

Installation and User Guide

# GSM Modem 5

English



Kamstrup A/S  
Industrivej 28, Stilling  
DK-8660 Skanderborg  
TEL: +45 89 93 10 00  
FAX: +45 89 93 10 01  
info@kamstrup.com  
www.kamstrup.com



<b>1. Description</b>	<b>3</b>
1.1 Description of GSM Modem 5	3
1.2 Using GSM Modem 5	3
1.3 Technical data	4
<b>2. Installation</b>	<b>5</b>
2.1 Installation	5
2.2 SIM card	5
2.3 GPRS (variant)	6
Set-up:	6
2.4 Supply and GSM network	6
2.5 Signal test	6
2.6 Selecting antenna	7
2.6.1 Internal antenna	7
2.6.2 External antenna (to be ordered separately)	7
2.6.3 Automatic antenna selection	8
2.6.4 Light-emitting diodes	8
2.7 Connecting meters and M-Bus Master	9
2.8 Connecting control relays	10
2.8.1 General information	10
2.9 Connecting status/pulse inputs	10
<b>3. Reading Meters via SMS</b>	<b>11</b>
3.1 Reading a Kamstrup electricity meters via SMS	11
3.1.1 Reading Kamstrup 162/382 via SMS	11
3.1.2 Reading Kamstrup 351 Combi via SMS	11
3.1.3 Reading P/L meter vis SMS	11
3.1.4 Reading MULTICAL® or an M-Bus system via SMS	11
<b>4. Error Detection Help</b>	<b>13</b>
<b>5. SMS Commands</b>	<b>15</b>
<b>6. GSM Modem 5 Variant Structure</b>	<b>19</b>



# 1. Description

## 1.1 Description of GSM Modem 5

GSM Modem 5 is GSM modem unit of general use. It is designed for meter reading and for special tasks e.g. like controlling relays and receiving input from status inputs.

## 1.2 Using GSM Modem 5

The modem can be used for following purposes:

<b>AU version:</b>	<b>Function</b>	<b>Meter Type</b>	<b>Software/Control Unit</b>
<b>1.0.0.1</b>	Reading of electricity meters	Kamstrup 162 Kamstrup 382 Kamstrup 351 Kamstrup 351 Combi P/L	EMS10
	Reading of heat meters	MULTICAL®	PcLink PcBase EMS 10
	Reading of M-Bus systems	M-Bus Master with cascade module	PcLink PcBase PcTarifBase (only electricity mters) EMS 10

GSM Modem 5 will constantly be developed which means that new versions of the software will appear with functions not mentioned here.

Therefore, we recommend you to send the SMS command: =version# to the unit to determine version and thereby which functions the modem can perform.

### 1.3 Technical data

- Dual band GSM modem for meter reading, M-Bus and standard RS232
- Standard IP 54 box with built-in 110/230 V power supply
- Communication up to 9600 baud
- Built-in real-time-clock (RTC) with back-up for 10 days
- 2 serial ports (1 pcs. Kamstrup 3-wire and 1 pcs. RS232/ Kamstrup 3-wire)
- 2 relay outputs, 230 VAC/100 mA, solid state
- 2 status inputs, potential free, 3.6 VDC in series with 1M
- Reading of Kamstrup electricity meters with SMS
- RTC controlled GSM reset
- Status LED's for GSM network and antenna signal
- Push button for GSM signal test
- Temperature range from -40° to +60°
- Consumption, idle: 2 VA, consumption active: 4 VA
- GPRS variant

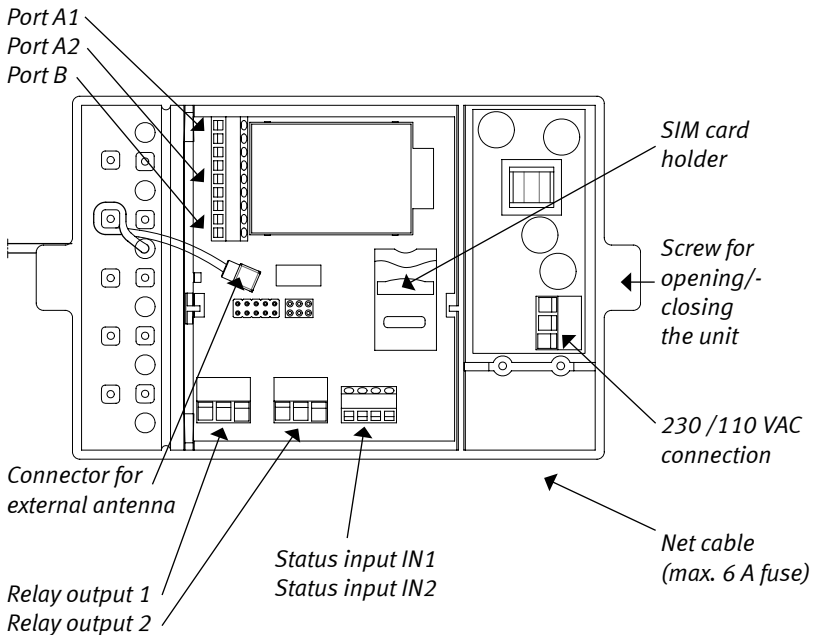


Fig. 1

## 2. Installation

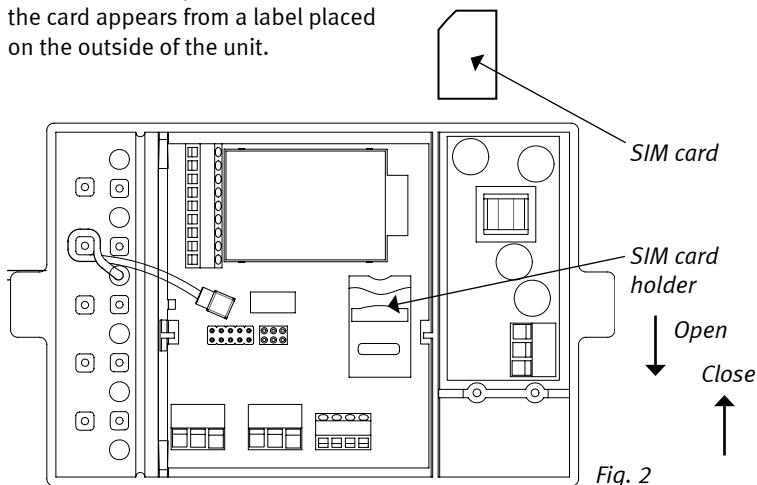
### 2.1 Installation

We recommend that GSM Modem 5 is installed by means of fittings or DIN brackets. GSM Modem 5 should not be mounted immediately next to power cables.

### 2.2 SIM card

The unit can be ordered with the SIM card mounted from the factory. Please check that the card has been inserted. The telephone number of the card appears from a label placed on the outside of the unit.

**NOTE:** Do not supply GSM modem 5 with voltage, while inserting/ changing the SIM card.



Please note, that Kamstrup A/S cannot be held responsible for theft and misuse of SIM cards from GSM Modem 5 units.

If the unit is supplied without a SIM card, make sure that it is inserted before using the unit. Open the SIM card holder by pushing it in the direction of the arrow towards "Open" and then carefully tipping up the holder. Place the SIM card with the "cut-off" corner in the top left side with the contacts facing the print. At last,

tip back the SIM card and lock it by pushing the holder in the direction of the arrow towards "Lock". Please remember to write the telephone number on a label placed on the outside of the unit.

The SIM card must fulfil following requirements: DATA/SMS-9.6kb V110, PIN code must be disabled, voice and pre-paid card cannot be used. Please contact your telecom supplier, if you have any questions.

## 2.3 GPRS (variant)

The GPRS variant has the same functionality as GSM Modem 5, however, it communicates via GSM and GPRS. To communicate via GPRS a few parameters must be determined prior to ordering.

### Set-up:

Kamstrup A/S recommends to create a closed APN (Access Point Name) with the telecom supplier, that is only accessible via a VPN (Virtual Private Network). GSM Modem 5 uses the APN name to log on the APN via GPRS.

In short, following items must be clarified prior to ordering:

- APN name (the name of a closed user group)
- VPN connection (tunnel between the GPRS unit and the reading system with data encryption)
- The network of the telecom supplier must be tested by Kamstrup.

Remember always to contact Kamstrup A/S before ordering GPRS.

## 2.4 Supply and GSM network

Correct installation and an unproblematic use of GSM Modem 5 requires supply voltage and the fact that the GSM modem is able to find its GSM network operator.

Connect 110/230 VAC to the unit via the enclosed net cable. The GSM receiving conditions depend on the electricity meter location. Therefore, use an external antenna if you are not sure that the GSM receiving conditions are sufficient to ensure an unproblematic operation.

## 2.5 Signal test

On GSM Modem 5 it is possible to make a signal test in connection with installation. The signal test states the signal level based on a scale with 32 levels:

1. Activate the push button for approx. 2 sec. (*see fig. 3*)
2. The TEST diode now lights constantly for approx. 10 sec. (*see fig. 3*), and the signal strength is indicated with flashes on the scale of 0 to 31:

- A long flash equals 10
- A short flash equals 1

I.e. a signal strength of 14 is indicated by one long flash and 4 short ones.

3. Recommended signal strength is min. 12.

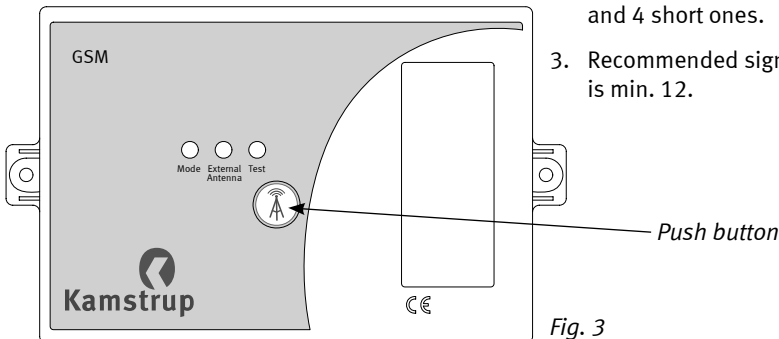


Fig. 3



## 2.6 Selecting antenna

### 2.6.1 Internal antenna

From the factory the GSM Modem 5 is equipped with an internal GSM antenna which is placed in the lid. The internal antenna will be used as default.

In connection with installation it is important to know if the internal antenna is sufficient or if an external antenna should be mounted.

In order to find out the fitter must make following selections:

1. Mount the lid on the GSM Modem 5 and make the signal test as shown in *paragraph 2.5*

If the signal conditions are acceptable it is not necessary to install an external antenna

2. If the signal conditions are not acceptable, an external antenna will be mounted, *see paragraph 2.6.2*

### 2.6.2 External antenna (to be ordered separately)

Connect the external antenna to the antenna connector on the print and turn the antenna cable around the connecting piece for correct strain relief, *see fig. 4*.

Place the external antenna for optimal antenna conditions.

1. Mount the lid of GSM Modem 5
2. Press the signal button twice. The diode indicating *External Antenna* emits light when external antenna is selected.
3. Perform a signal test as stated in paragraph 2.5
4. Move the external antenna to another position, if the signal test result is not satisfactory.
5. Always remember to perform a new signal test, if the external antenna has been moved.
6. If you wish to leave out the external antenna and use the internal antenna, press the button twice. The diode indicating *External Antenna* turns off.

If the buttons are not pressed correctly the diode flashes once to indicate that the modem does not understand the command.

Strain relief  
for external  
antenna

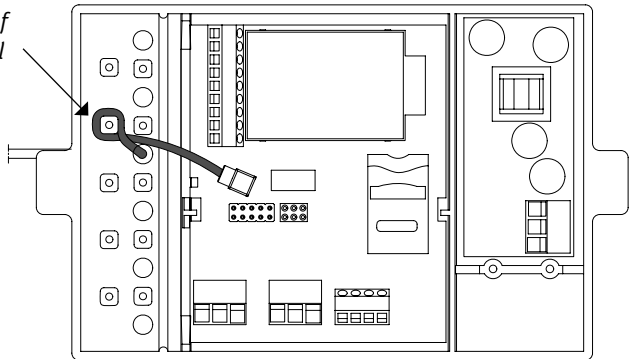


Fig. 4

Signal (dBm)	Signal with signal test	Signal with =signal# SMS	
-113	0	0	
-111	1	0	
-109	2	0	
-107	3	0	
-105	4	0	
-103	5	0	
-101	6	0	
-99	7	0	
-97	8	0	
-95	9	0	
-93	10	1	
-91	11	1	
-89	12	1	GSM minimum
-87	13	1	
-85	14	1	
-83	15	1	GPRS minimum
-81	16	1	
-79	17	1	
-77	18	1	
-75	19	2	
-73	20	2	
-71	21	2	
-69	22	2	
-67	23	2	
-65	24	2	
-63	25	2	
-61	26	3	
-59	27	3	
-57	28	3	
-55	29	3	
-53	30	3	
-51	31	3	

### 2.6.3 Automatic antenna selection

1 hour after the GSM Modem 5 has been set up, it automatically selects antenna. The modem finds the antenna with the best signal (internal or external antenna). From now on, the modem will automatically select antenna every 24 hours.

### 2.6.4 Light-emitting diodes

Please note that all light-emitting diodes automatically turn off after 10 minutes—no buttons have been activated. The light-emitting diodes are activated again by making a signal test (*see paragraph 2.5*).

<b>External antenna diode (orange)</b>	<b>Shows selected antenna</b>
LED emits light	External antenna has been selected
LED switched off	Internal antenna has been selected

<b>MODE diode (green)</b>	<b>Indicates supply and status of the GSM unit</b>
LED switched off	No supply voltage
LED emits light constantly	The GSM unit is establishing contact to the GSM network
LED flashes slowly ½ sec. ON/OFF	NORMAL SITUATION The GSM unit is connected to the GSM network
LED Flashes quickly ¼ sec. ON/OFF	The GSM unit is communicating, i.e. the unit has received a call and connection has been established

<b>TEST diode (orange)</b>	<b>Indicates antenna selection (<i>see paragraph 2.6.2</i>) and signal strength (<i>see paragraph 2.5</i>)</b>
----------------------------	--

## 2.7 Connecting meters and M-Bus Master

GSM Modem 5 can be connected to and read by electricity meters, heat meters and M-Bus Master. The meter or M-Bus Master is connected to

either port A1 (top) or port B (bottom) via the 3-wire cable which can be delivered together with the GSM unit.

Meters or M-Bus Master are connected as follows:

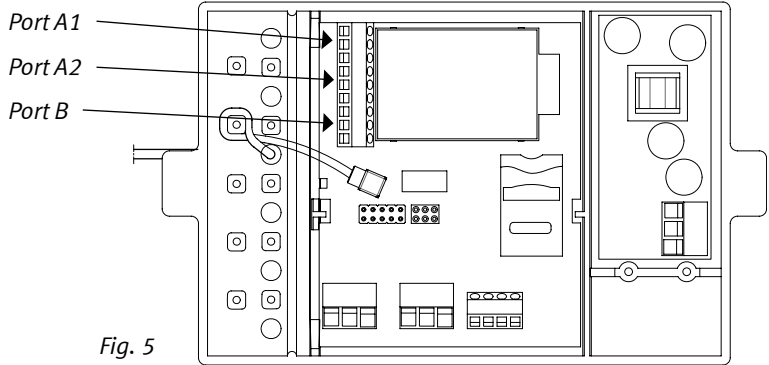


Fig. 5

Kamstrup 162/382

Kamstrup 351/351 Combi

M-Bus

MULTICAL®

GSM Modem 5 <b>Port A1 or Port B</b> (Kamstrup RS232)	Electricity meters Heat meters
DATA	62
REQ	63
GND	64

P/L precision  
electricity meter

GSM Modem 5 <b>Port A2</b> (True RS232)	P/L electricity meter
Rx	Tx brown (23 or 24)
Tx	Rx white (24 or 23)
GND	GND green (25)

GSM Modem 5 is automatically set-up and controlled through communication from the PC program PcLink, PcModem or EMS10.

## 2.8 Connecting control relays

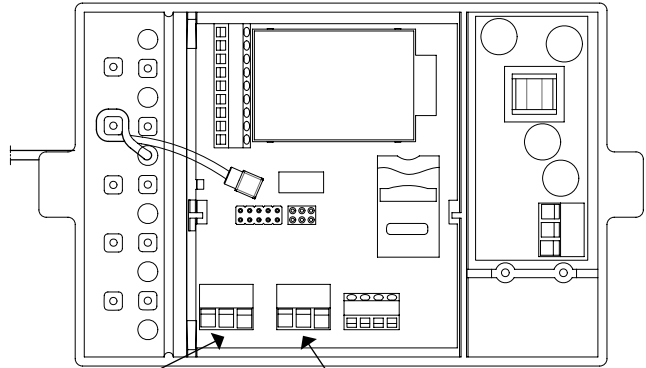
We recommend following relays:

OMRON type G2RS relay:

Connection, OUT 1 or OUT 2 (see fig. 6)

### 2.8.1 General information

The relay outputs are of the solid state type, and can each be loaded with 230 VAC, max. 100 mA.



Relay 1 (OUT 1)

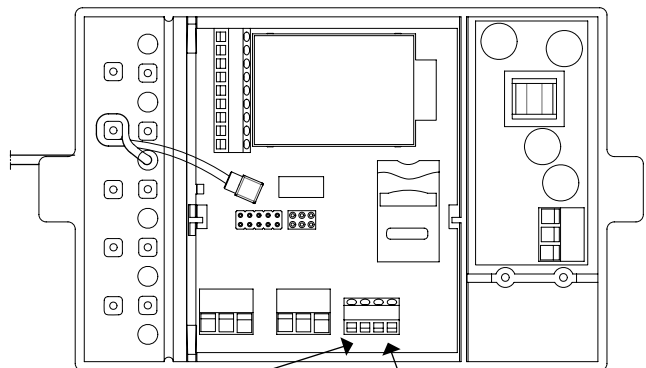
Relay 2 (OUT 2)

Fig. 6

## 2.9 Connecting status inputs

These inputs can e.g. be used as status input from the control relays.

The inputs are potential free.



Status input 1

Status input 2

Fig. 7

## 3. Reading Meters via SMS

### **NOTE:**

*SMS commands must consist of either capital letters or small letters, and small and capital letters must not be mixed in the same SMS command.*

### **3.1 Reading a Kamstrup electricity meters via SMS**

#### **3.1.1 Reading Kamstrup 162/382 via SMS**

A direct electricity meter of the types Kamstrup 162 or Kamstrup 382 connected to the GSM unit can be read from a GSM telephone by means of an SMS command.

The command is entered as follows:

```
=READ_METER#
```

Then dial the telephone number of the GSM unit and send the SMS.

The meter returns *<kWh> <power> <hour counter> <meter number>* including unit descriptions.

#### **3.1.2 Reading Kamstrup 351 Combi via SMS**

The command is entered as follows:

```
=READ_CT_METER#
```

Then dial the telephone number of the GSM unit and send the SMS.

The meter returns *<kWh> <kvarh> <hour counter> <meter number>* including unit descriptions.

#### **3.1.3 Reading P/L meter vis SMS**

GSM Modem 5 returns  
<NO METER RESPONSE>

#### **3.1.4 Reading MULTICAL® or an M-Bus system via SMS**

GSM Modem 5 returns  
<NO METER RESPONSE>

## 4. Error Detection Help

**NOTE:**

*SMS commands must consist of either capital letters or small letters and small and capital letters must not be mixed in the same SMS command.*

Check that 110/230 VAC is available	Measure on the net terminals, <i>see paragraph 1.3</i> The MODE diode must flash, <i>see paragraph 2.6.4</i>
Has the SIM card been placed correctly?	<i>See paragraph 2.2</i>
Is it the right SIM card?	Check the telephone number and make sure that it is a data subscription, <i>see paragraph 2.2</i>
Which status does the GSM unit have?	See the MODE diode, <i>see paragraph 2.6.4</i>
Is there a GSM signal?	The SIGNAL diode must either flash quickly or emit light constantly, <i>see paragraph 2.6.4</i>
Try to call the unit	A “modem/fax” sound can be heard, provided that a VOICE SIM card is not inserted into the unit
Has the meter been connected correctly?	<i>See paragraph 2.4 and 2.5</i>
Try to send an SMS to the modem e.g. =READ_RTC#	The unit must return with time and date
Test the GSM unit and meter connection by means of an SMS =READ_METER#	<i>See paragraph 4</i> for test of correct set-up and test of the GSM unit and meter connection
Test the GSM unit alone by means of SMS =READ_METER#	<i>See paragraph 4</i> , test of M-Bus, P/L meter, MULTICAL® heat meter and test the functioning of the GSM unit
Always make a final control reading from the main station	Call the utility and check that meter data has been received.
Defective modem	Always enclose a precise description of the error.





## 5. SMS Commands

### SET\_RTC – for setting the clock

Syntax	=SET_RTC <hh>:<mm>:<ss> <dd>/<mm>/<yy> <dag>#
Example: Set the clock at 12:15 p.m. Tuesday 15 March 2006 (Day: Monday = 1, Tuesday = 2 ... etc.)	=SET_RTC 12:15:30 15/03/04 2#
Return answer, correct	No answer
Return answer, error	No answer

### READ\_RTC – for reading the clock

Syntax	=READ_RTC#
Example: Return answer, correct	=READ_RTC# 13:11:27 17/06/04 3#
Return answer, error	No answer

### READ\_METER – for reading a direct meter (e.g. Kamstrup 382)

Syntax	=READ_METER#
Example: Return answer, correct Meter no. 10101010 is read, the register is 32432 kWh, the power is 343 W and the meter has operated for 2452 hours.	=READ_METER# 32432 kWh, 343 W, 2452 Hours Meter no: 10101010
Return answer, error	No answer

### READ\_CT\_METER – for reading a trafo meter (e.g. Kamstrup 351)

Syntax	=READ_CT_METER#
Example: Return answer, correct Meter no. 10101010 is read, the register is 32432 kWh, reactive energy is 343 Kvarh and the meter has operated for 2452 hours.	=READ_CT_METER# 32432 kWh, 343 Kvarh, 2452 Hours Meter no: 10101010
Return answer, error	No answer

**READ\_VERSION – to read the software version**

Syntax	=VERSION#
Example: Return answer, correct	=VERSION# GSM5 V1.0
Return answer, error	No answer

**FORCE\_RESET – to reset the GSM unit**

Syntax	=FORCE_RESET#
Example	=FORCE_RESET#
Return answer, correct	No answer
Return answer, error	No answer

**READ\_INPUT – to read the status/alarm inputs**

Syntax	=READ_INPUT <input>#
Example	=READ_INPUT 1#
Return answer, correct	Input 1 On/Input 2 On <b>or</b> Input 1 Off/Input 2 Off
Return answer, error	No answer

**IOSTATUS – for reading status for relay outputs and status/alarm inputs**

Syntax	=IOSTATUS#
Syntax, return answer	Relay1: <status> Relay2: <status>  Input1: <status> Input2: <status>
Example	=IOSTATUS#
Return answer 3, correct	Relay1: 1 Relay2: 0 Input1: 1 Input2: 0
Return answer, error	No answer

**SIGNAL – to check the GSM signal strength**

Syntax	=SIGNAL#
Example	=SIGNAL#
Reply, correct, the signal strength can assume four levels (0–3)	Signal strength: 3
Return reply, error	NO ANSWER

## 6. GSM Modem 5 Variant Structure

<b>68G5 -</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Power supply</b>							
110/230 V _ _ _ _ _	1						
24 V _ _ _ _ _	2						
<b>SIM card</b>							
None _ _ _ _ _		0					
BillingCom _ _ _ _ _		1					
SIM card supplied by the customer _ _ _		2					
<b>Software variants</b>							
Standard _ _ _ _ _			A				
EVL _ _ _ _ _			B				
<b>Communication cable mounted on port A</b>							
None _ _ _ _ _				0			
Kamstrup 3-wire _ _ _ _ _				1			
RS232 _ _ _ _ _				2			
<b>Communication cable mounted on port B</b>							
None _ _ _ _ _					0		
Kamstrup 3-wire _ _ _ _ _					1		
<b>Antenna</b>							
Internal antenna _ _ _ _ _						0	
External antenna, Triangle 1,5 m cable (6699407) _ _ _ _ _						1	
External antenna, Triangle X m cable (6699408) _ _ _ _ _						2	
External antenna, Dualband disc 1 m cable (6699458) _ _ _ _ _						3	
Antenna adapter, MCX for SMA (5000292) _ _ _ _ _						4	
Antenna adapter, MCX for FME (5000291) _ _ _ _ _						5	
<b>Fittings</b>							
None _ _ _ _ _							0
DIN _ _ _ _ _							1
Standard MC _ _ _ _ _							2

