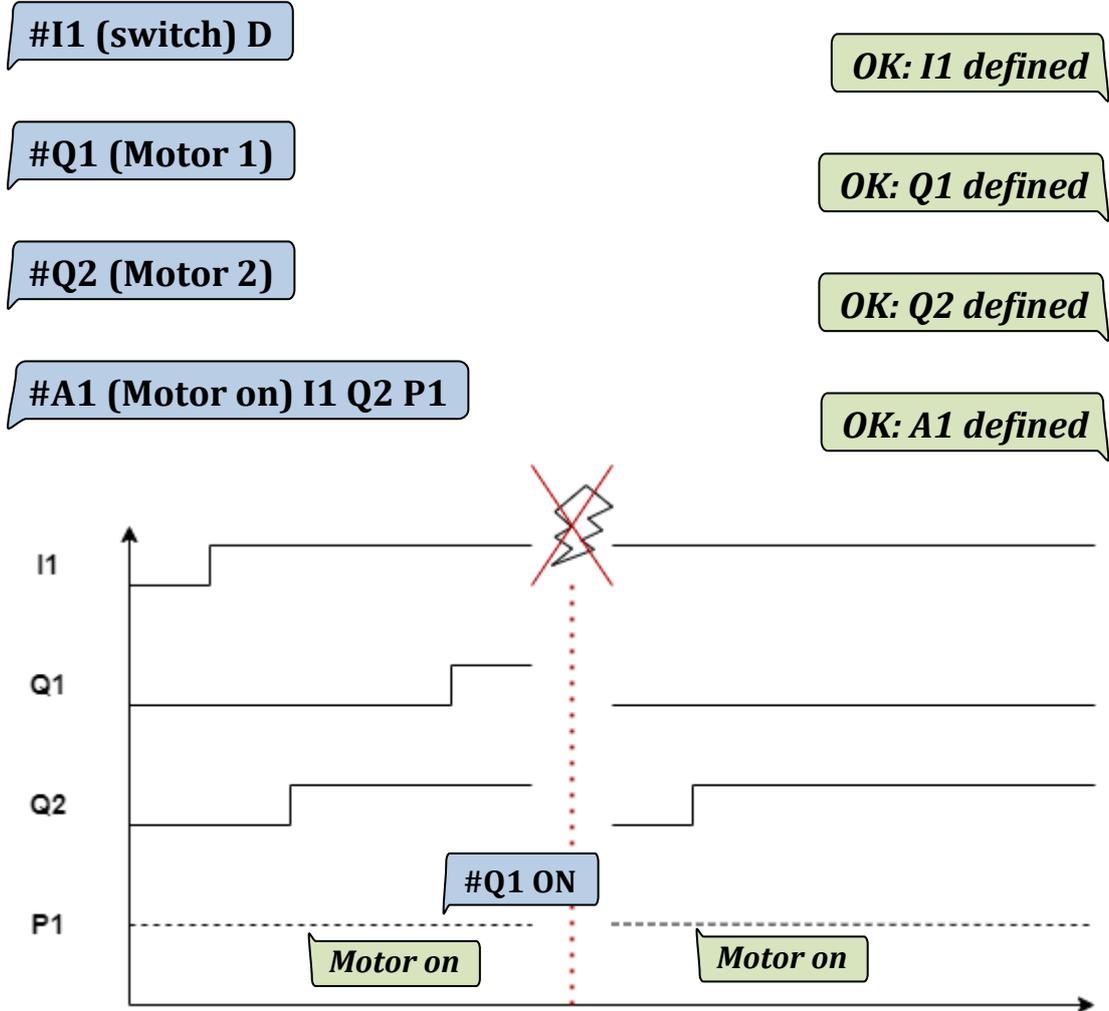
6.6. Significance of supply outages for rules and outputs

If the supply is lost, the relay outputs will turn off. When the supply comes back, the output will ONLY be switched on in accordance with the rules set. The same applies to the Bit variables B1..8.

Message outputs configured in the rules will also be re-executed when the supply returns.

For longer supply outages or supply output overloads, the module can inform the user via SMS message (see “10.3. Supply outages” and “10.4. Supply Output Overload”).

Example: Motor 2 switches on and sends a message when the switch goes high. Motor 1 is switched on via SMS.



We can see that after the supply outage only Motor 2 will be turned on again, seeing as the switch has been set to high.

7. Read values

#<Function> ?

<Function> is the function

Options:

N, LANG, P, Pn

Al, Aln, l, In, M, Mn, A, An, Z, Zn

Example: Read module name.

#N ?

N = Module 12

Example: Read the phone number on P1.

#P1 ?

P1 = +451010101

Example: Read the phone numbers in the module where only P1 and P3 have been set.

#P ?

P1 = +451010101

P3 = +4520202020

NB: If the phone book is empty, an empty message is returned.

Example: Read the value for Analogue Voltage Input 1
(defined as "#I1 (pressure) R0.01 Ubar L0.00 H10.00").

#I1 ?

pressure = 2.00 bar

Example: Read the value for voltage inputs.

#I ?

I1=2bar I2=4m I3=OFF

I4=OFF I5=OFF I6=OFF

NB: Digital voltage inputs return ON/OFF, Analogue voltage inputs return a number.

Example: Read tel.no. that last sent <input> for M2.

#M2 ?

M2 = +4510101010

Example: Read defined messages where only M1 and M2 have been defined.

#M ?

Defined messages: M1 M2

Example: Read the value for Rule 4.

#A4 ?

A4 = OFF

Example: Read defined rules where only A2 and A4 have been defined.

#A ?

Defined messages: A2=OFF A4=OFF

NB: Each rule has an On/Off value, depending on whether its <condition> is true or false.

Example: Read the reaction rate for Rule 4.

#Z4 ?

Z4 = 1 1 120

7.1. Message Input/Macro histories

#<LOG> ?

<LOG> which Message Input/Macro histories to read

Options:

LOG, LOG1,2...8

Example: Read all log histories

#LOG ?

0: M1 21/12/31 23:59 +4501234567
1: M1 21/12/31 23:55 +4501234567
3: M2 21/12/31 23:57 +4510101010

NB: reads all histories in memory (with the latest on top)

<place>: M<no> <year><month><day> <hours><minutes> <tel.no.>

#LOG1 ?

M1 21/12/31 23:59 +4501234567
M1 21/12/31 23:55 +4501234567

NB: reads all histories in memory for a specific Message Input/Macro (with the latest on top)

M<no> <year><month><day> <hours><minutes> <tel.no.>

8. Read Definitions

#<Function> ??

<Function> is the function

Options:

N, LANG, P

Al, Aln, I, In, M, Mn, A, An, Z, Zn

Example: Read Voltage Input 1.

#I1 ??

#I1 (pressure) R0.01
Ubar L0.00 H10.00

Example: Read syntax for digital and voltage input

#I ??

#In (txt) D
#In (txt) R<resolution>
U<unit> L<low> H<high>

Example: Read Rule 1's definition.

#A1 ??

#A1 (Open) I1 Q1 Q2 B3 P45

Example: Read syntax for rules.

#A ??

#An (txt) <condition> <action>

9. Delete definition / set to default

#<Function> 0

<Function> is the function

Options:

N, Pn, Mn, An (Delete)

In, Ain, Bn, Qn (Default)

Example: Place 1 in the phone book gets deleted.

#P1 0

OK: P1 deleted

Example: Deletes module name.

#N 0

OK: N deleted

Example: Input 1 is set by default.

#I1 0

OK: I1 deleted

Example: Deletes Rule 4.

#A4 0

OK: A4 deleted

10. Smart Functions

10.1. Service information

There are options in the module for reading different counters. Such as the number of activations of inputs and outputs and for how long they've been active. Various events are also logged, such as how many SMS messages have been sent, and the number of a variety of error states.

#Cn ?	#Cn 0
n is the number:	<i>n = 1,2...6 Digital Voltage Inputs 1 to 6</i>
	<i>n = 81,82...84 Relay Outputs 1 to 4</i>
	<i>n = 101...108 Bit Registers 1-8</i>
	<i>n = 141...148 Message Inputs/Macros 1-8</i>
	<i>n = 200 Number of grid power supply outages</i>
	<i>n = 201 Number of (+V) 20-24V supply output cuts</i>
	<i>n = 202 Number of rule activations</i>
	<i>n = 203 Number of attempts to send SMSs (including failed attempts)</i>
	<i>n = 204 Number of SMSs not sent due to errors</i>
	<i>n = 205 Number of communication errors with the modem</i>

Example: Read Digital Input 4.

#C4 ?

**C4: 9 activations, time:
1d 02:15:24**

NB: Time is given in d:days followed by hours, minutes, seconds.

Example: Reset data for Input 4.

#C4 0

OK: C4 reset

10.2. Special functions

#sys func <x> on	#sys func <x> off
<x> is the number:	<i>n = 1 Connects Input 4 to Output 1</i>
	<i>n = 2 Starts a periodic SMS that sends the uptime and the number of rules activated to P1 time defined in Z19 (default: every 24 hours)</i>

Example: Starts periodic sms

#sys func 2 on

OK: Function activated

(24 hours)

**2d 17:34:09. C202:
0 messages**

Example: Change sending of the periodic message to every 12 hours.

#Z19 12

OK: Z19 = 12

10.3. Supply outages

Functions that can send an SMS message when the supply is connected and disconnected. One can define up to 2 phone numbers to which the message is sent (the default is to send to P1 with the message text “Power on” and “Power off”).

#I200 (<txt-on>) (<txt-off>) <Pxy> <on> <off>	
<txt-on> message text in the event of a supply connection	<i>May not be empty Maximum 40 characters Refrain from using # [] () *</i>
<txt-off> message text in the event of a supply outage	<i>May not be empty Maximum 40 characters Refrain from using # [] () *</i>
<Pxy> Phone numbers the message is sent to	<i>Options: P12...8</i>
<on> The time in seconds that the supply needs to be ON for before <txt-on> gets sent.	<i>Options: 1...60</i>
<off> The time in seconds that the supply needs to be OFF for before <txt-off> gets sent.	<i>Options: 1...60</i>

Example: When the power supply has been removed for at least 4 seconds, the message “CCM Off” is sent to tel.nos. P1 and P8. When the Power Supply is reconnected for at least 4 seconds, they receive the message “CCM On”.

**# I200 (CCM On) (CCM Off)
P18 4 4**

OK: I200 defined

10.4. Supply Output Overload

If the module has a built-in power supply, it will be possible to send a message if the voltage output (+V) is overloaded. One can define up to 2 phone numbers to which the message is sent (the default is to send to P1 with the message text “+V Error” and “+V Ok”).

#I201 (<txt-error>) (<txt-ok>) <Pxy> <on> <off>	
<txt-on> message text in the event of a Supply Output overload	<i>May not be empty Maximum 40 characters Refrain from using # [] () *</i>
<txt-off> message text in the event of the Supply Output being OK again	<i>May not be empty Maximum 40 characters Refrain from using # [] () *</i>
<Pxy> Phone numbers the message is sent to	<i>Options: P12...8</i>
<on> The time in seconds that the supply needs to be ON for before <txt-on> gets sent.	<i>Options: 1...60</i>
<off> The time in seconds that the supply needs to be OFF for before <txt-off> gets sent.	<i>Options: 1...60</i>

NB: The supply output is not on the CCM164-24V module, so this function is not applicable.

Example: When the Supply Output is overloaded for 4 seconds, the message “CCM Error” gets sent to the phone numbers P1 and P8. When the Supply Output is no longer overloaded, the message “CCM Ok” gets sent after 4 seconds.

**# I201 (CCM Error) (CCM Ok)
P18 4 4**

OK: I201 defined

#sys defaults

Configures all values to factory settings

#sys defaults

OK: Sys Defaults

#sys restart

Restarts the module

#sys restart

'No answer'

NB: The function forces the module to restart, i.e. recently updated service information (see section "10.1 Service information") is not guaranteed to be saved at startup again.

#sys info

Example: Retrieve system information

#sys info

**Module 12. 2d 23:59:59 CCM164 -
GSM-230V FW &v2.1.0& EN.
mem:78/1100 Log:8/27 F=0000 -
Lock0 (User) Clock:09:30D3**

Module name = "Module 12" [the return is blank if there's nothing].

Uptime = "2d 23:59:59" [the time the module has been on for in days hours:minutes:seconds].

Product = "CCM164 - GSM-230V" [the product's name and model type].

Firmware version = "FW &v2.1.0&" will be read as version 2.1.0.

Language = "EN", for English.

Text memory used = "mem:78/1100" [used 78 out of 1100 characters].

LOG memory used = "Log:8/27" [used 8 out of 27 LOG places].

Special functions = "F=0000" [special functions selected]

Lock level = "Lock0 (User)" [the level and the access level of the phone number].

Module clock = "Clock:09:30D3" [time in the module and day of the week 1-7 (Mon-Sun)]

#sys iostat

Example: Show values for all inputs and outputs

#sys iostat

**AI1=OFF I1=2bar I2=4m I3=OFF
I4=OFF I5=OFF I6=OFF Q1=OFF
Q2=OFF Q3=OFF Q4=OFF**

NB: Reminds about "#I ?"

#sys astat

Example: Show values for all rules

#sys iostat

```
A1=OFF A2=OFF A3=OFF  
A4=OFF A5=OFF A6=OFF  
A7=OFF A8=OFF A9=OFF  
A10=OFF A11=OFF A12=OFF  
A13=OFF A14=OFF A15=OFF  
A16=OFF
```

NB: Reminds about “#A ?”, but also shows everything undefined

#sys cstat

Simplified Example: Show values for all Counters

#sys cstat

```
C1 0 0d 00:00:00  
C2 0 0d 00:00:00  
C3 0 0d 00:00:00  
...  
C205 0 0d 00:00:00
```

NB: Time is given in “activations, days, hours:minutes:seconds”.

#sys signal

Example: Check the signal strength

#sys signal

RSSI = 82%

NB: Receives the signal strength in percent, in the range of -51 dBm (100%) to -113 dBm (0%).

#sys storage

Eksempel: Check max messages

#sys storage

SMS Storage = 23

NB: the value represents, maksimum number of messages it is able to receive at a time

#sys network

Eksempel: check network

#sys network

Net = GPRS

NB: reads attached network, out of: GSM, GPRS, EDGE, LTE-M, NB-iot, LTE

#sys offset <day> <hour>

<day> number of days the clock needs to deviate from the network's time *Options: -6...6*

<hour> number of hours the clock needs to deviate from the network's time *Options: -23...23*

Example: Configure offset by 1 day forward and 2 hours back in relation to the network connection's time.

#sys info

Module 12. 2d 20:20:02 CCM164 -
GSM-230V FW &v2.1.0& EN.
mem:78/1100 Log:8/27 F=0000 -
Lock0 (User) Clock:09:30D3

#sys offset 1 -2

OK: OFFSET 1 -2

#sys info

Module 12. 2d 20:20:22 CCM164 -
GSM-230V FW &v2.1.0& EN.
mem:78/1100 Log:8/27 F=0000 -
Lock0 (User) Clock:07:30D4

10.6. Configure outputs manually

The value of the outputs can be changed by typing the below command.

#Qn <level> <On time>	
n is the output's number	Options: 1,2...4
<level> is the digital value	Options: ON, OFF
<On time> seconds the outputs are on for (only applies to ON)	May be empty Options: 1,2...3600

NB: The command is rejected if the output is being used in a rule.

Example: Turns on Output 2 for 60 seconds, after which it goes low again

#Q2 ON 60

OK: Q2 = ON 60s

Typical errors:

#Q2 OFF 10

Error in command: Q

NB: The OFF function for #Q can't have a timer.

The values for the Bit Registers can also be changed.

#Bn <level> <On time>	
n is the bit register's number	Options: 1,2...4
<level> is the digital value	Options: ON, OFF
<On time> seconds that the bit register is on for (only applies to ON)	May be empty Options: 1,2...3600

NB: Rules can reject the command if the command violates <action> in rules for the same Bn.

Example: Turns on the Bit Register 2 for 60 seconds, after which it goes low again

#B2 ON 60

OK: B2 = ON 60s

11. Good to know...

11.1. Removing a PIN code from a SIM card

Mount the SIM card in a mobile phone. If the telephone shows that the card requires a SIM or PUK code under startup, then use the telephone's configuration menu to disable this code. Confirm that the code has been disabled by powering the telephone off and on again. If the telephone does not request the code then the SIM card is ready for use in the module.

11.2. Manually unlocking the configuration

1. Turn off the power supply to the module, wait 30 seconds.
2. Open the module's cover, press and hold the MODE button.
3. Turn on the power supply while holding the MODE button depressed.
4. Wait 3-5 seconds until the STATUS flashes with three quick flashes.
5. Release the MODE button and the module is unlocked.

11.3. Manual restart module

1. Open the lid, push an hold MODE-button down
2. Wait 10-30 seconds until STATUS stops blinking
3. Release MODE-button and the module is restarted

11.4. Language restrictions, SMS length (GSM 7 bit / Unicode 16 bit)

Your CCM 164 module can manage SMS messages of various lengths, this depending upon the language that has been selected in the module. See *Error! Reference source not found.. Error! Reference source not found.* for details on how to change the language settings.

Mode GSM (7 bit) works with German, English and all Scandinavian languages and can handle up to 160 characters in an SMS.

Unicode (16 bit) mode can work with a full character set that includes Greek, Russian and French, and therefore does not allow large content in an SMS. For this reason the module will adapt return message lengths so they are suited to the selected language.

When changing language, please check the setup as special characters may be corrupted.

11.5. Recommended configurations

To ensure to receive notifications from the CCM 164 in cases of Net power fallouts the following configurations are recommended:

Net power fallouts

Example configuration of messages in case of Net power fallouts:

- #I200 (Net power on) (Net power off) P1 10 10

By using the configurations above it is ensured that messages are transmitted from the CCM 164 when the Net power falls out and when it comes back on.

If the messages should be sent to more than one phone number from the phone book the example configurations below can be used:

- #I200 (Net power on) (Net power off) P12 10 10

In the example above the messages are sent to phone number 1, 2 from the phonebook.

Supply output (+V) overload

Example configuration of messages in case of +V supply output overload:

- #I201 (+V Error) (+V Ok) P1 10 10

By using the configurations above it is ensured that messages are transmitted from the CCM 164 when the +V supply output is overloaded and when it is ok again.

If the messages should be sent to more than one phone number from the phone book the example configurations below can be used:

- #I201 (+V Error) (+V Ok) P12 10 10

In the example above the messages are sent to phone number 1, 2 from the phonebook.

Configuration of periodical SMS

Example configuration to enable periodic SMS once per day:

- #Z19 24
- #sys func 2 on

Locking of the module

It is generally recommended to lock the configuration using the #lock command. Please refer to *Error! Reference source not found. Error! Reference source not found.* for the details.

12. Problem resolving (troubleshooting)

It is always best to be located at the CCM 164 module when resolving problems. This allows for controlling that power is supplied and that there is sufficient GSM coverage. In many situations it is possible to tackle problems using simple SMS requests. Some of the following solutions are written as questions so as to lead to the problem's actual cause.

a) *I cannot contact the CCM 164 module?*

1. Is there a SIM card in the module?
2. Is power supplied to the module?
3. Do you have the correct number to the SIM card?
4. Is the SIM card *SIM code locked*?
5. Is there GSM coverage?
6. Is everything OK as regards the control lamps?

b) *I can read the module, but why does it return an error when I send a new telephone number?*

- Remember, for example for Denmark, the numbers consists of + and 10 digits, for example +4512345678, where +45 is DK.

c) *I cannot modify the message text A1 and I want to assign it a different name, how do I do this?*

- Make a copy of the message configuration.

Send: **#A1 ?**

Reply: **#A1 (High water alarm) I1 P135**

Remember that a function, message text and message list are closely interrelated.

Therefore, a change in text must be programmed with the same parameters as before for the same function.

Example: Message text 1 is **High water alarm**.

This must be changed to **Port has opened, must be checked** with the same function. When input 1 is activated, an SMS is sent to telephone numbers in the telephone book, namely those in positions 1, 3 and 5.

The new configuration will appear as:

#A1 (Port has opened, must be checked) I1 P135.

d) *I have tried to contact the module, but there is no connection. I know that it did function earlier?*

1. Try to send a **#sys info** to the module. It could be that the module has been locked and your phone number is not in the telephone book.
2. Confirm that the control lamps are lit on the module's cover.
3. Remove the SIM card from the module and insert it into a mobile phone. Send some text messages and see if they are responded to.
 - Error on GSM network.
 - Defect SIM card.
 - SIM card could have been erroneously closed by the service provider.
 - Confirm that the telephone number to the SIM card is the number you are using.
4. Confirm that the antenna and relevant cables are OK:
 - Confirm that the antenna is not snapped, cracked, loose or bent.
 - Confirm there is nothing wrong with the cable.
 - Confirm that the antenna plug is correctly tightened to the module.
5. Reset the module by depressing the MODE button for 10 seconds. When the control lamp flashes the MODE button must be released and the reset begins.

If none of the above remedy the situation then a final test is to turn off the module and let the internal battery discharge.

6. Turn off the power supply to the module and wait 30 minutes.
 - i. Confirm that no lamps are lit under the module's cover.
 - ii. If they are lit, wait until everything is powered off and wait another 5 minutes.
 - iii. Turn on the power supply.
 - iv. Test again by sending **#sys info**.

NB: In some situations there may be a long delay before the message is returned.

If there is still no response and all the above issues have been attempted, then refer to **15.2. Guarantee**.

e) When the supply voltage disappears I do not receive any messages?

A message line must be programmed for power failure.

- Example: #I200 (Net power on) (Net power off) P1 10 10
Written in a new SMS message and sent to the module.

f) SMS module cannot be contacted

If the SMS module cannot be contacted because an error occurred during the programming of the telephone book numbers or similar, then the module can be reset by depressing the MODE button for 10 seconds. The MODE button can be released when the control lamp flashes, this begins resetting the module.

g) SMS module returns "ERROR writing to EEPROM"

Possible error cause:

- The net power is disconnected from module and the module runs in backup mode. It is not allowed to write to the memory in this condition.

h) SMS module returns "ERROR in EEPROM"

This message indicates that a memory error has occurred. To determine whether it is a permanent error or first-start difficulties it is recommended first to reset the module by sending

- #sys defaults
Which is answered by "OK: Sys Defaults"

After the procedure above it is validated by inspecting the STATUS LED whether the module is ok. If not, send

- #sys restart or press and hold the button for 30 seconds

After the procedure above it is validated by inspecting the STATUS LED whether the module is ok by e.g. sending the #sys info. If the module still returns "**ERROR in EEPROM**" please see 15 Responsibility and guarantee

i) The names consists of nonsense characters (@@*&£@|)

This can be due to first-start difficulties or language change. Reset the module by sending

- #sys defaults
Which is answered by "OK: Sys Defaults"

After the procedure above it is validated by sending

- #sys info
Answer Example: "Randersvej 44. 0d 00:01:04. CCM164 - GSM-230 V FW &v2.1.0& EN. mem:78/1100 Log:8/27 F=0000 - Lock0 (User) Clock:09:30D3"
- **IMPORTANT:** if the response displays *Log:0/27*, please send "#sys defaults" again.

13. Overview of commands (short form)

13.1. General command definitions:

- # commands can contain a text/description which must always be within parenthesis (text).
- Only the following characters are allowed in the text description: a-z, A-Z, æ-å, Æ-Å, 0-9, and ; , + - ? &
- # is used as the beginning of a command and must otherwise not be used.
- () are used for definitions of reply text or for naming of an input or output.
- Numerical values with decimal places can only use a dot as separator.
- In general a command followed by a single question mark returns the value and a command followed by two question marks returns the definition. The space between the command and the question mark is optional.

Command		#Kn <parameter>
Parameter	<parameter>	{p1, p2..pN}
Syntax	#K?? #K ??	#Kn <parameter> #Kn <parameter>
Set	#Kn p1 #K p1	OK: Kn defined OK: K defined
Definition	#Kn?? #Kn ??	#Kn p1 #Kn p1
Get	#Kn? #Kn ? #K? #K ?	p1 Kn = p1 p1 pN K1 = p1 ... KN = pN

- Error types:
CCM164 uses a number of defined error messages. The two most typical replies to erroneous commands are:
 - If the command cannot be recognized by the CCM164 “Error command unknown” is returned:
 - E.g. #Q6 ON → Error command unknown: #Q6 ON
 - If the command is recognized but a parameter contains an error “Error in command parameter” is returned:
 - E.g. #LANG BT → Error in command parameter: BT

Module name		#N (<name>)
Parameter	<name>	Name, maximum 40 characters
Configure	#N (Module 12)	OK: N defined
Retrieve	#N??	#N (<name>)
	#N?	module 12
	#N ?	N = Module 12

Language selection		#LANG <language>
Parameter	<language>	Language, {DA, EN, DE, RU, FR, ES}
Configure	#LANG DA	OK: LANG defined
Retrieve	#LANG??	#LANG <language>
	#LANG?	DA
	#LANG ?	LANG = DA

NB: Russian, French and Spanish use Unicode (for sending special characters), i.e. SMSs are getting slower and the App can't be used for large configurations (see section 11.4 for more info regarding this). When changing language, please check the setup as special characters may be corrupted.

Phone book		#Pn <countrycode><phonenumber>
Parameter	n = {1,2,...8}	The phone number's place.
	<countrycode><phonenumber>	Country code, '+', two numbers and the phone number. Maximum 14 characters incl. the '+' sign.
Configure	#P1 +4501234567	OK: P1 defined
Retrieve	#P??	#Pn <countrycode><phonenumber>
	#P?	Defined numbers: +4501234567
	#P ?	Defined numbers: P1 = +4501234567
	#P1?	+4501234567
	#P1 ?	P1 = +4501234567

Locking		#<Function> <x>
Parameter	<Function>	{Lock, Unlock}
	<x> = {0,1,...4}	Different locking methods
Configure	#Lock 3	OK: Access control active Admin: P1...8 Advanced: P1...8 User: P1...8
	#Unlock	OK: Access control not active (60 min)

	<i>Admin</i>	<i>Advanced</i>	<i>User</i>
Lock 0:	<i>Anyone</i>	<i>Anyone</i>	<i>Anyone</i>
Lock 1:	<i>P8</i>	<i>Anyone</i>	<i>Anyone</i>
Lock 2:	<i>P8</i>	<i>P1...8</i>	<i>Anyone</i>
Lock 3:	<i>P8</i>	<i>P1...8</i>	<i>P1...8</i>
Lock 4:	<i>P8</i>	<i>P8</i>	<i>P1...8</i>
<i>Admin: Full control</i>			
<i>Advanced: Read inputs and outputs, change outputs, change phone numbers</i>			
<i>User: Send message input/macro.</i>			

Current input		#AI<txt> R<resolution> U<unit> L<low> H<high>
Parameter	n = { 1 } <txt> <resolution> <unit> <low> <high>	Power input number. Input name, maximum 16 characters. Resolution, {1, 0.1, 0.01, 0.001}. Unit text, maximum 5 characters. Low value at 4 mA {-99999...99999} High value at 20 mA {-99999...99999}
Configure		#AI1 (Level) R0.01 Um L0.00 H10.00 OK: AI1 defined
Retrieve	#AI?? #AI1?? #AI1? #AI1 ?	#AI<txt> R<resolution> U<unit> L<low> H<high> #AI1 (Level) R0.01 Um L0.00 H10.00 2m Level = 2 m

Voltage input		#I<txt> R<resolution> U<unit> L<low> H<high>
Parameter	n = {1,2...6} <txt> <resolution> <unit> <low> <high>	Input number. Input name, maximum 16 characters. Resolution {1, 0.1, 0.01, 0.001} Unit text, maximum 5 characters. Low value at 0 V {-99999...99999} High value at 10 V {-99999...99999}
Configure		#I2 (Pressure) R0.1 Ubar L0.0 H20.0 OK: I2 defined
Retrieve	#I?? #I2?? #I2? #I2 ?	#I<txt> D #I<txt> R<resolution> U<unit> L<low> H<high> #I2 (Pressure) R0.1 Ubar L0.0 H20.0 7.0 bar Pressure = 7.0 bar

Digital input		#I<txt> D
Parameter	n = {1,2...6} <txt>	Input number. Input name, maximum 16 characters.
Configure		#I1 (Light) D OK: I1 defined
Retrieve	#I?? #I1?? #I2? #I2 ?	#I<txt> D #I<txt> R<resolution> U<unit> L<low> H<high> #I1 (Light) D ON Light = ON

Clock		#Wn (<txt>) ON:<hh>:<mm><dd> OFF:<hh>:<mm><dd>
Parameter	n = {1,2...4} <txt> <hh> <mm> <dd>	Input number. Function name, maximum 16 characters. The hours of the time {00,01...23} The minutes of the time {00,01...59} Day of the week {123...7} <i>Monday to Sunday.</i>
Configure	#W1 (Evening) ON:17:00D12345 OFF:22:00D12345	OK: W1 defined
Retrieve	#W?? #W? #W1?? #W1? #W1 ?	#Wn (<txt>) ON:<hh>:<mm><dd> OFF:<hh>:<mm><dd> Messages Defined: W1 = OFF W2 = OFF #W1 (Evening) ON:17:00D12345 OFF:22:00D12345 ON W1 = ON
Delete	#W1 0	OK: W1 deleted

NB: The time in the module is continuously retrieved from the network of the module's SIM card. It is possible to make a time shift in relation to the network's time zone (for more info on this, see the "#sys offset" section 10.5).

NB: The time will not be updated if the SIM card is removed. If the module is started without a network connection, the time will be invalid.

Message Inputs/Macros		#Mn (<txt>) (<input>) LOGm
Parameter	n = {1,2...8} <txt> <input> m = {1,2...21}	The message's number. Function name, maximum 16 characters. Activation text, maximum 20 characters. <i>Not dependent on caps or spaces.</i> Refrain from using special characters. Max number of macro histories saved
Configure	#M1 (Lamp 1 on) (Turn Light On) Turn Light On	OK: M1 defined OK: Lamp 1 on
Retrieve	#M?? #M1?? #M1 ? #M? #LOG ? #LOG1 ?	# Mn (<txt>) (<input>) # M1 (Lamp 1 on) (Turn Light On) LOG1 M1 = +4512345678 Messages Defined: M1 M2 0: M1 21/12/31 23:59 +4501234567 1: M1 21/12/31 23:55 +4501234567 3: M2 21/12/31 23:57 +4510101010 M1 21/12/31 23:59 +4501234567 M1 21/12/31 23:55 +4501234567
Delete	#M1 0	OK: M1 deleted

Output		#Qn (<txt>) #Qn <level> <ON time>
Parameter	n = {1,2...4} <txt> <level> <On time>	Output's number. Output's name, maximum 16 characters. Level is ON or OFF On time in seconds, {1.2...3600}
Configure	#Q1 (Lamp 1) #Q1 ON #Q1 ON 60	OK: Q1 defined OK: Q1 = ON - Turns on Output Q1 invariably OK: Q1 = ON 60s - Turns on Output Q1 for 60 seconds
Retrieve	#Q?? #Q1?? #Q1? #Q1 ? #Q? #Q ?	#Qn (txt) #Qn <level> <ON time> #Q1 (Lamp 1) ON Lamp 1 = ON ON OFF OFF OFF Q1 = ON Q2 = OFF Q3 = OFF Q4 = OFF

NB: The command is rejected if the output is being used in a rule.

Bit Register		#Bn (<txt>) #Bn <level> <ON time>
Parameter	n = {1,2...4} <txt> <level> <On time>	The bit register's number. The bit register's name, maximum 16 characters Level is ON or OFF On time in seconds, range {1..3600} seconds.
Configure	#B1 (Reaction1) #B1 ON #B1 ON 60	OK: B1 defined OK: B1 = ON - Turns on Output B1 invariably OK: B1 = ON 60s - Turns on Output B1 for 60 seconds
Retrieve	#B?? #B1?? #B1? #B1 ? #B? #B ?	#Bn (txt) #Bn <level> <ON time> #B1 (Reaction1) ON Reaktion1 = ON ON OFF OFF OFF ... B1 = ON B2 = OFF B3 = OFF B4 = OFF ...

NB: The command is rejected if the bit register is being used in a rule.

Rule		#An (<txt>) <condition> <action>
Parameter	n = {1,2...16} <txt>	The rule's number (The highest number is determinative) The rule's name (refrain from using: # [] () * <condition> <con1><op><con2> or <con1> {AIn, In, Bn, Mn, An, !AIn, !In, !Bn, !Mn, !An} <Op> = {<, >, +, &}
	<action>	<out1> <out2> <out3> <out4> { Qn, Bn, P12...8, M12...8, !Qn, !Bn, =Qn, !=Qn, TQn, QnDt, !QnDt, =Bn, !=Bn, TBn, QnDt, !QnDt} <i>May be empty</i> =Qn, the value of <condition> becomes Qn !=Qn, opposite value of <condition> becomes Qn TQn, changes the Qn value once QnDt, sets Qn to high for 't' seconds !QnDt, sets Qn to low for 't' seconds (Same goes for B instead of Q)
<p>Largest rule no. A<n> determines value for Output Qn and Bn. A <condition> that's false only determines for =Qn, !=Qn, =Bn and !=Bn.</p>		
Configure	#A1 (Level higher than 5) A1>5 Q1D10 Q2 TQ3 =Q4	OK: A1 defined
Retrieve	#A?? #A1?? #A1? #A1 ?	#An (txt) <condition> <action> #A1 (Level higher than 5) A1>5 Q1D10 Q2 TQ3 =Q4 OFF Level higher than 5 = OFF
Delete	#A1 0	OK: A1 deleted

Reaction speed		#Zn <RT> <RF> <RD>
Parameter	n = {1,2...16} <RT> <RF> <RD>	#Zn is the reaction speed for #An. Seconds <condition> is true before <action> applies/is performed, {0,1,2...3600} Seconds <condition> is false before <action> doesn't apply, {0,1,2...3600} Seconds <condition> is true before sms messages are sent, {1,2...3600} 0 performs <action> as fast as possible, but no faster than 10Hz.
Configure	#Z1 10 10 120 #Z 5 5 10	OK: Z1 defined OK: Z defined
Retrieve	#Z?? #Z ? #Z1?? #Z1? #Z1 ?	#Zn <RT> <RF> <RD> Z1 =10 10 120 Z2=10 10 120 ... Z16=10 10 120 #Z1 10 10 120 10 10 120 Z1 = 10 10 120

Counters		#Cr <clr>
Parameter	r	r = [1..6] Analogue/Digital Voltage Input 1..6 r = [81..84] Relay Output 1..4 r = 101...108 <i>Bit Register 1-8</i> r = 141... 148 <i>Message Input/Macro 1-8</i> r = 200 Number of grid power supply outages. r = 201 Number of (+V) 20-24 V supply output cuts. r = 202 Number of actions that have been triggered. r = 203 Number of attempts to send SMSs r = 204 Number of SMSs not sent due to errors. r = 205 Number of communication errors with the modem.
	<clr>	Configured to '0' in order to reset counter activations and the time.
Configure	#C1 0	OK: C1 deleted
Retrieve	#C?? #C1? #C1 ?	#C<1-6,81-84,101-108,141-148,200-207> 0 0mV, 0 activations, time 0d 00:00:00 C1: 0mV, 0 activations, time 0d 00:00:00

Supply outage		#I200 (<txt-on>) (<txt-off>) <Pxy> <on> <off>
Parameter	<txt-on> <txt-off> <Pxy> <on> <off>	The text in the event of a connection, maximum 40 characters. The text in the event of an outage, maximum 40 characters. The tel.no. messages are sent to {P12...8} Seconds the supply needs to be connected before <txt-on> gets sent, {1,2...60} Seconds the supply needs to be disconnected before <txt-off> gets sent {1,2...60}
Configure	#I200 (Power on) (Power off) P1 10 10	OK: I200 defined
Retrieve	#I200?? #I200? #I200 ?	#I200 (Power on) (Power off) P1 10 10 OFF I200 = OFF
Delete	#I200 0	OK: I200 disabled

Supply Output Overload		#I201 (<txt-error>) (<txt-ok>) <Pxy> <on> <off>
Parameter	<txt-error> <txt-ok> <Pxy> <on> <off>	The text in the event of an error, maximum 40 characters. The text in the event of a connection, maximum 40 characters. The tel.no. messages are sent to {P12...8} Seconds the +V supply needs to be experiencing an error before <txt-error> gets sent, {1,2...60} Seconds the +V supply needs to be ok before <txt-ok> gets sent, {1,2...60}
Configure	#I201 (+V Error) (+V Ok) P1 10 10	OK: I200 defined
Retrieve	#I201?? #I201? #I201 ?	#I201 (+V Error) (+V OK) P1 10 10 OFF I201 = OFF
Delete	#I201 0	OK: I201 disabled

NB: The supply output is not on the CCM164-24V module, so this function is not applicable.

Enable special functions		#sys func <x> <level>
Parameter	<x> = {1,2}	1: Connects Input 4 to Output 1 2: Periodic SMS to P1, time defined in Z19 (Default: every 24 hours) Level is ON or OFF
Configure	#sys func 2 ON	OK: Function activated
Configure	#Z19 12	OK: Z19 = 12

System commands

Configure default values		#sys defaults
Configure	#sys defaults	OK: Sys Defaults
Description	Configures all values to factory settings	

Restart the module		#sys restart
Configure	#sys restart	<i>The module doesn't respond to this command</i>

Retrieve system information		#sys info
Configure	#sys info	Randersvej 44. 2d 23:59:59 CCM164 - GSM-230V FW &v2.1.0& EN. mem:78/1100 Log:8/27 F=0000 - Lock0 (User) Clock:09:30D3

Retrieves current values for inputs and outputs		#sys iostat
Configure	#sys iostat	A11=3998uA I1=OFF I2=OFF I3=OFF I4=OFF I5=OFF I6=OFF Q1=OFF Q2=OFF Q3=OFF Q4=OFF

Retrieve current status for all #An		#sys astat
Configure	#sys astat	A1=OFF A2=OFF A3=OFF A4=OFF A5=OFF A6=OFF A7=OFF A8=OFF A9=OFF A10=OFF A11=OFF A12=OFF A13=OFF A14=OFF A15=OFF A16=OFF

Retrieve current values for all Counters		#sys cstat
Configure	#sys cstat	C1 0 0d 00:00:00 C2 0 0d 00:00:00 C3 0 0d 00:00:00 ... C205 00d 00:00:00

Signal strength (telephone network)		#sys signal
Retrieve	#sys signal	RSSI = 82%
Description	Receives the signal strength in percent, in the range of -51 dBm (100%) to -113 dBm (0%).	

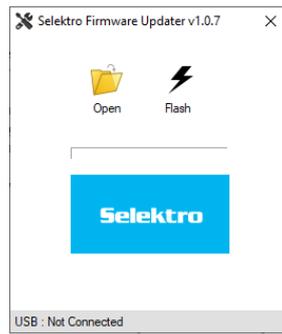
SMS Storage		#sys storage
Retrieve	#sys storage	SMS Storage = <value>
Description	<i>The value represents, maksimum number of messages it is able to receive at a time</i>	

Network		#sys network
Hent	#sys network	Net = <network>
Beskrivelse	<i>Reads attached network, out of: GSM, GPRS, EDGE, LTE-M, NB-iot, LTE</i>	

Adjust Clock offset		#sys offset <day> <hour>
Parameter	<day> <hour>	Number of days the clock needs to deviate from the network's time {-6... 6} Number of hours the clock needs to deviate from the network's time {-23...23}
Configure	#sys offset 0 2	OK: offset 0 2

14. Firmware update

The firmware in CCM 164 can be updated using the PC programme “Selektro Firmware Updater” for Microsoft Windows 7 or later, and a Micro USB cable for connecting between a PC and CCM 164:

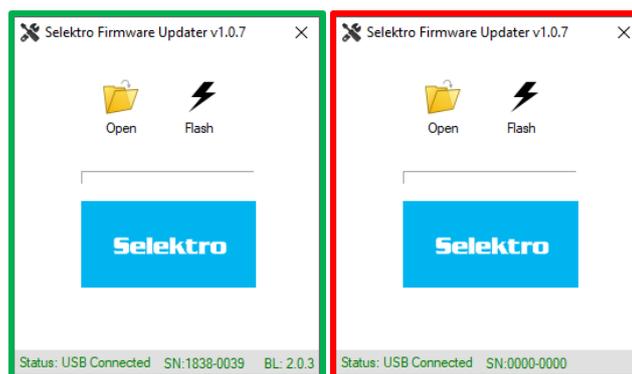


It is important to make a backup of your settings before starting the firmware update. I.e. programmed phone numbers, messages and other settings. **This is important because it might be necessary to reset the configurations after updating the firmware.**

1. Start the PC programme “Selektro Firmware Updater”.
2. Now connect the Micro USB cable between the PC and CCM 164.



3. Hold down the Mode button until the program displays an SN number (approximately 20 seconds):



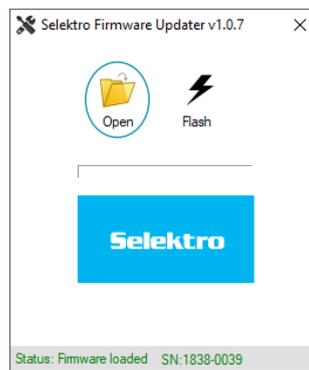
Correct example

not connected yet

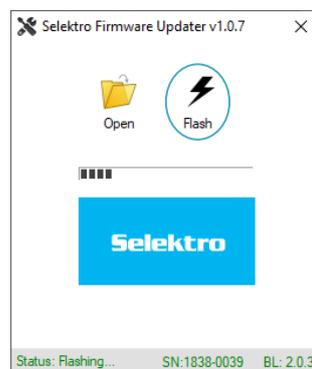
If this method doesn't work:

- a. Send the command “#sys restart”
- b. Remove the supply to the module. Wait until the backup supply is completely discharged (all LEDs are off), which can take up to 20 minutes. *Now unplug it and plug it in again*

- Click the “Open” button, then select the firmware file e.g. CCM164-vxyz.srec. If all goes well, the programme status will change to “Firmware Loaded”:

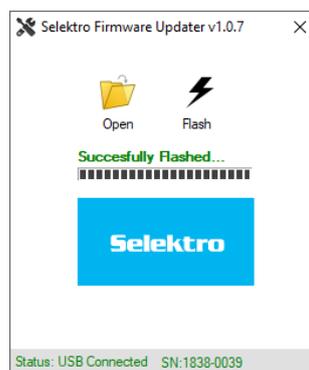


- Click the “Flash” button to start the update. The programme status will change to “Flashing...”, and the status bar in the middle will show the progress of the update.

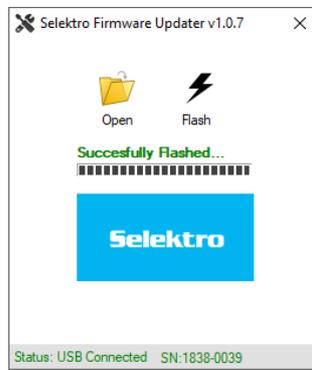


NB: Don't remove the USB cable while the module is being updated.

- When the update is complete, the status bar will say “Successfully flashed !!!”:



- Remove the USB cable before closing the “Selektro Firmware Updater”.



8. Close the “Selektro Firmware Updater”.

9. Send “#sys defaults” to the module

Updating the software version may make changes that trigger EEPROM errors when starting up. Send the message “#sys defaults”. This resets the configuration. Validate whether the module starts up without an EEPROM error indication.

10. You can then check with “#sys info” whether the version has been updated to the desired version. If the module doesn’t start up afterwards, try updating again.

If using the app, remove the module and retrieve it again.

15. Responsibility and guarantee

15.1. Responsibility for CCM 164 and its use

The CCM 164 module from Selektro A/S is intended for monitoring and registering events on its inputs. An SMS with the programmed text is sent to the programmed telephone numbers. The module can, upon receipt of an SMS, start and close four relay outputs. The CCM 164 module will send a message if power from the power grid (230 VAC) is lost.

A Selektro CCM 164 module, is as described, intended for monitoring and error reporting. The module can, upon receipt of an SMS message with the appropriate text, activate one of the outputs, which can then be used as necessary.

The CCM 164 module uses the standard GSM850/900 and GSM1800/1900 net, and there can be periodic failure or varying coverage. Reliability of the SMS can therefore never be better than that in the local GSM network.

GSM coverage must be ensured upon installation of the system, and this for all actual locations and under all conditions.

Selektro A/S does not accept any responsibility for damages caused by use of a CCM 164 module, and this for both person and material damages.

15.2. Guarantee

Selektro A/S provides 1 year and 6 months guarantee on its CCM 164 modules, and this from the date (year and week code) specified by the Warranty Start on the Warranty label on the side of the module. The guarantee does not cover materials or working hours for the repair of defect modules that have been sent to our address.

Exempt from guarantee are:

- Incorrect connection to the power source.
- Incorrect voltages on inputs.
- Excessive loads on relay outputs.
- Disassembly of the product.
- Bad GSM coverage in the area of its implementation.
- Programming of a replaced module.

What to do if a module is defective within its guarantee period:

Call Selektro at +45 87761100 and request a return authorization. Following investigation of the defect CCM 164 we will determine whether it will be repaired or exchanged.

What to do if a module is defective outside its guarantee period:

Call Selektro at +45 87761100 and request a return authorization. Following investigation of the defect CCM 164 we will send you an offer for the repair or possible exchange.

16. Electrical specifications

Order number:

CCM164 – IoT – 24V	1310-2408164
CCM164 – 4G – 24V	1310-2404164
CCM164 – GSM – 24V	1310-2401164
CCM164 – IoT – 230V	1310-0008164
CCM164 – 4G – 230V	1310-0004164
CCM164 – GSM – 230V	1310-0001164

Main power supply:

CCM 164 - 24V		CCM 164 - 230V	
Supply voltage	24VDC (19-32V)	Main voltage	230 Vac +10% /-20%
Supply current	0.002-0.300 A	Frequency	50/60Hz
	Max. 10A	Input current	0.004 ... 0.06 A
Power consumption	Standby 0,6W	Inrush current	<10A
	Max. 10W	Power consumption	Max. 10W
		External fuse	≤250mAT

- Overvoltage Category III
- Pollution degree 3
- Rated impulse withstand voltage $U_{imp} = 4kV$

Installation and physical:

- Mount on a 35 mm DIN rail
- Size (WxHxD) 87 x 90 x 62mm
- Weight 250g
- Wire size 0.5 - 2,5mm²
- Vibration (sinusoidal) 10-500Hz, 1G
- Free fall 0.3m
- Protection degree IP20
- Relative air humidity 10% - 95% no condensation.
- Ambient temperature operation -20°C to +50°C
- Must not be exposed to direct sunlight during operation.
- Storage and transportation temperature -20°C to +60°C
- Max. altitude above sea level 2000m
- Startup time 20-120sec. depending on GSM NET.
 - Warning: Contains power bank, do not disassemble!
- Backup 2 SMS messages @ 2min.
Number of messages depends upon GSM NET and provider.

Analog input 0 ... 20 mA / 4 ... 20 mA:

- Number 1
- Electrically isolated No
- Analog mode
 - Measure range 4 ... 20mA
 - Input impedance Approx. 100Ω
 - Error limit +/- 1% at FS
- Input range [min/max] 0...24mA, 0...30VDC
- Input frequency Max. 10Hz
- Line Length: Max. 100m

Digital input with optional 0...10 V analog:

- Number 6
- Electrically isolated No
- Digital mode
- Input voltage low < 5V high > 11V
- Input current low < 1mA high > 4mA
- Analog mode
 - Measure range 0 ... 10VDC
 - Input impedance Approx. 20kΩ
 - Error limit +/- 1% at FS
- Input range [min/max] 0 ... 30VDC
- Input frequency Max. 10Hz
- Line length Max. 100m

Digital output:

- Number 4
- Output type Relay outputs
- Electrical isolated Yes
- Isolation voltage 4 kV
- Relay NO #11 and #21
 - Continuous load Max. 10A @ 230Vac - AC1
Max. 500W @ 230Vac - AC3
Max. 1A @ 48VDC
Max. 10A @ 24VDC
 - Minimum current 5mA @ 10V
 - Max inrush current 18A
 - Switching rate Max. 1Hz
- Relay NO #31 and #41
 - Continuous load Max. 2A @ 230Vac - AC1
Max. 100W @ 230Vac - AC3
Max. 1A @ 30VDC
 - Min. current 5mA @ 10V
 - Max. inrush current 6A or 10A @ 20ms
 - Switching rate Max. 10Hz
- Line length Max. 100m

Power supply output +V (Only 230V version):

- Output voltage 24 V DC
- Tolerance +/- 20 %
- Output current max. 100 mA

Antenna:

- Gain: 0 dBm
- Connector on module: SMA female

Band and frequency:

- GSM type:
 - GSM/EDGE: B3/B8 - 850/900/1800/1900Mz
- 4G type:
 - LTE: B1/B3/B7/B8/B20/B28 - 700/800/1700/1800/1900/2000/2100/2500/2600MHz
 - WCDMA: B1/B8 - 850/900/1700/1800/1900/2100Mz
 - GSM/EDGE: B3/B8 - 850/900/1800/1900Mz
- IoT type:
 - Cat M1:
B1/B2/B3/B4/B5/B8/B12/B13/B14/B18/B19/B20/B25/B26/
B27/B28/B66/B85 – 700/800/850/900/1700/1800/1900/2000/
2100/2500/2600MHz
 - GSM/EGPRS: B3/B8 - 850/900/1800/1900Mz



Electric and electronic equipment (EEE) contains materials, components and compounds that can be dangerous and damaging to human health and to the environment. This is when waste from such electrical and electronic components (WEEE) is not correctly disposed of.

Products that are marked with the cancelled trash can are electric and electronic equipment. The cancelled trash can symbolizes that waste from the electric and electronic equipment must not be disposed of together with unsorted household garbage, but must be collected separately.

For this purpose, all local councils have established collection procedures whereby electric and electronic trash can be delivered free of charge for recycling or to sites for its disposal. Direct collection from households is also possible. Relevant details can be obtained from the respective council's technical

EU – Declaration of Conformity

Undersigned

Selektro Group A/S, Erhvervsvej 33, DK-9632 Møldrup.

hereby declare under our sole responsibility that the following equipment/product/apparatus:

Manufacturer Selektro A/S

Product CCM 164 – GSM, CCM 164 - 4G og CCM 164 - IoT

is in accordance with the requirements of the EU directives specified below, when applied with the mentioned standards:

Directives:

- 2014/35/EU Low Voltage Directive (LVD)
- 2014/53/EU Radio Equipment Directive (RED)
- 2014/30/EU Electromagnetic Compatibility (EMC) Directive
- 2011/65/EU + 2015/863/EU RoHS 2 Directive
- 2012/19/EU WEEE Directive

Standards:

- EN 62368-1:2020+AC:2020 Audio/video and communication technology equipment – Safety requirements
- EN 61000-6-2:2019 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments;
- EN 61000-6-3:2007+A1:2011+A1/AC:2012 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments;
- EN 301 489-1 V2.2.0:2017 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
- EN 301 489-52 V1.1.0:2016 Electromagnetic Compatibility (EMC) standard for radio equipment and services;
- EN 301 511 V12.5.1:2017 Global System for Mobile communications (GSM); Mobile Stations (MS) equipment;
- EN 301 908-1 V13.1.1:2019 IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
- EN 301 908-2 V13.1.1:2020 IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU;
- EN 301 908-13 V13.1.1:2019 IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

This requires that the product is correctly mounted, maintained and used as originally intended, in accordance with the judicial laws, valid manufacturer guidelines and standard accepted procedures and use.

Applicable from 2nd of January 2021.



Karl Peter Andersen
Director
Selektro A/S