

# **Be16 X Be142 SMS GENERATOR MONITORING**

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### **Warranty**

Bernini Design SRL (hereinafter "BD") warrants that Be16 shall be free from defect in material or workmanship for a period of 3 years from the BD delivery date. BD shall, at its option, repair or replace the product without charge. BD shall return the Be16 to the buyer with the default parameters with no charge. The buyer shall furnish sufficient information on any alleged defects in the product so as to enable BD to determine their cause and existence. If the Be16 is not defective, or the product is defective for reason other than covered by this warranty, the buyer will be charged accordingly. This warranty shall not apply if the Be16 has not been used in accordance with the User Manual and other operating instruction, particularly if any defects are caused by misuse, improper repair attempts, negligence in use or handling. This purchase is non-refundable.

**Be16 supports Siemens-MC35i and CEP-AG GT864 modems. Other modems may work, but full operation cannot be guaranteed. We recommend that you use the Be16 module to supply your modem. It provides all protections when the battery of the engine is the sole source that supplies the modem. Contact us for support at support@bernini-design.com**



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### **Introduction**

The Be16 is an optional module (see section 6.0) suitable for the Be142 AMF & generator controller. It features RS485 & RS232 serial interface. It includes a regulated power supply for the modem as well. You can connect the Be16 directly to the battery of the engine or to any DC supply in the range 8-30V. It stores up to 14-numbers in a Phone-book. The Be16 is basically a gateway that translates a Short Messages Service (SMS) into MOD-BUS compatible commands and vice versa. This module allows you to monitor & control a standby generator using your mobile phone. You can control the connection of the LOAD to Mains or Generator and you can turn off the system by using your mobile phone

## **1.0 SETTING UP THE BE16**

You can configure the Be16 module by using a mobile phone (see 2.0). You can configure advanced functions like [Node Address] and [Phone-book] by using the configuration software (see 3.0).

## **2.0 CONFIGURATION VIA MOBILE PHONE**

The purpose of this procedure is to store your mobile phone number into Be16 phone-book. To set up the communication, follow the instructions.

- 1)** Insert a SIM into modem. Make sure the SIM has the PIN disabled. If not, you are required to disable it by using a mobile phone.
- 2)** Connect the RS232 cable to the modem, connect the RS485 cable to the Be142, connect the modem supply cable to Be16. Finally, connect the Be16 & Be142 to a DC power supply (10-30V). The wiring diagram is printed on the Be16 plastic box.
- 3)** The Be16 will turn on the power supply LED indicators [6] & [7] (see 6.0). The Be16 will intermittently illuminate the indicators [8] & [9] as well. In case an indicator does not work, you are required to check the wiring. If the indicator [7] turns off and on after a few seconds you have to check the hardware connection of the modem.
- 4)** Wait five minutes to allow the modem to find the closest antenna tower or network.
- 5)** Compose, with the correct syntax, on your mobile phone, the following message text

**DEVICE\_ID \*PHONE NUMBER#** (Example: Be142 \*00123456789#)

<p><b>NOTE</b> Be16 is not case-sensitive: Be142 &amp; be142 are the same. Put a space after DEVICE_ID. The first time you use the Be16 , you have to use Be142 as DEVICE_ID.</p>
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The '**DEVICE\_ID**' factory setting is Be142, except the case you changed it by using the configuration software. The phone number must include country and area codes.

- 6)** Once you verified the syntax, send the message.
- 7)** If everything is ok, after a while, you will receive an SMS with the following content:

**DEVICE\_ID OK** (Example 'Be142 OK')

- 8)** We recommend that you remove the power supply to Be16 & Be142 for a few seconds. Connect the supply; within two minutes you should receive the following message:

**The modem is online. BE16 for BE142 03.08**

**(The '03.08' is the Be16 software version. It may change based on new releases)**

- 9)** You can start using the system by typing the commands described in section 4.2. You are required to follow the instructions about SMS syntax in section 4.0. We recommend that you change the '**DEVICE\_ID**' of your system as described in section 4.1.

<p style="text-align: center;"><b><u>NOTE</u></b> <b><u>If you keep the BE142 name (DEVICE ID), anyone who knows the number of the SIM can take control of your system.</u></b></p>
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### **3.0 ADVANCED CONFIGURATION**

Connect the Be16 to your computer via an RS232 cable or by means of an RS232 to USB converter. Supply the Be16 (10-30VDC). Start on the computer the Be16 configuration software. Select the proper communication port of your computer. Click the [Connect] button. Click the [Read phone-book] button. Type the phone number in the box provided by the software. You can set up up to 14 numbers. The phone-book will be automatically updated. You can change the NODE address of the Be16 by using the software. This in case you have a network of MOD-BUS devices. Factory setting of Be16 node is '1'.

#### **3.1 EDITING PHONE-BOOK & RESTORE FACTORY SETTINGS**

When you need to store a new number, or to change a number, simply type the number into proper box. Click the [Write phone-book] button to transfer the phone numbers into Be16 non volatile memory. To cancel the entire phone-book click the [Restore Factory Settings] button.

### **4.0 SMS SYNTAX AND INSTRUCTIONS**

To send a valid SMS command to Be16, you are required to compose the SMS on your mobile phone according to the following syntax:

**DEVICE\_ID COMMAND** (upper or lower case letters are treated the same)

'**DEVICE\_ID**': is the name of the generator controller. Default name is Be142. But, we recommend that you change it as soon as possible (see 4.1). In this way, you add security to your system. As a matter of fact, the Be16 will ignore all messages with a different '**DEVICE\_ID**'.

'**COMMAND**' is the text that defines the function that you want to make. The table in section 4.4 describes the commands.

In between the '**DEVICE\_ID**' and '**COMMAND**' you have to type a space. The Be16 treats uppercase letters and lowercase letters in the same way. So, you can use capital or lower case characters. In other words, Be16 makes the same work when it receives '**ENGINE TEST**' or '**engine test**'.

#### **4.1 EDITING THE 'DEVICE ID'**

We recommend that you change the DEVICE\_ID immediately after you verified that the communication is working. Follow the instructions.

1) Type this message on your mobile phone:

**BE142 (NEW DEVICE\_ID)**

The **NEW DEVICE\_ID** must be included in round brackets; you can use maximum 8 letters or numbers. In between the '**BE142**' and '**(NEW DEVICE\_ID)**' you are required to type a space.

Example of valid ID: **BE142 (mygen)**

2) Send the message. After a few seconds you should receive the following message:

**NEW DEVICE\_ID OK** (example **mygen OK**)

3) From now on, when you will edit an SMS, you have to include the '**NEW DEVICE\_ID**' instead of '**BE142**' (in this example '**mygen**').

You can also use the configuration software by following the steps:

- 1) Connect the Be16 to your computer via the RS232 or USB interface.
- 2) Supply the Be16 (10-30VDC).
- 3) Start, on the computer, the Be16 configuration software.
- 4) Select the proper communication port of your computer. Click [Connect].
- 5) Using the cursor enter and click the box [DEVICE\_ID] (default Be142).
- 6) Type a new [DEVICE\_ID] (example 'mygen').
- 7) Click [WRITE].

After writing, we recommend that you remove the supply to Be16 for a few seconds. Connect the supply. Once the Be16 communicates with the software, click [READ]. Check if the DEVICE\_ID is correct (in this example 'mygen').

#### **4.2 EXAMPLE OF VALID COMMANDS**

In this example we suppose you changed your 'DEVICE\_ID' to 'MYGEN'.

**MYGEN ENGINE TEST** (or Mygen engine test)

**SYNTAX: 'MYGEN' = DEVICE\_ID and 'ENGINE TEST' = COMMAND**

The '**MYGEN**' is the '**Device Identifier**' of the controller and '**ENGINE TEST**' defines the type of the command. You have to type a space between '**MYGEN**' and '**ENGINE TEST**'. The '**ENGINE TEST**' command will work only if the '**MYGEN**' 'DEVICE\_ID' is stored into Be16.

#### **4.3 EXAMPLE OF NOT VALID COMMANDS**

In this example we suppose you changed your 'DEVICE\_ID' to 'MYGEN'.

**MYGENENGINE TEST** (wrong!)

(there is no space between '**MYGEN**' = DEVICE\_ID and '**ENGINE TEST**' = COMMAND)

**BE142 ENGINE TEST** (wrong!)

(the DEVICE\_ID is '**MYGEN**' =, it is not '**BE142**')

#### **4.4 TABLE OF THE BE142 COMMANDS**

The list of the commands is indicated below along with a short description. In typing a command, any uppercase or lowercase character can be entered. If the Be142 is in Manual mode of operation, or the Be142 controller is password protected, the commands (\*) will be ignored. If the Be142 is protected by a password, you are required to Log-IN (see 4.5).

<b>STATUS</b>	It sends a request to read the status of the engine, mode of operation, status of the circuit breakers and to read the power supply of the BE16 module.
<b>ALARM</b>	It sends a request to get information about active alarms. In case of no alarms, the Be16 will return the message ' <b>NO ALARMS</b> '.
<b>GENV</b>	It sends a request to read voltages, currents and frequency of the Generator.
<b>MAINS</b>	It sends a request to read voltages, currents and frequency of the Mains.
<b>ENGINE</b>	It sends a request to read Battery Voltage, Speed, Oil Pressure, Fuel %, Temperature (supposing Be142 configured for that), and h-meter.
<b>CLEAR</b> (*)	It clears a warning or it cancels a shutdown. Please note that in case of a shutdown, the Be16 will force the Be142 to enter the OFF mode of operation. After that, you are required to take an action. Otherwise, the controller will remain in OFF mode of operation.
<b>OFF</b> (*)	It commands the BE142 to enter the OFF mode of operation and eventually shuts down the engine. The command is ignored if the Be142 controller is in manual mode of operation.
<b>AUTO</b> (*)	It forces the Be142 to enter the AUTO mode of operation (only if it was in OFF mode). You cannot change a MODE of operation if the Be142 is locally in MANUAL mode. So, this command is totally ignored in MANUAL mode of operation.
<b>ENGINE TEST</b> (*)	It makes the Be142 starting the engine (only if Be142 is in AUTO mode of operation).
<b>GENSET TEST</b> (*)	It makes the Be142 starting the engine and, when the electrical parameters are within the programmed settings, it will transfer the LOAD to the generator (allowed in AUTO mode of operation only).
<b>STOP</b> (*)	It stops the engine after an ENGINE TEST or GENSET TEST (only if Be142 is in AUTO mode of operation). This command is ignored if the engine is running for other reasons (example Mains Failure). In this case, to stop the engine, you have to use the command OFF. The Be142 will shut down the engine and will enter the OFF mode of operation. To restart, you are required to use the command 'AUTO'.

## **4.5 LOG-IN AND LOG-OUT**

We recommend that you limit the access to the Be142 by using a password (see OEM Be142 manual section 6.4). In this way you protect the settings of the parameters and you will limit the execution of critical SMS commands; Be16 shares the same password. Once the Be142 is protected by a password, the BE16 will ask for a Log-IN procedure. To make a remote engine test, for example, you are required to type the four digit password of the Be142. If you send an engine test without being logged, you will receive this SMS:

**DEVICE\_ID Remote commands disabled. Please login**

You have to Log-IN by typing the following message:

**DEVICE\_ID LOGIN XXXX**

**'DEVICE\_ID'** Type the DEVICE\_ID (example MYGEN).

**'LOGIN'** Type it with uppercase or lowercase, does not matter.

**'XXXX'** This is the four digit code of the Be142 controller password.

After a few seconds you will receive this message:

**DEVICE\_ID Remote commands enabled**

After making your business, we recommend that you log-OUT the connection by typing the following SMS on your mobile phone:

**DEVICE\_ID LOGOUT**

After a few seconds you will receive this message:

**DEVICE\_ID Remote commands disabled.**

In this way nobody can have access to critical SMS commands. People that know the SIM card number and DEVICE\_ID will be able to read information about the generator, but they will not be able to make the commands indicated with (\*) in the table 4.4.

## **5.0 AUTOMATIC NOTIFICATIONS**

1) The Be16 is able to send notifications about particular events. You will receive an SMS in case of alarm, warning or shutdown and change of mode of operation. There are more than 20 alarm messages. You can find the all list on the Be142 operating manual (see section 13.0 of the Be142 OEM manual).

2) In case you use a different power supply for the Be16 (example a separate battery) you will receive a warning when the battery drops below 10.0 Volt. You will get the SMS:

**Low battery supply warning XX.X V (XX.X example 9,9V)**

3) In case you use a different power supply for the Be16 (example a separate battery) you will receive a notification when the battery rises above 10.5 Volt. You will get the SMS:

**DEVICE\_ID: BE16 POWER SUPPLY XX,XV (XX.X example 12,1V)**

4) When you connect a Fuel Level Sensor and correctly configure it, you will get automatic notifications about fuel level variation.

The Be16 will send an SMS each time there is at least a 5% variation in the Fuel Level.

Example of a message:

**DEVICE\_ID: BE16 FUEL LEVEL 63%**

5) When there is a failure of the MODBUS connection in between the Be142 controller and the Be16 module, the Modem will send you this SMS

**DEVICE\_ID: MODBUS Communication failure;**

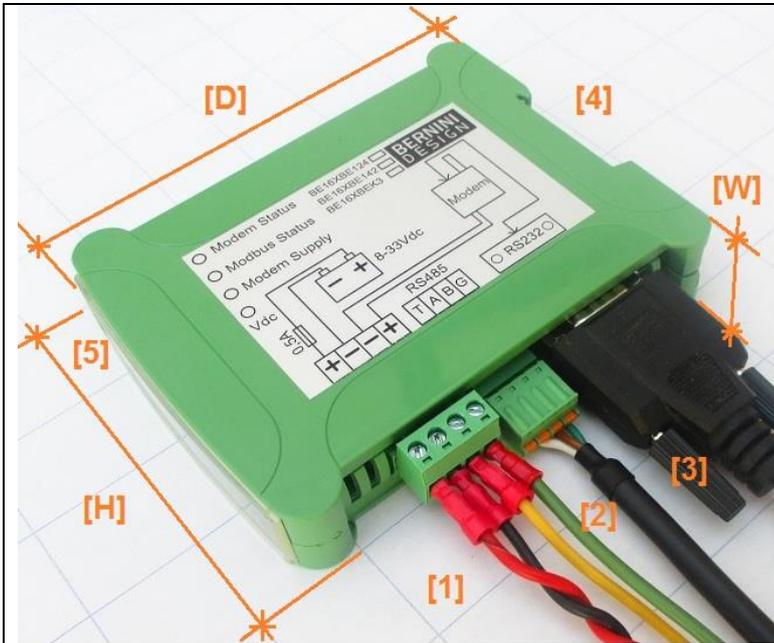
5) In addition, the Be16 can generate the following miscellaneous messages:

<b>PROGRAM MODE</b>	The Be142 is locally in PROGRAM mode.
<b>CALIBRATION MODE</b>	The Be142 is locally in CALIBRATION mode.
<b>OFF MODE</b>	The Be142 is locally in OFF mode of operation.
<b>AUTO MODE</b>	The Be142 is locally in AUTO mode of operation.
<b>MANUAL MODE</b>	The Be142 is locally in MANUAL mode of operation.
<b>ENGINE OFF</b>	The engine is totally stopped
<b>STARTING</b>	The Be142 is starting the engine
<b>ENGINE RUNNING</b>	The engine is running.
<b>COOLING</b>	The engine is running out of LOAD
<b>STOPPING</b>	The Be142 is stopping the engine
<b>KG OPEN</b>	The Be142 disable the Generator Circuit Breaker.
<b>KG CLOSED</b>	The Be142 enables the Generator Circuit Breaker.
<b>KM OPEN</b>	The Be142 disables the Mains Circuit Breaker
<b>KM CLOSED</b>	The Be142 enables the Mains circuit Breaker

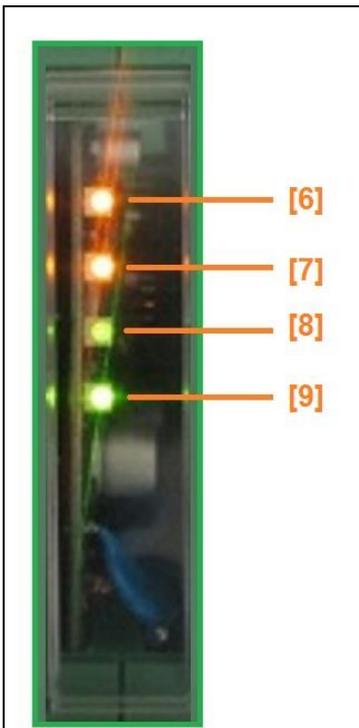
6) Due to the continuous product improvement you can find additional messages not reported in this user manual. Contact us for information [support@bernini-design.com](mailto:support@bernini-design.com)

### 5.0 DIMENSIONS & CONNECTIONS

Despite the fact that the Be16 is designed for wall vertical mount panel on DIN rail, you can use the module in any position. The maximum distance is limited by the RS485 specifications: about 1000 meters. The Be16 is supplied with one-meter RS485 cable suitable with all Bernini Design generator controller. If you purchase our modem, we supply the RS232 cable as well (one-meter long).



<b>1</b>	Supply plug connector (pitch 5mm) +V Battery 8-30VDC input. - V Battery 0VDC input. - Modem supply output (0VDC) + Modem supply output (11V-400mA)	
<b>2</b>	RS485 plug connector (pitch 3.81mm) Termination / A / B / Ground. Use twisted cable (max lenght 1000 meters).	
<b>3</b>	RS232 connector, 9 poles male sub-D. 2=RX 3=TX 4=DTR 6=DSR 7=RTS 5=GND. Use a modem cable with maximum length of about nine meters.	
<b>4</b>	Fixings are provided for DIN rail mounting.	
<b>5</b>	Transparent window; the Be16 features LED indicators as below described. - Modem status: yellow LED. - Modbus status: yellow LED. - Supply for modem: green LED. - Be16 power supply presence: green LED.	
<b>D</b>	Depth 125 mm	Total weight 120gr.
<b>H</b>	Height 100 mm	
<b>W</b>	Width 25 mm	



LED INDICATORS	
<b>6</b>	<b>MODEM</b> status (yellow). It blinks once a second to indicate that the modem is online. It illuminates continuously for about three seconds when it sends an SMS. It blinks fast when it receives an SMS.
<b>7</b>	<b>MOD-BUS</b> status (yellow). It blinks once a second to indicate that the Be142 is connected. It is totally off when the RS485 is not connected or the Be142 is not working.
<b>8</b>	<b>MODEM</b> supply (green). It turns on when the modem supply is normal. It turns off and on when the Be16 tries to initialize the modem.
<b>9</b>	<b>SUPPLY</b> (green). It indicates the presence of the DC power supply. When the voltage drops below 10.0 VDC, the Be16 sends a warning message. We recommend protecting the Be16 with 0.5 Amp fuse.
TROUBLESHOOTING	
<p><b>A)</b> The indicator [9] is always off: there is no power supply. Check polarity of the connection. Voltage must be within 8-30VDC (max internal consumption 300mA).</p> <p><b>B)</b> The indicator [8] repeatedly turns off and on for about three seconds: there is no communication with the modem and Be16 tries to reset it all the time.</p> <p><b>C)</b> The indicator [7] (or [6]) is always OFF. This is a typical case of wrong connections of the cables or severe hardware problem.</p> <p><b>D)</b> All indicators are ok, but no SMS communication takes place:                      -check the SIM inside; you must remove the PIN;                      -check the syntax when you type an SMS;                      -you are required to set up your mobile phone into Be16 in the first place (see 2.0);                      -you are required to include the DEVICE_ID in each SMS (see 4.1)</p>	
for additional information contact <a href="mailto:support@bernini-design.com">support@bernini-design.com</a>	