# CM5

**DC High-Voltage Generator**

# USER MANUAL FOR CM5

# CONTENTS

Appendix  CM5 interface description (depends on the supplied bus module)

# Preface

This manual describes the installation and usage of the CM5. Any mention of a generator elsewhere in this user manual refers to the CM5. Charging bars and charging electrodes are referred to in this user manual as charging electrodes.

A symbol or text in square brackets [ ] indicates an operating button on the generator. Text in quotation marks (" ") indicates text on the generator display.

This manual must be available at all times to staff operating the equipment.
Read through the entire manual before installing and using the product.
Follow the instructions set out in this manual to ensure proper operation of the product and to retain your entitlement under the guarantee. The terms of the guarantee are set out in the Simco-Ion Europe General Terms and Conditions of Sale.

# Explanation of symbols

**Warning**
**Indicates special information to prevent injury or significant damage to the product.**

**Attention**
**Important information for making the most efficient use of the product and/or for preventing damage to the product.**

# 1. Introduction

The CM5 is a high voltage generator that is used to supply Simco-Ion charging bars/electrodes with a high voltage. This combination is called the CM5 electrostatic charging system. It is used to bond materials temporarily.

The generator can either be operated manually or remotely (analogue or digital). Due to the digital bus the generator can be used in a serial network.

On the front of the generator there is an on/off switch, a display for displaying system settings and information, six operating buttons (touch keys) for setting the high voltage or operating the user interface and a limit indicator to indicate that the output voltage or supplied current is limited.

On the back are the mains input, the high voltage connections, the serial bus or network module, connections for analogue operation and for switching the high voltage on and off remotely.
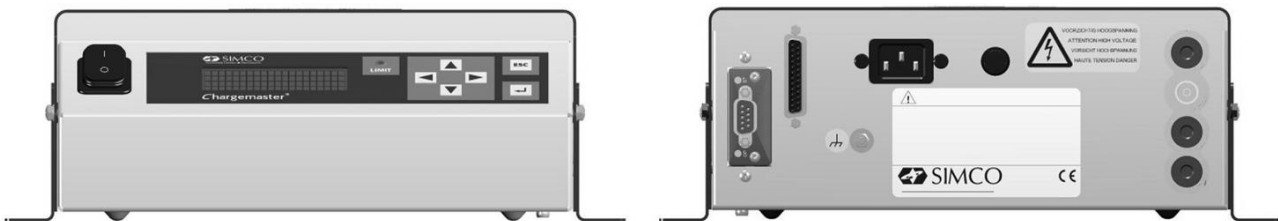


Figure 1: front and backside of the CM5

# 2. Description and operation

Description

Once the mains voltage has been connected and the generator has been switched on, it will generate a stabilised high voltage. The output voltage and current can be controlled from the generator and these are short-circuit protected. A keyboard is used to operate the generator. Information about the generator is shown via a display. This display shows information about the currently measured high voltage and current at the output, but also information such as the high voltage and current settings, operational modes and various generator settings. The user can choose one of the 4 available languages for showing the information and instructions on the display. The generator has analogue and digital connections, making it possible to remotely operate the generator. The generator is protected against overload, whereby in the event of an overload the high voltage output will be limited. If the limit indicator lights up, the generator is limited.
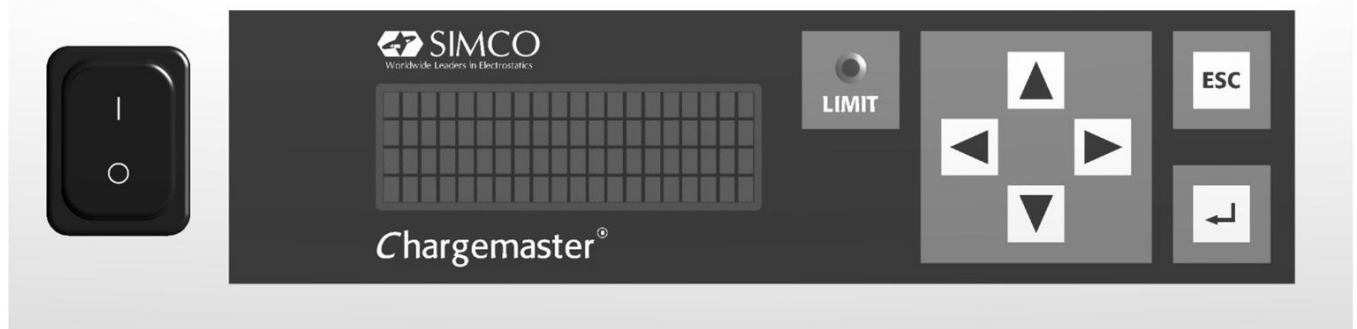


Figure 2: front panel of the CM5

## 2.1. Operating modes

The generator has a number of different operating modes:

- Local mode       The high voltage or output current of the generator is set using the keyboard.

- Remote mode      The high voltage or output current of the generator is set and read via external analogue control signals.

- Fieldbus mode    (Optional) The high voltage or output current of the generator is set and read via a serial communication interface.

- AdvOutC mode     (Optional) Advanced Output Control mode. In this mode the high voltage that is set depends on an analogue control signal, e.g. speed control of the machine (see **Appendix IX:**).

By using the generator's integrated menu structure, it is possible to switch between the various operating modes.

Locked mode

If operating in local mode it is possible to (temporarily) lock the operation. This is called 'locked' mode. In this mode it is no longer possible to change the output voltage or output current using the keyboard.

## 2.2. Control modes

The generator has different ways of controlling the output voltage and current. The generator can be switched to VC/CV mode or CC mode.

- VC/CV mode       Voltage Control or Constant Voltage. The generator will maintain the set voltage value and the current to be supplied by the generator will be adjusted to this.

- CC mode          Current Control or Constant Current. The generator will maintain the set current value and the output voltage to be supplied by the generator will be adjusted to this.

- AdvCC mode       (Optional) Advanced Current Control mode. The generator operates in an intelligent CC mode, with the ability to switch back to the stand-by state when no object is present below the connected electrodes (see **Appendix VIII:**).

## Operation in Voltage Control mode
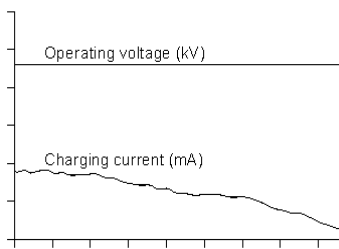


Figure 3: Voltage Control mode

When the generator is operating in the VC mode, the desired output voltage is set on the generator. The generator now maintains the set output voltage and, depending on the load, adjusts this with a larger or smaller current. The charging current decreases, however, if the electrodes become dirty.

## Operation in Current Control mode
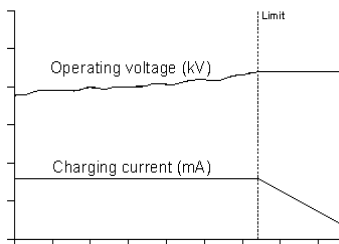


Figure 4: Current Control mode

When the generator is operating in the CC mode, the desired current is set on the generator. The generator now maintains the set current and adjusts this with a higher or lower output voltage. This method of control results in a constant ion current, or constant charging.

## 2.3. Menu

Various generator settings can be changed via the menu. This is done by using various key combinations or by configuring the various parameters. This advanced menu consists of main menus and submenus. Access to this menu can be protected with a user password.

## 2.4. Activation of the high voltage

The generator is able to switch the high voltage on and off using an external switch signal. This is the Remote On/Off control.

Cont or Continuous The HV output voltage is continuously present at the output of the generator.

Ext or External The HV output voltage is switched on and off via an externally connected switching signal.

Bus The HV output voltage is switched on and off via information in the serial communication protocol.

## 2.5. Serial communication bus module (optional)

Installing an Anybus module means that the generator can be operated by a serial bus. In order to be able to communicate with a generator in the communication network that is switched off, an external supply voltage must be connected. The choice of serial communication protocol used is determined by the Anybus module that is installed.

# 3. Safety

The following safety guidelines must be observed in order to prevent physical injury and damage to objects or to the generator itself.

⚠️ **Warning:**

- Electrical installation must be carried out by a skilled electrical engineer according to the applicable national and local regulations.
- The equipment must be properly earthed. Earthing is required to ensure safe and proper operation and to prevent electrical shocks upon contact.
- Do not touch any live parts.
  *Otherwise you will receive a dangerous electric shock!*
- Disconnect the power supply before carrying out work on the unit.
- Only use the generator in combination with suitable Simco-Ion bars/electrodes.
- Keep the generator free of dirt, dust and moisture in order to ensure its safe operation.
- High voltages are dangerous, especially for people with a pacemaker.
- Do not use the CM5 in an environment where there is a risk of fire or explosion.
- Do not expose the CM5 to vibrations and knocks.
- The equipment may only be repaired by Simco-Ion employees.

# 4. Technical specifications

**Required power supply:**

| | |
|---|---|
| Supply voltage | 100–240 V AC |
| Supply voltage limit values | 85–264 V AC |
| Frequency | 50–60 Hz |
| Frequency limit values | 47–63 Hz |
| Current power | Max. 240 W |
| Connection | Euro connector IEC-320 |
| Fuse (rear): | 3.15 AT |

**Output:**

| | CM5 30N (30P) | CM5 60N (60P) |
|---|---|---|
| Max. output voltage | 30 kV DC | 60 kV DC |
| Max. output current | 5 mA | 2.5 mA |
| Max. output power | 150 W | 150 W |
| High voltage connection | 4x spring connector | 4x spring connector |
| | | |
| Voltage stabilisation | 2% of max. output voltage | |
| Load stabilisation | 2% of max. output voltage | |
| Output voltage | Can be set between 0 kV and max. output voltage | |
| Ripple, peak-peak | 5% of max. output voltage at maximum load | |

**User interface:**

| | |
|---|---|
| Operation | 4x cursor keys, ESC key and ↵ key |
| Limit indicator | Red LED |
| Display | 4x 20 character LCD with background lighting |
| Accuracy | 5% of the maximum voltage ± 2 digits |

**Digital I/O:**

| | |
|---|---|
| Bus module | 1x Anybus connector. The Anybus module is optional. For the available networks and protocols, contact Simco-Ion Europe or your local representative |
| Additional options | - Switching the high voltage on/off<br>- Readout of the output voltage (absolute and percentage values)<br>- Readout of the output current (absolute and percentage values)<br>- Setting the output voltage or current (absolute and percentage values)<br>- Setting the maximum output current or voltage |

**I/O analogue (via the 25-pin sub-D connector):**

| | |
|---|---|
| External bus supply voltage input | Specification:<br>10 V DC, 0.5 A max / 27 V DC, 0.2 A max. |
| Remote HV on/off input | 0 V = off, 10-30 V = on (typically 12 V)<br>Specification:<br>10 V DC, 10 mA min / 30 V DC, 25 mA max. |
| Status indicators (Operating and Limit Alarm/Arc Detect) | 30 V DC, 50 mA max. |

| Analogue control voltage | Specification: |
| | 0–5 V DC or |
| | 0–10 V DC or |
| | 0–20 mA DC or |
| | 4–20 mA DC. |
| Analogue readout voltage | Specification: |
| | 0–5 V DC or |
| | 0–10 V DC or |
| | 0–20 mA DC or |
| | 4–20 mA DC. |

**Control voltage output:**

| 12 V output voltage | 12 V DC ± 20% 20 mA max. |

**Environment:**

| Use | Industrial, internal use |
| Temperature | 0–55°C |
| Installation | Dust-free and vibration-free |
| Protection class | IP20 |

**Mechanical:**

| | CM5 30N (30P) | CM5 60N (60P) |
|---|---|---|
| Dimensions | | |
| Length (incl. high voltage connector) | 340 mm | 388 mm |
| Width | 272 mm | 272 mm |
| Height | 108 mm | 108 mm |
| Weight | 8.2 kg | 8.2 kg |
| Housing | Sheet steel (+powder coating) | |

**Also supplied:**
Brackets
25-pin sub-D connector

HV outputs (4x) for spring loaded connector

Euro connector IEC-320

I/O connector 25p Sub-D female

Bus interface

Earthing stud

107

264

270,5

Bracket

55

Wall mounting

55

Flat mounting

296

314

6

328

388 (60kV), 340 (30kV)
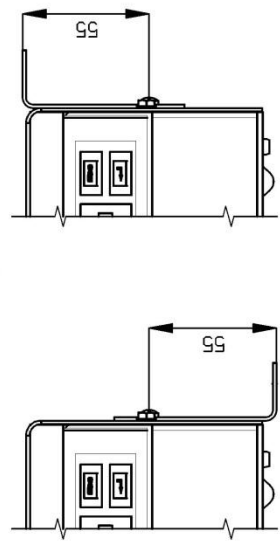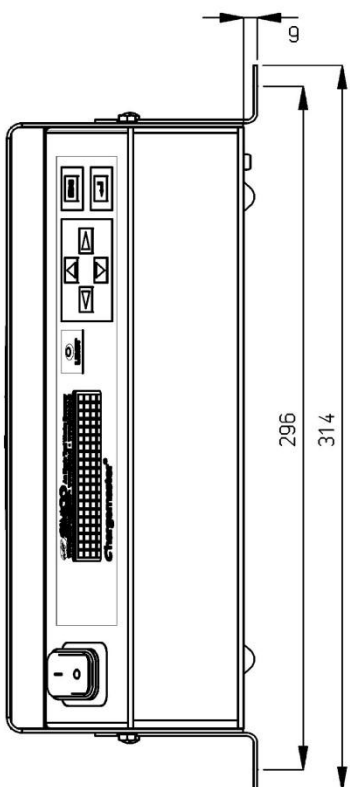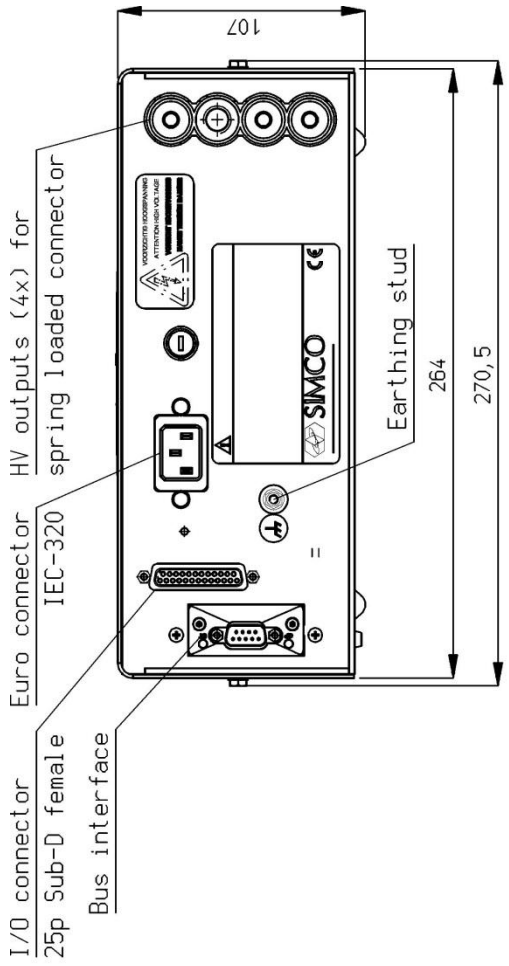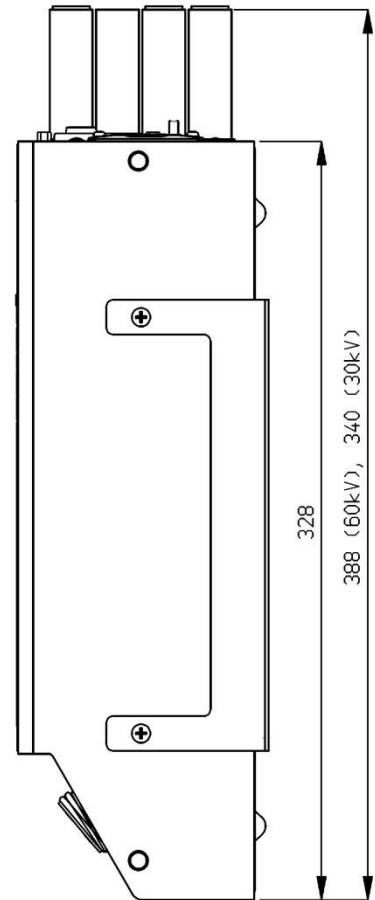
Figure 5: dimensions of the CM5

# 5. Installation

⚠️ **Warning:**
- **Electrical installation must be carried out by a skilled electrical engineer according to the applicable national and local regulations.**
- **The equipment must be properly earthed. Earthing is required to ensure safe and proper operation and to prevent electrical shocks upon contact**
- **Disconnect the power supply before carrying out work on the unit.**

## 5.1. Prior check

- Check that the equipment is undamaged and that you have received the correct version.
- Check that the details on the packing slip correspond to the details of the product received.
- Check that the voltage shown on the rating plate corresponds to the (mains) voltage you intend to use.

*If you have any problems and/or doubts, please contact Simco-Ion Europe or the Simco-Ion agent in your region.*

## 5.2. Overview

Position the generator in a clearly visible, easily accessible and stable location, on or close to the machine, and as close as possible to the charging bar or electrode.

👉 **Note:**
- **Earthing must be via the power cable <u>and</u> via the external earth wire to the earthing point on the generator. Connect the external earth wire to an earthed machine part.**

## 5.3. Installing the CM5

👉**Note:**
- **Use only the supplied fasteners to fix the bracket to the CM5 (M4x8 fastening screws).**
- **Do not install the generator in a dirty or damp environment, or in an environment where chemicals or other corrosive agents are handled.**
- **Arrange the generator so that it is free from vibrations.**

1. Secure the generator using the mounting materials supplied.
2. If required, the front panel can be rotated 180° to make operation easier (see section **5.4**).
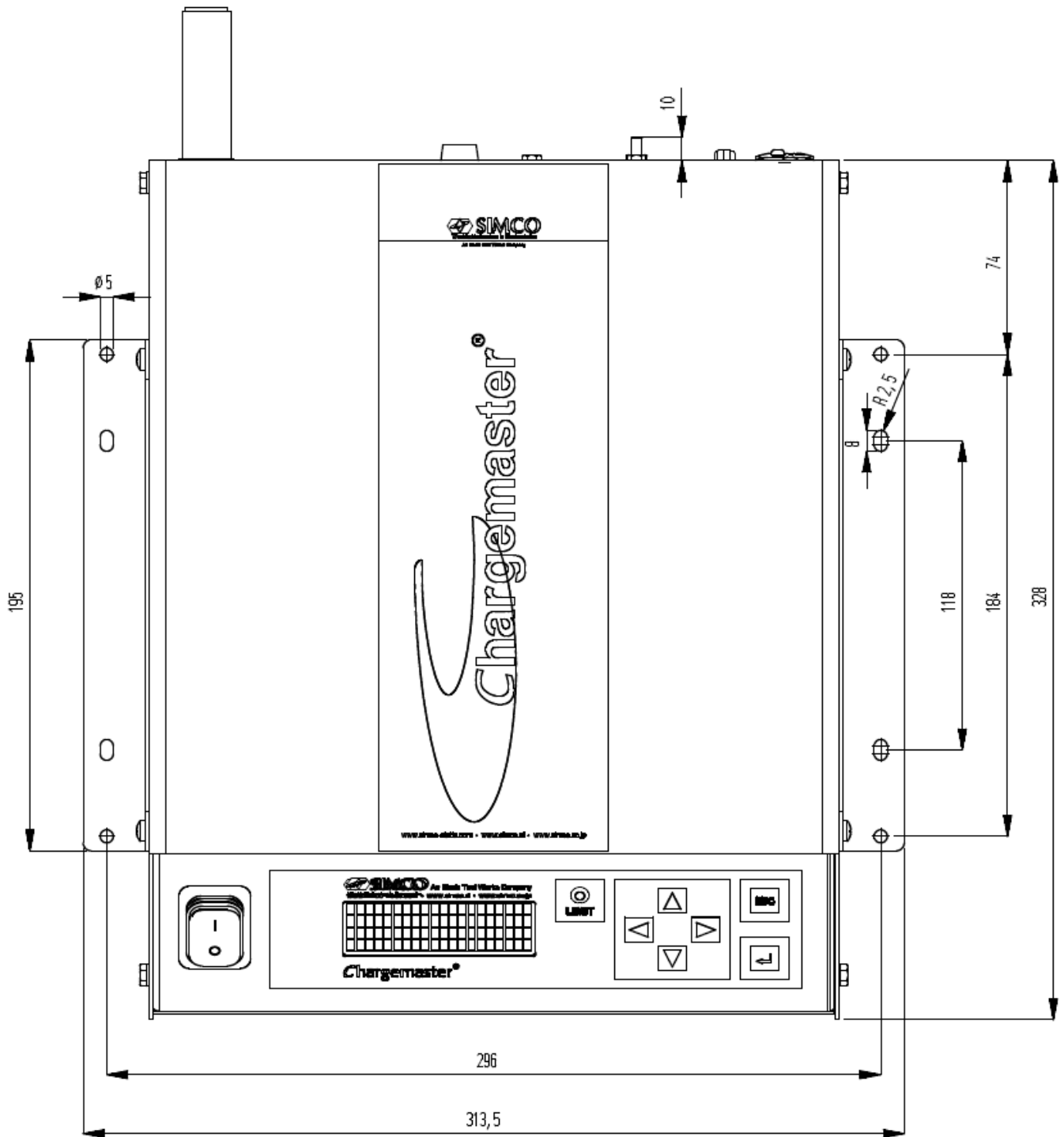
Figure 6: CM5 assembly holes

## 5.4. Rotating the front panel 180°

The front panel of the generator can be rotated 180° as follows:
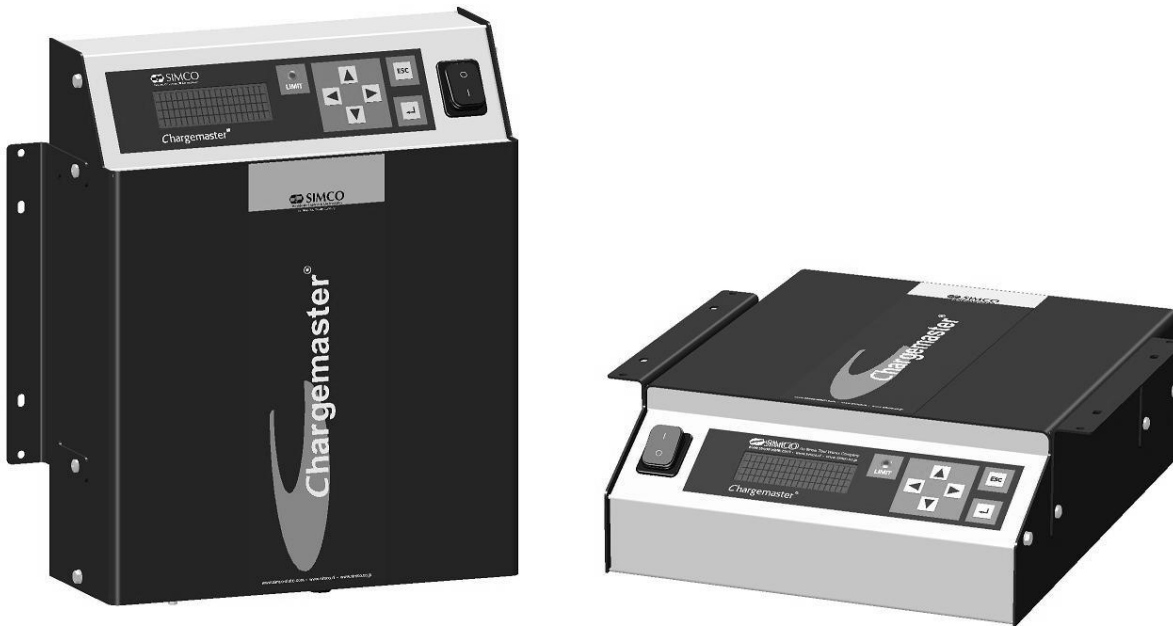


Figure 7: different CM5 models

1. De-energise the generator and remove the power cable.
2. Remove the cover.
3. Disconnect the mains switch faston plugs.
4. Disconnect the front panel connectors from the upright PCB.
5. Unscrew both hexagon nuts on the front panel.
6. The front panel can now be taken off the generator and turned round.
7. Re-attach the front panel with the two hexagon nuts.
8. Also rotate the switch.
9. Reconnect the front panel connectors.
10. Reconnect the mains switch faston plugs (2x black to the top connection and brown/blue to the middle connection).
11. Fit the cover.
12. Reconnect the power cable and switch the generator back on.



Brown

Black

Blue

Black
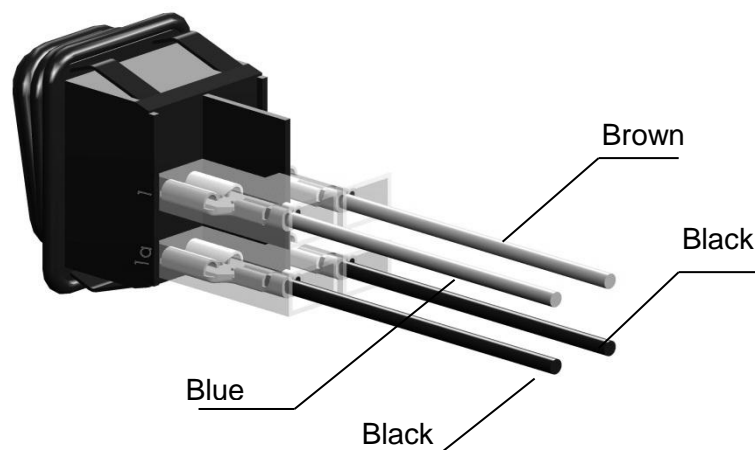
Figure 8: main switch connection of the CM5

## 5.5. Connecting the CM5

☞**Note:**
- **Do not lay high voltage cables along sharp metal parts or in sharp bends and do not kink them.**
- **Keep high-voltage cables separate from low-voltage wiring.**
- **Keep high-voltage cables as short as possible.**

1. Connect the earth wire to an earthing point.
2. If necessary, fit the spring connectors to the high voltage cable of the electrodes

   ☞**Note: the 30 kV and 60 kV models have different connectors.**
3. Screw the spring connectors of the charging electrodes into the high voltage connectors of the generator. Cover unused outputs with the supplied caps.
4. If an "Anybus" module is fitted (back of the generator), it can be connected to the relevant network. The connector depends on the protocol being used. Please refer to the manual for the relevant Anybus module.
5. Connect the desired analogue I/O signals to the 25-pin sub-D connector. See section **5.6** to **0**.
6. Set the [ 0 / I ] switch to the [ 0 ] position.
7. Plug the power cable into the IEC connector at the back of the generator.
8. Plug the power cable into an earthed wall socket.

## 5.6. External control signals

On the back of the CM5 there is a 25-pin sub-D connector. This connector is intended for various external connections. A summary of these connections is given below.

- Remote HV on/off
- Remote control of high voltage and current
- Readout of output voltage and current
- Status indicators
- Power supply for fieldbus sleep mode indication

## 5.7. Switching the high voltage on and off externally (Remote HV on/off)

The high voltage output of the generator can be switched on and off remotely by a machine or PLC. In order to switch on the high voltage a voltage must be connected between pin 1 (+V) and pin 14 (0 V). The voltage must be between 10 and 30 V DC. If no voltage is connected, the high voltage is switched off. When the indicated voltage is connected to this input the high voltage is switched on.
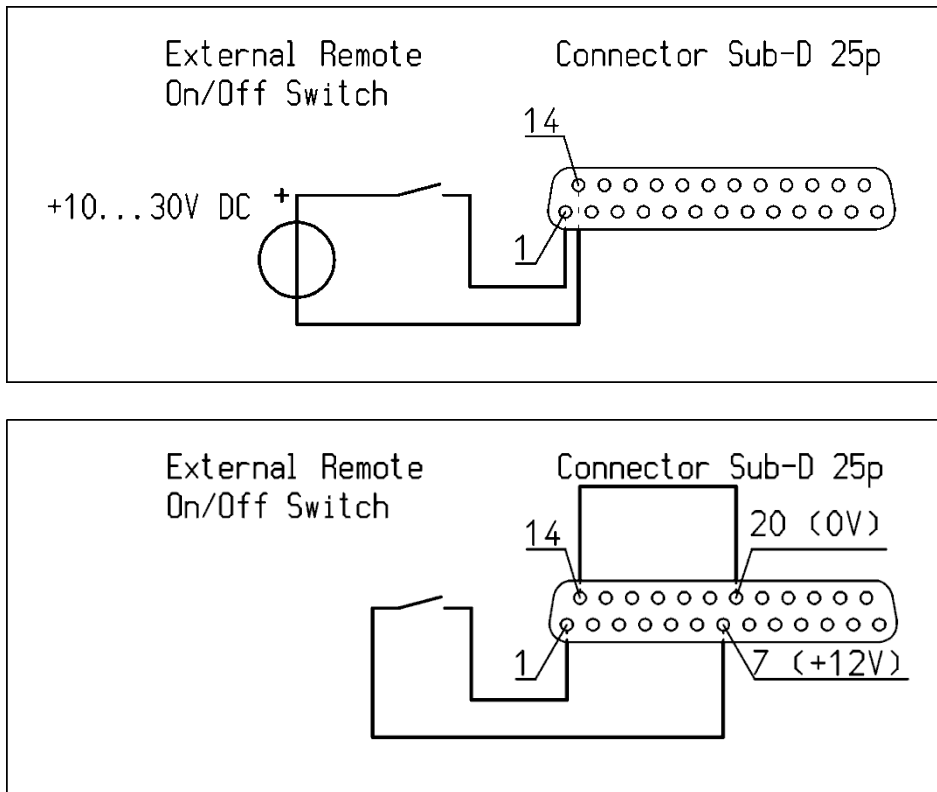
Figure 9: wiring diagram for Remote HV on/off for the CM5

☞**Note:**

Ensure that the external control is switched on using the configuration menu for the relevant operational mode. See section **6.19**, menu **7300** choice **7313** and **Appendix VII:** example 5.

## 5.8. Analogue control signals

Two inputs have been defined for controlling the high voltage or the setpoint of the current to be supplied. Both signals can be configured and controlled independently of each other. In order to configure the inputs the generator menu must be used. This is explained in menu items **7630** to **7634** and **7640** to **7644** (see section **6.28**).

The following control voltages / currents can be used: 0 – 5 VDC, 0 – 10 VDC, 0-20 mADC or 4 – 20 mADC, depending on the selected menu setup. This voltage / current can be used to adjust the high voltage output linear between 0 and 100% of the maximum value.

☞**Note:**

The input signals are protected against overload. If, for example, the 0–20 mA DC mode is activated, and a current of more than 20 mA DC is connected, the high voltage output will be switched off. The generator indicates this on the display via an error message. Check why the input is incorrectly adjusted and restore the correct configuration setting for the relevant input.

If the 0 – 5 V DC mode is activated and a voltage higher than 5 V DC is connected, the maximum control voltage will be internally limited to the maximum control voltage of 5 V DC. The generator will give its maximum voltage or current on the output.

### 5.8.1. Analogue control signal Remote Voltage Setpoint/Voltage Limit

To connect the control signal for the high voltage a voltage or current source must be connected between pin 3 and earth pin 16 as indicated in the diagram below.
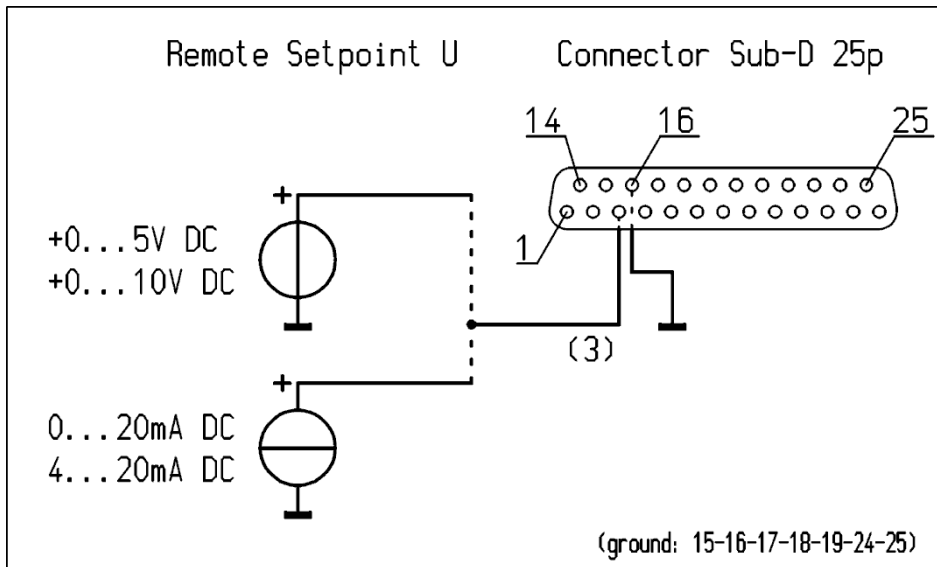


Figure 10: wiring diagram for the Remote Setpoint U for the CM5

### 5.8.2. Analogue control signal Remote Current Limit/Current Setpoint

To connect the control signal for the output current to be supplied, a voltage or current source must be connected between pin 2 and earth pin 15 as indicated in the diagram below.
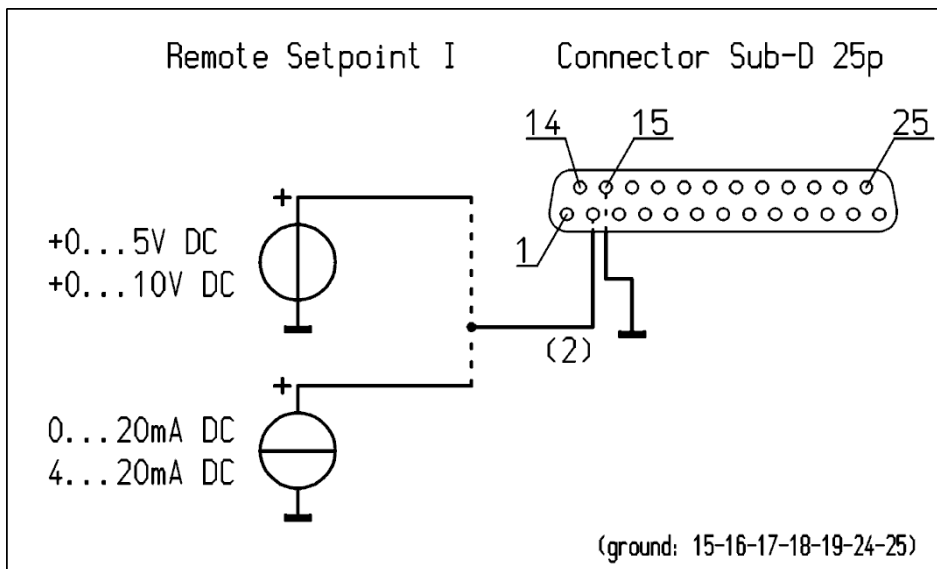


Figure 11: wiring diagram for the Remote Setpoint I for the CM5

☞ **Note:**

In order to be able to use the control input for controlling or limiting the current, the option **4300** must be set to external in the menu (menu item **4320**). If this option is not enabled, the maximum output current to be supplied will be determined via the menu settings.

## 5.9. Analogue readout signals

Two analogue signals are available for reading out the high voltage or output current. Both signals can be configured and read out independently of each other. In order to configure the outputs the generator menu must be used. For configuring the outputs, see menu items **7610** to **7614** and **7620** to **7624**.

### 5.9.1. Analogue readout signal Remote Output Voltage

To connect the readout signal for the supplied high voltage, a voltage or current meter must be connected between pin 4 and earth pin 17 as indicated in the diagram below.
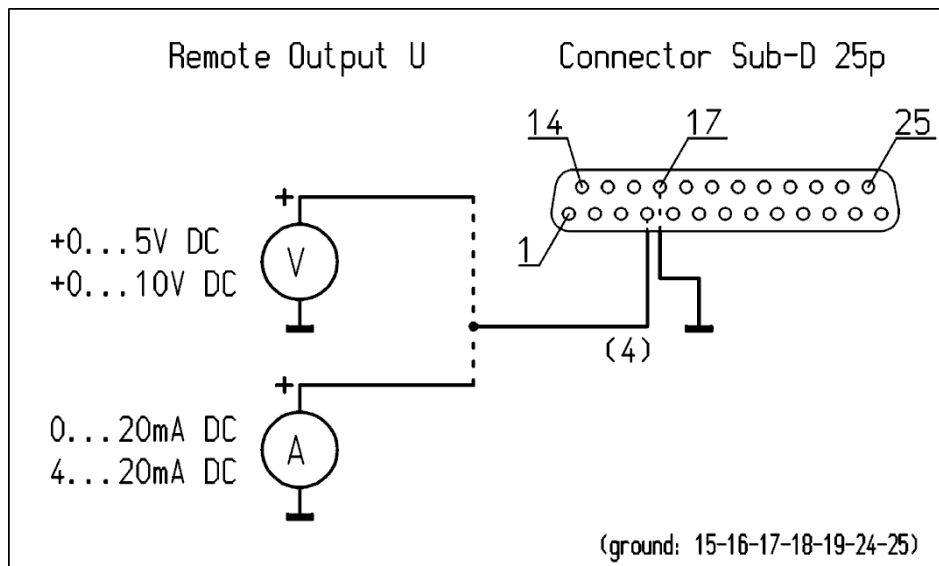


Figure 12: wiring diagram for the Remote Output U for the CM5

## 5.9.2. Analogue readout signal Remote Output Current

To connect the readout signal for the supplied output current, a voltage or current meter must be connected between pin 5 and earth pin 18 as indicated in the diagram below.
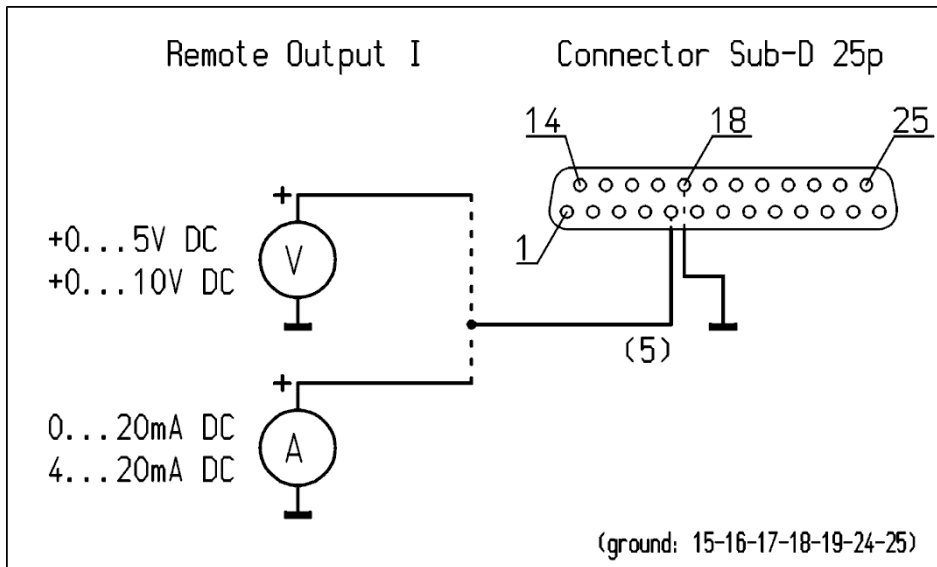


Figure 13: wiring diagram for the Remote Output I for the CM5

## 5.10. Internal 12 V supply voltage

The generator has an internal electrically isolated power circuit that can be used to feed the digital control signals (see **5.7** and **0**).
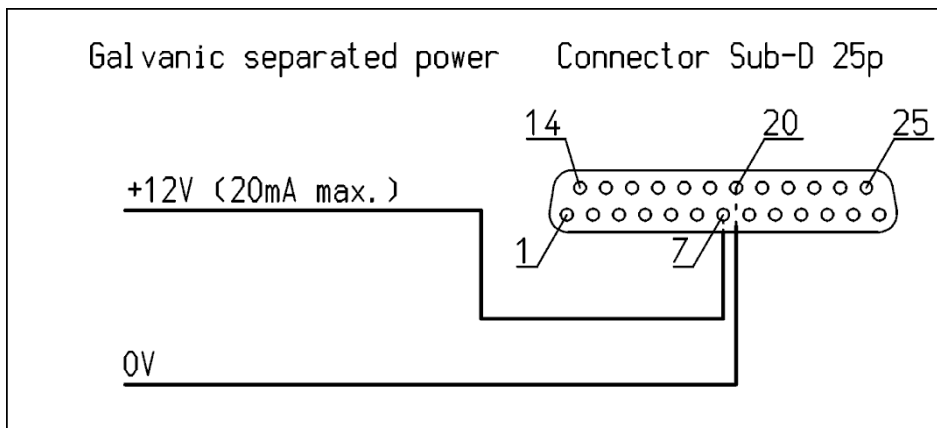


Figure 14: wiring diagram for the external 12 V supply voltage for the CM5

## 5.11. Digital status signals

For reporting the status of the generator, the following signals can be found on the 25-pin sub-D connector.

- Limit Alarm    Indicates that the output voltage or current is limited (see **6.21**).
- Arc Detect    Indicates that an arc has been detected (see **0**).
- Operating    Indicates whether the generator is operational (see **6.23**).

### 5.11.1. Operating signal

The operating signal must be connected as indicated in the diagram below (between pin 10 (OC Open Collector) and 23 (OE Open Emitter)). The maximum current is 50 mA. When connecting make sure the polarity is correct.
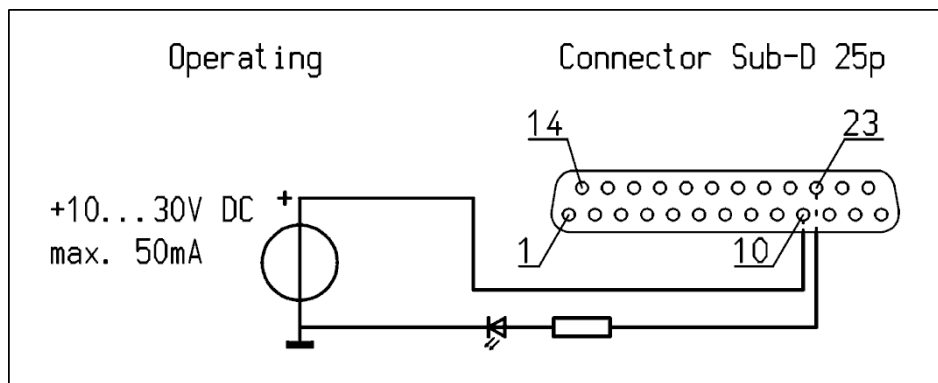


Figure 15: wiring diagram for CM5 operating signal

### 5.11.2. Pin 9 output select: limit alarm/arc detect

The limit alarm/arc detect signal must be connected as indicated in the diagram below (between pin 9 (OC Open Collector) and 22 (OE Open Emitter)). The maximum current is 50 mA. When connecting make sure the polarity is correct.
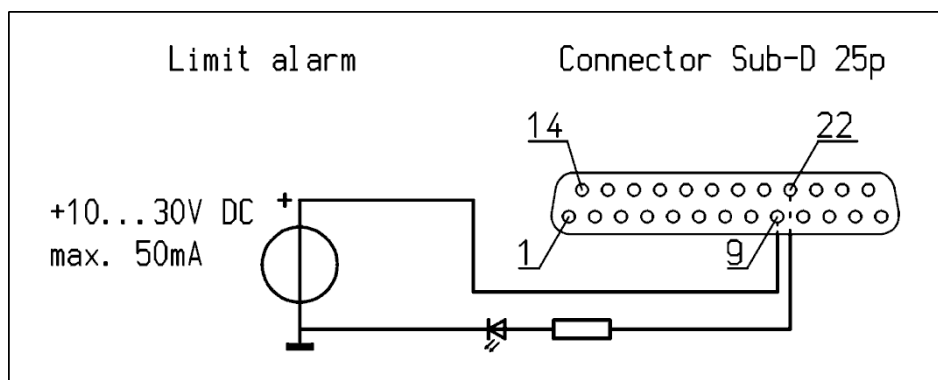


Figure 16: wiring diagram for CM5 limit alarm/arc detect signal

## 5.12. External bus supply voltage

The CM5 high voltage generator has a communication bus stand-by function. This function allows the generator to issue a 'sleep mode' message via the bus communication system when the generator supply voltage is switched off.

An external supply voltage can be connected to the CM5, which allows the bus communication to be kept active when the generator is switched off.

The external bus supply voltage must be connected between pin 6 (+) and 19 (earth) as indicated in the diagram below.
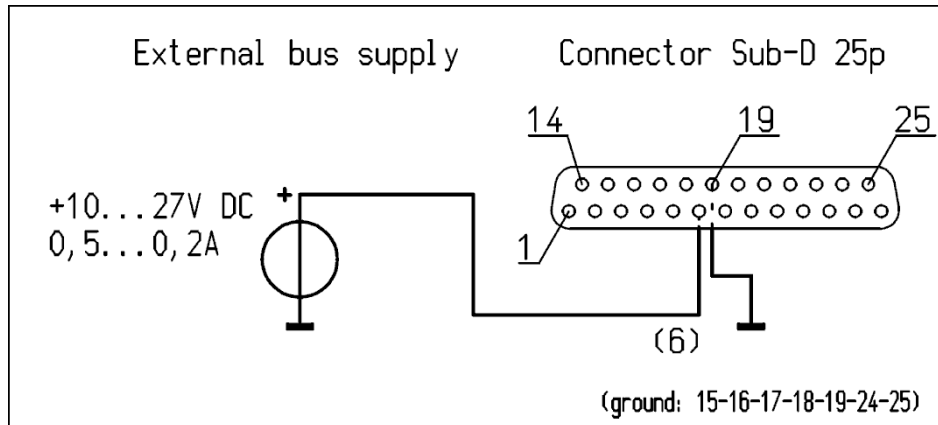


Figure 17: wiring diagram for the external bus supply voltage for the CM5

# 6. Commissioning

 **Warning:**
- **High voltage can be dangerous, especially to people with a pacemaker.**
- **Touching live parts of the charging bar/electrode will cause a dangerous electric shock.**

## 6.1. Switching the mains voltage on/off

- Switching on      = Switch to position [ I ].
- Switching off     = Switch to position [ 0 ].

When switching on the generator, the limit indicator will flash for 2 seconds.
After 2 seconds the background lighting on the display will slowly illuminate and information will be shown about the generator. This information includes:

- The generator type (e.g. "**CM5-60N**")
- The firmware version
- The communication bus address
- In some cases additional information

This information is displayed for 2 seconds and then the generator continues to start.

When the generator is switched on for the first time or when the factory settings are reset, the generator will first need to be set up via a quick configuration ('initial setup') (see **6.2**). In all other cases the generator will start normally and the main menu will be displayed (see **0**). The generator always starts up in the mode that was active when the generator was switched off.

## 6.2. Configuring the generator via the 'Initial setup' (Quick Init) menu

The 'Initial setup' or quick configuration menu is used to quickly configure the generator. After running through and configuring a few common base settings, you can then quickly start using the generator.

As soon as "**[Initial setup]**" appears in the display, this means that the generator still needs to be configured for use. Depress [▲] / [▼] to select another setting. Once the correct setting has been selected, depress [↵] to actually activate and enable this setting.

The 'initial setup' menu is proceeded through as follows.

☞**Note:**
When carrying out a quick configuration, some parts may be skipped depending on the selections that have been made.

### 6.2.1. Selecting the user language

The generator shows information and instructions on the display in English by default. However, the user can change this to the language he or she prefers.

Changing the language parameter:

**"Language: English"**

Use the [▲] / [▼] keys until the desired language option "**English"** (English), "**Deutsch**" (German), "**Italiano"** (Italian) or **"Français**" (French) flashes on the display. Then press [↵] to confirm the choice. From now on, the selected language will be used for operating the CM5. Depending on the available functional options, the generator will have to be configured as a simple charging generator or as a generator with Anybus module. This is described in the next 2 sections.

### 6.2.2. CM5 as simple charging generator (ECM)
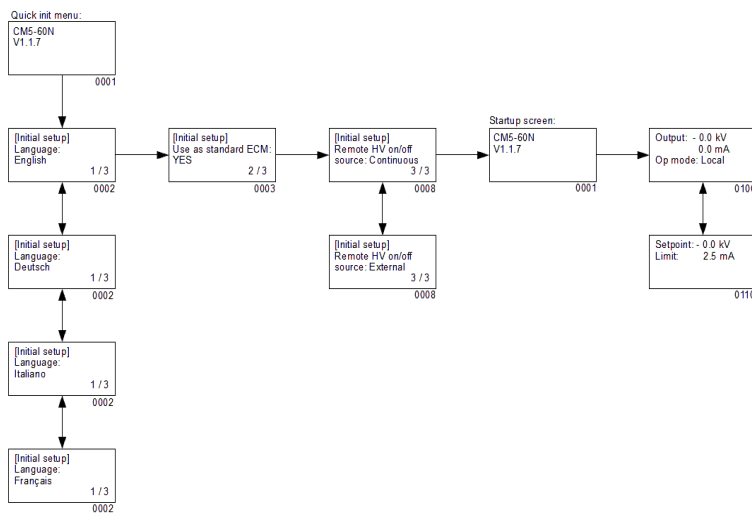


Set the following parameters:

"**Use as standard ECM:**"

Using the [▲] / [▼] keys, select until the option "**YES**" flashes on the display. Then depress [↵] to confirm the choice.

The following text then appears:

"**Remote HV on/off source:**"

Using the [▲] / [▼] keys select until the correct option flashes on the display. You can choose to continuously switch on the output voltage ("**Continuous**") or to switch the output voltage on and off remotely via the external input ("**External**"). Then depress [↵] to confirm the choice.

The CM5 can now be used as a replacement for an ECM. The main screen of the CM5 will then be displayed.

☞**Note:**

    If the CM5 is being used as a replacement for the regular ECM, access to the menu is disabled. See section **6.3** to enable the menu.

## 6.2.3. CM5 with Anybus module (optional)

Quick init menu:
```
CM5-60N
V1.1.7
Busaddress: 126
                0001
```

```
[Initial setup]        [Initial setup]        [Initial setup]        Startup screen:
Language:              Busaddress:            Remote HV on/off       CM5-60N
English                126                    source: Bus            V1.1.7
        1 / 3                  2 / 3                  3 / 3          Busaddress: 2
      0002                   0007                   0008                   0001
```

```
[Initial setup]        [Initial setup]        [Initial setup]
Language:              Busaddress:            Remote HV on/off
Deutsch                0...125                source: External
        1 / 3                  2 / 3                  3 / 3
      0002                   0007                   0008
```

```
[Initial setup]
Language:
Italiano
        1 / 3
      0002
```

```
[Initial setup]
Language:
Français
        1 / 3
      0002
```

Set the following parameters:

**Bus address:"**

Using the [▲] / [▼] keys, select until the desired bus address [1…125] flashes on the screen. Then depress [↵] to confirm the choice.

The following text then appears:

"**Remote HV on/off source:**"

Using the [▲] / [▼] keys, select until the correct option flashes on the screen. You can choose to switch the output voltage on and off via the bus communication ("**Bus**") or via the external input ("**External**"). Then depress [↵] to confirm the choice.

The CM5 is now configured and can be used. The main screen of the CM5 will then be displayed.

## 6.2.4. CM5 in Local mode, Remote mode or AdvOutC mode (optional)

Quick init menu:
```
CM5-60N
V1.1.7
Busaddress: 126
                0001
```

```
[Initial setup]    [Initial setup]                                                                                                       Startup screen:
Language:          Use as standard ECM:                                                                                                   CM5-60N
English            YES                                                                                                                    V1.1.7
        1 / 7              2 / 7                                                                                                          Busaddress: 126
      0002               0003                                                                                                                   0001
```

```
[Initial setup]    [Initial setup]      [Initial setup]    [Initial setup]    [Initial setup]        [Initial setup]    [Initial setup]
Language:          Use as standard ECM: Operating mode:    Control mode:      Remote I/O mode        Busaddress:        Remote HV on/off
Deutsch            NO                   Local              VC                 all I/O: 0-5V DC        126                source: Continuous
        1 / 7              2 / 7                3 / 7              4 / 7              5 / 7                  6 / 7              6 / 6
      0002               0003                0004               0005               0006                   0007               0008
```

```
[Initial setup]                         [Initial setup]    [Initial setup]    [Initial setup]        [Initial setup]    [Initial setup]
Language:                               Operating mode:    Control mode:      Remote I/O mode        Busaddress:        Remote HV on/off
Italiano                                Remote             CC                 all I/O: 0-10V DC       0...125            source: External
        1 / 7                                  3 / 7              4 / 7              5 / 7                  6 / 7              6 / 6
      0002                                   0004               0005               0006                   0007               0008
```

```
[Initial setup]                         [Initial setup]    [Initial setup]    [Initial setup]                           [Initial setup]
Language:                               Operating mode:    Control mode:      Remote I/O mode                           Remote HV on/off
Français                                Fieldbus           AdvCC              all I/O: 0-20mA DC                        source: Bus
        1 / 7                                  3 / 7              4 / 7              5 / 7                                      6 / 6
      0002                                   0004               0005               0006                                     0008
```

```
                                        [Initial setup]                       [Initial setup]
                                        Operating mode:                       Remote I/O mode
                                        Adv. output control                   all I/O: 4-20mA DC
                                               3 / 7                                 5 / 7
                                             0004                                  0006
```

Set the following parameters:

- "**Language**"

   Set the desired user language. Use the [▲] / [▼] keys until the desired language option "**English"** (English), "**Deutsch**" (German), "**Italiano"** (Italian) or **"Français**" (French) flashes on the screen. Then press [↵] to confirm the choice. From now on, the information and instructions will be shown in the selected language.

- "**Use as standard ECM**"

   If the CM5 is being used as a simple charging generator (ECM), use the [▲] / [▼] keys to select until the option "**YES**" flashes on the screen. Then depress [↵] to confirm the choice. The main screen of the CM5 will then be started.

   If "**NO**" is selected, the following settings are run through.

   ☞**Note:**
   If the CM5 has been chosen as a simple charging generator (ECM), access to the menu is disabled. Access to the menu can be enabled as described in section **6.3**.

- "**Operating mode**"

   This option selects whether the generator should operate in "**Local**", "**Remote**", "**Fieldbus**" (optional) or "**AdvOutC**" (optional) mode. Depress [▲] / [▼] to select the correct mode and then depress [↵] to enable the setting.

- "**Control mode**"

   (Not for AdvOutC mode) This option selects whether the generator should operate in "**VC**", "**CC**" or "**AdvCC**" (optional) control mode. Depress [▲] / [▼] to select the correct mode and then depress [↵] to enable the setting.

- "**Remote I/O mode all I/O**"

   (Only in Remote operating mode) This option selects whether all analogue I/O signals of the generator should operate in "**0-5 V DC**", "**0-10 V DC**", "**0-20 mA DC**" or "**4-20 mA DC**" mode. Depress [▲] / [▼] to select the correct mode and then depress [↵] to enable the setting.

- "**Bus address**"

   (Only if the Anybus module is activated) This option selects the bus address for the serial communication. Depress [▲] / [▼] to select the correct slave address and then depress [↵] to enable the setting.

- "**Remote HV on/off source**"

   Select "**Continuous**" to ensure that the generator continuously supplies the set output voltage, or select "**External**" to be able to switch the output voltage on and off via the external input. Depress [▲] / [▼] to select the correct mode and then depress [↵] to enable the setting.

-   "**Remote HV on/off source**" (only in Fieldbus mode)

    (Only if the Anybus module is activated) Select "**Bus**" to be able to switch the set output voltage on and off via the bus communication, or select "**External**" to be able to switch the output voltage on and off via the external input. Depress [▲] / [▼] to select the correct mode and then depress [↵] to enable the setting.

Once all parameters have been set, the generator will once again display the information about the generator type (e.g. "**CM5-60N**"), the firmware version, the communication bus address and in some cases additional information. This information is displayed for 2 seconds, after which the generator continues to start and the main screen is displayed.

## 6.3. Activating the locked menu

If the CM5 is configured as a simple charging generator (ECM) during the Quick init, the menu is disabled from that moment. Access to the menu can be enabled by switching off the CM5, and then simultaneously holding down the [◄] and [↵] keys and switching on the CM5. After a short time the message "**Menu activated**" appears on the screen. After 2 seconds the software of the CM5 will start and the main screen will be displayed. The menu is now unlocked and accessible for the user.

☞**Note:**

It is not possible to activate the menu when the generator is active in the RunButton mode (see section **6.10**). First press [**ESC**] to exit the RunButton mode.

## 6.4. Resetting the language to English

If the wrong language is selected during the Quick init installation for the CM5, it can be reset to English as follows. The user language can be reset by switching off the CM5, then simultaneously holding down the [►] and [**ESC**] keys and switching on the CM5. After a short time, the message "**Default language restored.**" will appear on the screen. After 2 seconds the software of the CM5 will start and the main screen will be displayed. The default user language has been reset to English.

## 6.5. The main menu

The LCD display provides information about the status of the generator. This information is shown via texts and symbols.



Figure 18: CM5 display

The main screen of the generator shows the currently measured voltage and current and also the operational mode. Texts are shown on the left-hand side of the display and symbols on the right-hand side. The symbols that refer to an operating mode appear on the same line as the text.

Explanation of the symbols used:

| | |
|---|---|
| ᵛᶜ | Generator is operating in Voltage Control (VC) mode. |
| ᶜᶜ | Generator is operating in Current Control (CC) mode. |
| ᶴ | Generator is operating in Advanced CC (AdvCC) mode. |
| ⎣ | Generator is operating in Advanced Output Control (AdvOutC) mode. |
| ⚡ | High voltage is switched on. |
| ⚷ | Keyboard is locked. |
| ↑ | External on/off mode is enabled. |
| ↵ | RunButton mode is enabled. |
| \|⁄–⸜ | Rotating dash, serial communication is operational. |
| E | Flashing E, communication problems. |
| 🔒 | Parameter cannot be changed. |
| ✝ | Hi-Current (Nominal) mode during AdvCC mode. |
| ↓ | Lo-Current (Standby) mode during AdvCC mode. |

When the generator is operated via the keyboard, this is called the 'local' mode. When the generator is operated via the external analogue control inputs, this is called the 'remote' mode. When the generator is operated via the serial communication, this is called the 'fieldbus' mode (see section **2**).

## 6.6. Key functions

The keys on the CM5 are defined as follows:

[▲]  Change the Voltage/Current Setpoint/Select a menu item/Change a parameter.

[▼]  Change the Voltage/Current Setpoint/Select a menu item/Change a parameter.

[◄]  Display the Setpoint values/Location of the cursor when changing some parameters.

[►]  Display the Setpoint values/Location of the cursor when changing some parameters.

[↵]  Access to the menu and menu items/Accept changed parameters/Activate the HV in RunButton mode.

[**ESC**]  Exit the menu and menu items/Exit the RunButton mode.

## 6.7. Displaying the current Voltage / Current setpoint

Depress the [◄] or [►] key. The set voltage and current limit are now shown on the display. The set values are shown for as long as the key is depressed. After releasing the key the main screen is displayed again after 2 seconds.

## 6.8. Changing the Voltage / Current setpoint

☞**Note:**
- **Avoid unnecessarily high output voltages, otherwise spark-over can occur on the charging bars or electrodes. This will impair the reliability and proper functioning of the charging process.**

☞**Note:**
  Ensure that the generator is operating in the local mode, otherwise this function does not work.

Depress the [▲] / [▼] key. The currently set values will now be shown on the display. Depress the [▲] / [▼] key again to change the setpoint value. In VC mode the Voltage Setpoint will be changed, whilst in CC or AdvCC mode the Current Setpoint will be changed. If the keys are not operated for longer than 2 seconds, the main screen is displayed again.

To raise/lower the setpoint more rapidly, depress the [▲] / [▼] keys for longer. The longer the keys are depressed, the faster the value changes. Also, the value initially changes in steps of 0.1 kV or mA and after a short time in steps of 1.0 kV or mA.

Increase the output voltage until the desired value is reached. Then set the output voltage approx. 10% higher to accommodate process fluctuations.

## 6.9. Keyboard lock

The keyboard on the CM5 can be locked. Simultaneously depress the [◄] and [►] keys for about 1 second. The "⛨" symbol appears on the screen. The keyboard is now locked. When the keyboard is locked it is not possible to change the Setpoint value of the generator. By using the [▲], [▼], [◄] and [►] keys, the currently set Setpoint values can still be displayed.

Simultaneously depress the [◄] and [►] keys again for about 1 second. The "⛨" symbol now disappears from the screen. The keyboard is unlocked again and can be used to change the Setpoint settings of the generator.

☞**Note:**

If the keyboard has been locked via the menu, it CANNOT be unlocked by simultaneously depressing the [◄] and [►] keys. In this case the "⛨" symbol flashes 5 times to indicate that the keyboard remains locked. In order to unlock the keyboard in this case, you will need to access the menu (see section **6.3**).

## 6.10. RunButton mode

To activate the output independently from an external on/off control signal it is possible to use the RunButton mode. With this mode it is possible to manually turn on the high voltage (overruled) to do for example initial tests.

**Note:** the RunButton mode can only be used if the generator has been set as 'Local Ext', 'Remote Ext', 'Fieldbus Bus' or 'Fieldbus Ext'.

In order to activate the RunButton mode, simultaneously depress the [**ESC**] and [↵] keys for about 1 second. As soon as the generator switches over to the RunButton mode this is indicated in the display by a flashing "↵" symbol in the right top corner.

When the generator is operating in the RunButton mode, depress the [↵] key to switch on the high voltage. Release the [↵] key and the HV switches off again.

Depress the [**ESC**] key to switch off the RunButton mode again. The flashing "↵" symbol will disappear from the display and the generator will now function normally again. The generator exits the RunButton mode also if the main switch of the generator is turned off and on again.

## 6.11. Menu entrance

Press the [↵] key when the generator is in the main screen to access the menu. If the user password is not changed, direct access to the menu will be given. If the user password is changed, this password must be entered first before menu access is allowed (see **6.15**).

## 6.12. Menu screens

As soon as the user password is entered the first main menu item is displayed. Depress [▲] / [▼] to select another main menu item. Each menu screen shows the number of items the relevant menu contains and the sequence number of the selected item (e.g. 3/7). In many cases the displayed menu item has an underlying submenu. Depress the [↵] key to activate this underlying submenu or a subsequent submenu. Depress [**ESC**] to exit the main menu or a submenu.

As soon as one of the system parameters is displayed with the current set value, depress the [↵] key to change the parameter. The set value or the cursor will now start flashing. Depress [▲] / [▼] to change the value. Depress the [↵] key to accept and save the new setting. Depress the [**ESC**] key to undo the change and restore the previous value.

Depress [**ESC**] for longer than 2 seconds to return to the first main menu item from any other menu item or parameter. In this case the [**ESC**] key acts like a HOME key.

☞**Note:**

If no keys are depressed for a period of 30 seconds, the system automatically returns to the main screen.

Summary:

- Use the [▲] / [▼] keys to scroll through the menu items or to change a parameter value.
- Use the [◄] / [►] keys to move the cursor to the left or right (when entering parameters).
- Use the [↵] key to select an underlying menu item. The [↵] key is also used to make a system parameter editable or to save a changed parameter.
- Use the [**ESC**] key to exit a menu item. The key can also be used to not save a changed parameter and to restore the original value.

Also see section **6.28** menu item **1000** for more information about the menu structure.

## 6.13. Changing the user language

Information and instructions are shown on the display in English by default. However, the user can change this to the languages German, Italian or French. This works as follows:

1. Press the [↵] key to access the menu.
2. The generator will then display the following text:
> "**[Main]**"
> "**Operating mode:**"
> "**Local**"

(The mode displayed depends on the selected operating mode).
3. Press the [▲] / [▼] key until the menu item changes to:
> "**[Main]**"
> "**Advanced settings**"
4. Press the [↵] key to activate this menu item.
5. The generator will then display the following text:
> "**[Advanced settings]**"
> "**General settings**"
6. Press the [↵] key to activate this menu item.
7. The generator will then display the following text:
> "**[General settings]**"
> "**Change lock mode:**"
> "**Unlocked**"
8. Press the [▲] / [▼] key until the menu item changes to:
> "**[General settings]**"
> "**Language:**"
> "**English**"
9. Press the [↵] key to change the user language.
10. The activated language will then flash.
11. Press the [▲] / [▼] key to select one of the other languages.
12. When the desired user language has been selected, press the [↵] key. The text no longer flashes and the user language has been changed.
13. Press the [**ESC**] key 3 times in a row to leave the menu entirely and return to the main screen.

From now on, all information and instructions will be shown in the selected language.

## 6.14. Changing the user password

The entrence to the user menu can be protected by a user password. Default this password is set to 0000, but it can be changed by the user as follows.

1.   Depress [↵] to enter the menu.
2.   The generator displays the following text:
             "**[Main]**"
             "**Operating mode:**"
             "**Local**"
     The displayed mode is dependant of the selected operating mode).
3.   Depress  [▲] / [▼] till the menu item is changed into:
             "**[Main]**"
             "**Advanced settings**"
4.   Depress [↵] to activate the menu item.
5.   The following text is displayed:
             "**[Advanced settings]**"
             "**General settings**"
6.   Depress [↵] to activate the menu item.
7.   The following text is displayed:
             "**[General settings]**"
             "**Change lock mode:**"
             "**Unlocked**"
8.   Depress [▲] / [▼] till the menu item is changed into:
             "**[General settings]**"
             "**Change password:**"
             "**0000**"
9.   Depress [↵] to enable password changing.
10.  The cursor will flash on the First position.
11.  Depress [▲] / [▼] to change the digit into the desired value.
12.  Depress [►] to move the cursor 1 position to the right.
13.  Repeat steps 11 and 12 until the desired password is entered. If necessary depress [◄] to move the cursor 1 position to the left.
14.  When the complete password in entered, depress [↵]. The cursor is no longer flashing and the password is changed.
15.  Depress 3x times the [**ESC**] key to exit the complete menu and return to the main screen.

From now on it is only possible to enter the menu with use of the user password if this is requested.

## 6.15. Entering a user password

The use of the user menu can be protected using a password. The user password set by default at the factory is 0000. Provided this password has not been changed by the user, this user password will not be requested prior to activating the menu. Depress the [↵] key to access the menu from the main screen. The first menu item will now be visible with the text "**Operating mode**".

However, if the user password has been set, then after depressing the [↵] key the text "**User password:**" will appear on the screen. The user password must now be entered. Depress [▲] / [▼] to change the character under the flashing cursor. Depress [◄] / [►] to move the cursor 1

position to the left or right. When the cursor is moved to the right, the previous character will change into a "*". Once the full 4-digit password has been entered, depress [↵] to activate the menu. If an incorrect password is entered, the system returns to the main screen.

☞**Note:**

If the user exits the menu and wants to activate the menu again within 60 seconds, then on depressing the [↵] key the user password is not requested again and the menu is immediately activated.

## 6.16. Restoring the user password

A situation may occur whereby the user password has been changed but this is unknown to the user.

The CM5 allows the user password to be reset. Use the following procedure to do this.

1.   Switch the generator off ([ 0 / I ] switch to the [ 0 ] position).
2.   Simultaneously depress the [◄] and [►] keys.
3.   Now switch the generator on ([ 0 / I ] switch to the [ I ] position).
4.   The generator starts up and the following text is displayed again:
          "**Restore user password: NO**"
     Depress [▲] / [▼] to change the text to "**YES**". Now depress [↵].
5.   The following text is displayed: "**Factory password**". Using the [▲] / [▼] and [◄] / [►] keys, enter the factory password (this can be found in **Appendix X:** that is enclosed on a separate sheet). Now depress [↵].
6.   The text "**User password is restored.**" appears on the display. After 1 second the generator shows the main screen.

The user password is reset to 0000 and if desired it can be set again (see **0**).

## 6.17. Analog (Remote) control of the setpoint and limit

To control the setpoint or limit of the output voltage or current with use of an analogue signal for example from a PLC, the generator must be switched to remote mode (see menu **1200**. The menu structure is explained further in section **6.28**).

In remote mode default only the setpoint of the analogue input is controlled. To control also the limit with use of the analogue input, an extra setting has to be set. Set menu item **4300** to item **4320**.

For the remote control, the necessary analogue control signals must also be connected as explained in section **5.8**. The correct control modes must be selected for the relevant control signals (see **7630** and **7640**).

## 6.18. Fieldbus control (only if an Anybus module has been installed and activated)

In order to allow the generator to function using serial bus communication, the generator must first be switched over to the fieldbus mode (see **1300**). The correct bus address must also be set (see **7131**). Refer to the interface description for the supplied module for the data to be used.

## 6.19. External switching of the high voltage of the generator (Remote HV on/off)

☞**Note:**
    This function only controls the output voltage, not the mains voltage.

External on/off switching of the high voltage can be done by:
1) present an external switching signal to the sub-D connector without changing the preset setpoint settings. Activate this option in menu **7300** choice **7313**.
2) (optional) serial bus communication. If this option is mounted the target or master system (a machine or PLC) can send a command to switch on and off the high voltage. Activate this option in menu **7300** choice **7312**.

Depending on the operational mode of the generator, the relevant external control mode must also be activated. See menu **7300** (see section **5.7** for connection).

☞**Note:**
    The switching speed: the generator needs up to 60 ms to reach the maximum output voltage starting from 0 kV. The time needed to reach 0 kV again from the maximum output voltage very much depends on the connected load.

## 6.20. Limit indicator

The Limit indicator on the front panel of the generator indicates that the generator is limited. In VC and AdvOutC mode this means that the desired (set) high voltage value is not reached. In CC and AdvCC mode the set current value is not attained. See section **9** for possible problems and solutions.

## 6.21. Limit alarm output (Pin9)

The limit function (as described in section **6.20**) is also externally available via the sub-D connector from the generator. See section **5.11.2** for connecting and menu **7670** choice **7672** to activate the output.

☞**Note:**
    Pin 9 can only be used as a Limit Alarm **or** Arc Detect message. However, the output can also be switched off (see menu item **7670**)

## 6.22. Arc detect output (Pin 9)

The CM5 generator can pass on detected arcs directly via this output to the machine or PLC. This output will be active for each detected arc. When the arc is rectified, this output signal will again become inactive. This allows, for example, a counter to be controlled, counting the number of arcs of the high voltage.

This output is available on de Sub-D connector (see section **5.11.2**) and must be activated via the menu. See menu **7670** choice **7671**.

☞**Note:**

Pin 9 can only be used as a Limit Alarm **or** Arc Detect message. However, the output can also be switched off (see menu item **7670**)

## 6.23. Operating signal

The operating signal is used to indicate that the generator is supplying high voltage to the output. However, as soon as the high voltage is limited and the limit indicator illuminates, or the setpoint is 0 or the external high voltage control signal is switched off the operating signal will also no longer be active. The conditions for the operating signal can be found in **Appendix IV:**.

## 6.24. "Too many ARCs error!" safety

When "**Too many Arcs ERROR!**" appears on the display, more than 10 arcs within a minute. have been detected. The generator is protected and in this situation the high voltage switches off. To avoid dangerous situations the high voltage will be switched off

This error situation can be corrected by depressing the [**ESC**] key on the keyboard. If the generator is operating in the external remote HV on/off source mode, the error can also be corrected by switching the high voltage off and then on again via the external switching signal. When using the fieldbus communication, switching the high voltage off and on via the checking bit of the data communication will also rectify the error situation.

## 6.25. Switching arc detection protection on/off

If you do not want the high voltage of the generator to switch off on detection of too many arcs, this option can be disabled. See menu option **7140**.

## 6.26. Restoring the factory settings

A situation may occur where the user has changed the generator settings in such a way that it is no longer clear how the generator is operating or, more seriously, in such a way that the generator no longer functions at all. In such a situation it is possible to reset the generator back to the factory settings.

To do this go to menu item **7820** and select the option "**Restore factory settings: YES**". After a short time the generator will start up again with the factory settings. In this case the generator will once again run through the Quick Init menu in order to set the most used base settings (see **6.2** and **6.27**). Other settings then need to be set via the menu (see **0** and **6.28**).

☞**Note:**

During the resetting of the factory settings, the user password is NOT reset. In order to reset the user password, the procedure in section **6.16** must be followed.

## 6.27. Quick init menu structure

The 'quick init' menu structure of the CM5 is shown in the following diagram.
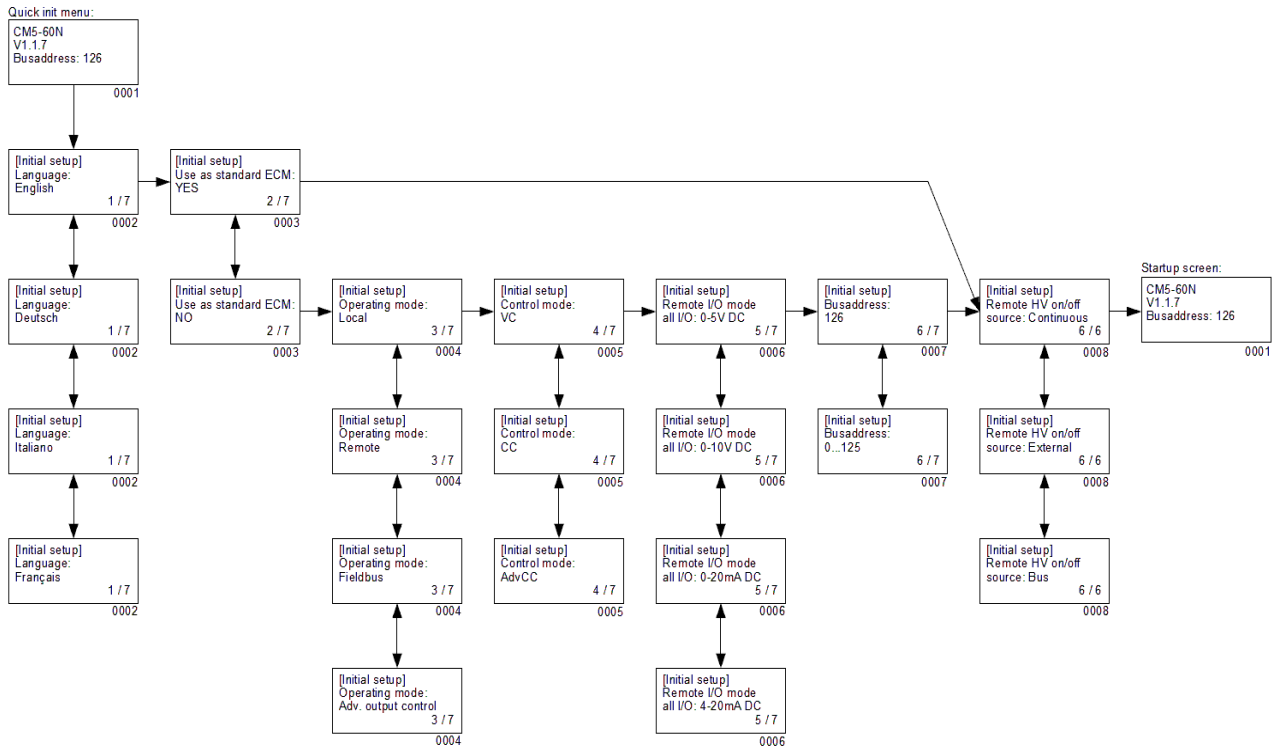


0001    Startup screen. This gives information about the generator type, the current firmware version, the set communication bus address (if applicable) and other relevant information about the generator.

0002    Menu option for selecting the language used in the display. You can choose between the following languages: "**English**" (English), "**Deutsch**" (German), "**Italiano**" (Italian) and "**Français**" (French).

0003    Menu option to determine whether the generator must function as a simple generator (ECM) or whether the generator must be configured more specifically. If the generator is used to replace an ECM, select the option "**YES**". By selecting "**NO**", other parameters will need to be set.

0004    Menu option for setting the operating mode of the generator. Possible choices: "**Local**" for keyboard operation, "**Remote**" for control via the analogue signals and "**Fieldbus**" (optional) for control via a serial communication network or "**AdvOutC**" (optional) for speed-related control of the high voltage.

0005    Menu option for setting the control mode of the generator. Possible choices are "**VC**" for voltage control, "**CC**" for current control or "**AdvCC**" (optional) for advanced (or intelligent) current control.

0006    Menu option for selecting the control voltages for the remote I/O inputs and outputs. A choice can be made from "**0-5 V DC**", "**0-10 V DC**", "**0-20 mA DC**" and "**4-20 mA DC**".

0007    Optional menu option for setting the communication bus address. By default this is set to "**126**". The possible range is from address "**0**" to "**125**".

0008    Menu option for setting the use of the external switching input. "**Continuous**" mode indicates that the output voltage is continuously switched on. The option "**External**" is used to switch the output voltage on and off via the external input. The option "**Bus**"

(only for the fieldbus mode) is used to switch the output voltage on and off via the fieldbus communication.

## 6.28. Menu structure

The menu structure of the CM5 is shown in the following diagrams.
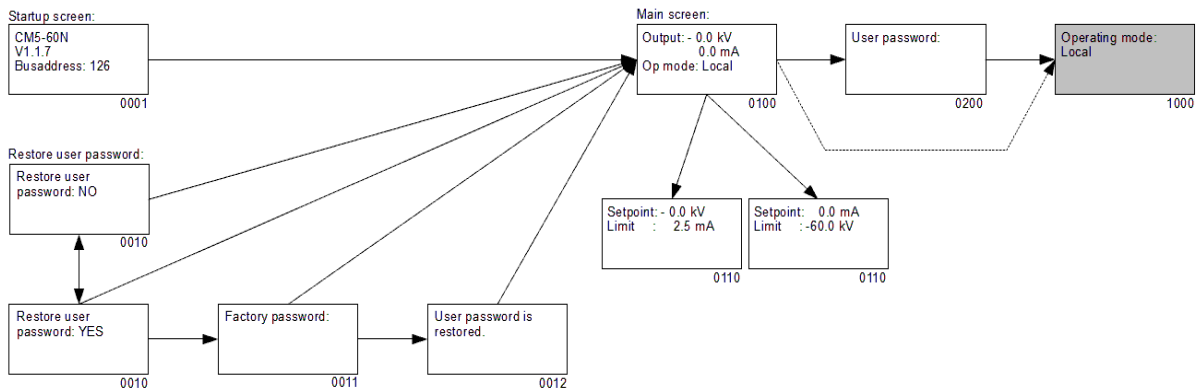


| | |
|---|---|
| 0001 | Start-up screen showing information about the generator. |
| 0010 | Screen asking whether the user wants to reset the user password. Select "**YES**" to change the password. |
| 0011 | Screen for entering the factory password. |
| 0012 | Screen indicating that the user password has been reset. |
| 0100 | Main screen. This shows the currently measured voltage and current, but also information about the modes of the generator that have been set. |
| 0110 | Setpoint screen. This shows the set voltage and current. |
| 0200 | The user password must be entered in this screen in order to access the user menu. |
| 1000 | This is the 1st item of the main menu. |

```
┌─────────────────┐      ┌─────────────────┐          ┌─────────────────┐
│ User password:  │─────▶│ [Main]          │─────────▶│ [Main]          │
│                 │      │ Operating mode: │          │ Operating mode: │
│                 │      │ Local           │          │ Local           │
│            0200 │      │            1000 │          │            1100 │
└─────────────────┘      └─────────────────┘          └─────────────────┘
                                  │                            ▲
                                  │                            ▼
                                  │                   ┌─────────────────┐
                                  │                   │ [Main]          │
                                  │                   │ Operating mode: │
                                  │                   │ Remote          │
                                  │                   │            1200 │
                                  │                   └─────────────────┘
                                  │                            ▲
                                  │                            ▼
                                  │                   ┌─────────────────┐
                                  │                   │ [Main]          │
                                  │                   │ Operating mode: │
                                  │                   │ Fieldbus        │
                                  │                   │            1300 │
                                  │                   └─────────────────┘
                                  │                            ▲
                                  │                            ▼
                                  │                   ┌─────────────────┐
                                  │                   │ [Main]          │
                                  │                   │ Operating mode: │
                                  │                   │ Adv. output     │
                                  │                   │        control  │
                                  │                   │            1400 │
                                  │                   └─────────────────┘
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│ [Main]          │
                         │ Control mode:   │          │ Control mode:   │
                         │ VC              │          │ VC              │
                         │            2000 │          │            2100 │
                         └─────────────────┘          └─────────────────┘
                                  ▲                            ▲
                                  │                            ▼
                                  │                   ┌─────────────────┐
                                  │                   │ [Main]          │
                                  │                   │ Control mode:   │
                                  │                   │ CC              │
                                  │                   │            2200 │
                                  │                   └─────────────────┘
                                  │                            ▲
                                  │                            ▼
                                  │                   ┌─────────────────┐
                                  │                   │ [Main]          │
                                  │                   │ Control mode:   │
                                  │                   │ AdvCC           │
                                  │                   │            2300 │
                                  │                   └─────────────────┘
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Change settings │          │                 │
                         │ local mode      │          │                 │
                         │            3000 │          │                 │
                         └─────────────────┘          └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Change settings │          │                 │
                         │ remote mode     │          │                 │
                         │            4000 │          │                 │
                         └─────────────────┘          └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Change settings │          │                 │
                         │ fieldbus mode   │          │                 │
                         │            5000 │          │                 │
                         └─────────────────┘          └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Change settings │          │                 │
                         │ AdvOutC mode    │          │                 │
                         │            6000 │          │                 │
                         └─────────────────┘          └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Advanced settings│         │                 │
                         │            7000 │          │                 │
                         └─────────────────┘          └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐          ┌─────────────────┐
                         │ [Main]          │─────────▶│                 │
                         │ Service mode    │          │                 │
                         │ * Simco only 8000│         │                 │
                         └─────────────────┘          └─────────────────┘
```

0200   The user password must be entered in this screen in order to access the user menu. (The default user password is set to 0000.)

1000   Menu option that shows the generator's current operating mode. By selecting the option, the operating mode of the generator can be changed ("**[Operating mode]**").

   1100   Select to let the generator operate in de 'Local' mode.

   1200   Select to let the generator operate in de 'Remote' mode.

   1300   Select to let the generator operate in de 'Fieldbus' mode.

   1400   Select to let the generator operate in de 'Advanced Output Control' mode.

2000   Menu option that shows the generator's current 'Control' mode. By selecting the option, the 'Control' mode of the generator can be changed ("**[Control mode]**").

   2100   Select to let the generator operate in VC (Voltage Control) mode.

   2200   Select to let the generator operate in CC (Current Control) mode.

   2300   Select to let the generator operate in AdvCC (Advanced Current Control) mode.

3000   Menu for changing the settings for the 'Local' operating mode.

4000   Menu for changing the settings for the 'Remote' operating mode.

5000   Menu for changing the settings for the 'Fieldbus' operating mode.

6000   Menu for changing the settings for the 'Advanced Output Control' operating mode.

7000   Menu for changing advanced generator settings.

8000   Menu for changing service settings (this menu can only be accessed by authorized Simco-Ion employees).


☞**Note:**

Depending on the used operating mode not all menu options will be available. To select matching settings, first select the specific operating mode (**1000**).

User password:

0200

[Main]
Operating mode:
Local

1000

[Main]
Control mode:
VC

2000

[Main]
Change settings
local mode

3000

VC mode
[Local settings]
Voltage setpoint:
- 0.0 kV

CC/AdvCC mode
[Local settings]
Current setpoint:
0.0 mA

3100

VC mode
[Local settings]
Voltage setpoint:
- 0.0, 1.0 ... U$_{userlimit}$ kV

CC/AdvCC mode
[Local settings]
Current setpoint:
0.0, 0.1 ... I$_{userlimit}$ mA

3110

[Local settings]
Current limit:
2.5 mA

[Local settings]
Voltage limit:
- 60.0 kV

3200

[Local settings]
Current limit:
0.0, 0.1 ... I$_{userlimit}$ mA

[Local settings]
Voltage limit:
- 0.0, 1.0 ... U$_{userlimit}$ kV

3210

[Main]
Change settings
remote mode

4000

[Remote settings]
Voltage setpoint:
- 0.0 kV

[Remote settings]
Current setpoint:
0.0 mA

4100

[Remote settings]
Current limit:
2.5 mA

[Remote settings]
Voltage limit:
- 60.0 kV

4200

[Remote settings]
Current limit:
0.0, 0.1 ... I$_{userlimit}$ mA

[Remote settings]
Voltage limit:
- 0.0, 1.0 ... U$_{userlimit}$ kV

4210

[Remote settings]
Remote limit
control:
Local controlled

4300

[Remote settings]
Remote limit
control:
Local controlled

4310

[Remote settings]
Remote limit
control:
External controlled

4320

[Main]
Change settings
fieldbus mode

5000

[Fieldbus settings]
Voltage setpoint:
- 0.0 kV

[Fieldbus settings]
Current setpoint:
0.0 mA

5100

[Fieldbus settings]
Current limit:
2.5 mA

[Fieldbus settings]
Voltage limit:
- 60.0 kV

5200

[Main]
Change settings
AdvOutC mode

6000

[AdvOutC settings]
Current limit:
2.5 mA

6100

[Remote settings]
Current limit:
0.0, 0.1 ... I$_{userlimit}$ mA

6110

[Main]
Advanced settings

7000

[Main]
Service mode

* Simco only          7000

1000    Menu option that shows the generator's current operating mode. By selecting the option, the operating mode of the generator can be changed.

2000    Menu option that shows the generator's current 'Control' mode. By selecting the option, the 'Control' mode of the generator can be changed.

3000    Menu for changing the settings for the 'Local' operating mode

("**[Change settings local mode]**").

    3100    VC: set value for the Voltage Setpoint (Local mode).
                 CC: set value for the Current Setpoint (Local mode).

        3110    VC: set the Voltage Setpoint.
                     CC: set the Current Setpoint.

    3200    VC: set Current Limit value (Local mode).
                 CC: set Voltage Limit value (Local mode).

        3210    VC: set the Current Limit.
                     CC: set the Voltage Limit.

4000    Menu for changing/readout the settings for the 'Remote' operating mode

("**[Change settings remote mode]**").

    4100    VC: set value of the analogue input of the Voltage Setpoint (Remote mode).
                 CC: set value of the analogue input of the Current Setpoint (Remote mode).

    4200    VC: set value of the analogue input of the Current Limit (Remote mode).
                 CC: set value of the analogue input of the Voltage Limit (Remote mode).

    ☞**Note:**

When option **4320** is enabled, the set value can only be read out (marked by the "🔒" symbol). When option **4310** is enabled, option **4210** is also enabled, meaning that the set value can be changed.

        4210    VC: set the Current Limit.
                     CC: set the Voltage Limit.

    4300    Configure the maximum current (VC mode) or maximum voltage (CC mode) setting in Remote operating mode.

        4310    The maximum current/voltage is set locally via the menu (see **4210**).

        4320    The maximum current/voltage is controlled via the remote I/O.

5000    Menu for changing/readout the settings for the 'Fieldbus' operating mode

("**[Change settings fieldbus mode]**").

    5100    VC: set value of the Voltage Setpoint (Fieldbus mode).
                 The parameter is read-only, marked by the "🔒" symbol.
                 CC: set value of the Current Setpoint (Fieldbus mode).
                 The parameter is read-only, marked by the "🔒" symbol.

    5200    VC: set value of the Current Limit (Fieldbus mode).
                 The parameter is read-only, marked by the "🔒" symbol.
                 CC: set value of the Voltage Limit (Fieldbus mode).
                 The parameter is read-only, marked by the "🔒" symbol.

6000    Menu for changing the settings for the 'Advanced Output Control' operating mode

("**[Change settings AdvOutC mode]**").

    6100    Set value of the Current Limit when the generator is operating in Advanced Output Control mode.

7000    Menu for changing advanced generator settings.

8000    Menu for changing service settings.

| [Main]<br>Advanced settings<br>7000 | → | [Advanced settings]<br>General settings<br>7100 | → | [General settings]<br>Change mode:<br>Unlocked<br>7110 | → | [General settings]<br>Change mode:<br>Unlocked<br>7111 |
| | | | | | | [General settings]<br>Change mode:<br>Locked<br>7112 |

[General settings]<br>Change password:<br>0000<br>7120 → [General settings]<br>Change password:<br>0000 .... 9999<br>7121

[General settings]<br>Busaddress:<br>126<br>7130 → [General settings]<br>Busaddress:<br>0 ... 125<br>7131

[General settings]<br>Enable limited<br>arcs: YES<br>7140 → [General settings]<br>Enable limited<br>arcs: YES<br>7141

[General settings]<br>Enable limited<br>arcs: NO<br>7142

[General settings]<br>Disable menu access:<br>NO<br>7150 → [General settings]<br>Disable menu access:<br>NO<br>7151

[General settings]<br>Disable menu access:<br>YES<br>7152

[General settings]<br>Language:<br>English<br>7160 → [General settings]<br>Language:<br>English<br>7161

[Advanced settings]<br>Output limits<br>7200 → [Output limits]<br>User voltage limit:<br>- 60.0 kV<br>7210 → [Output limits]<br>User voltage limit:<br>- 0.0, 1.0 ... U$_{factlimit}$ kV<br>7211

[Output limits]<br>User current limit:<br>2.5 mA<br>7220 → [Output limits]<br>User current limit:<br>0.0, 0.1 ... I$_{factlimit}$ mA<br>7221

[Advanced settings]<br>Remote HV on/off<br>source settings<br>7300

[Advanced settings]<br>Advanced output<br>control settings<br>7400

[Advanced settings]<br>Display settings<br>7500

[Advanced settings]<br>I/O settings<br>7600

[Advanced settings]<br>Unit info<br>7700

[Advanced settings]<br>Restore factory<br>settings: NO<br>7800

7000     Menu for changing advanced generator settings ("**[Advanced settings]**").

       7100     Submenu with general settings for the generator ("**[General settings]**").

             7110     Setting the keyboard lock.

                    7111     Unlock the keyboard.

                    7112     Lock the keyboard.

             7120     Display the current user password.

                    7121     Change the user password.

             7130     Display the communication bus address.

                    7131     Change the communication bus address.

             7140     Protection for switching off the HV output voltage of the generator after a preset number of arcs.

                    7141     HV will be switched off after 10 arcs/minute.

                    7142     HV will not be switched off after detecting 10 arcs/minute.

             7150     Option for disabling access to the menu from the main screen.

                    7151     Access to the menu is enabled.

                    7152     Access to the menu is disabled.

             7160     Select user language.

                    7161     Selection of one of the available languages (English, German, Italian or French).

       7200     Submenu for limiting the HV output ("**[Output limits]**").

             7210     Set maximum output voltage.

                    7211     Change maximum output voltage.

             7220     Set maximum output current.

                    7221     Change maximum output current.

       7300     Submenu for the Remote HV on/off source settings.

       7400     Submenu for the Advanced Output Control mode settings.

       7500     Submenu for the display settings.

       7600     Submenu for the settings for the analogue I/O inputs and outputs.

       7700     Submenu with information about the generator.

       7800     Menu for restoring the factory settings for the generator.

```
┌────────────────┐         ┌────────────────┐      ┌──────────┐
│ [Main]         │ ──────> │ [Advanced      │ ───> │          │
│ Advanced       │         │  settings]     │      │          │
│ settings       │         │ General        │      │          │
│          7000  │         │ settings  7100 │      │          │
└────────────────┘         └────────────────┘      └──────────┘
                                  ↕
                           ┌────────────────┐      ┌──────────┐
                           │ [Advanced      │ ───> │          │
                           │  settings]     │      │          │
                           │ Output limits  │      │          │
                           │          7200  │      │          │
                           └────────────────┘      └──────────┘
                                  ↕
  ┌────────────────┐    ┌────────────────┐    ┌────────────────┐
  │ [Advanced      │──> │ [RemOn/Off     │──> │ [RemOn/Off     │
  │  settings]     │    │  settings]     │    │  settings]     │
  │ Remote HV on/off│   │ Remote HV on/off│   │ Remote HV on/off│
  │ source settings │   │ source:        │    │ source:        │
  │          7300  │    │ Continuous 7310│    │ Continuous 7311│
  └────────────────┘    └────────────────┘    └────────────────┘
                                                      ↕
                                              ┌────────────────┐
                                              │ [RemOn/Off     │
                                              │  settings]     │
                                              │ Remote HV on/off│
                                              │ source: Bus    │
                                              │          7312  │
                                              └────────────────┘
                                                      ↕
                                              ┌────────────────┐
                                              │ [RemOn/Off     │
                                              │  settings]     │
                                              │ Remote HV on/off│
                                              │ source: External│
                                              │          7313  │
                                              └────────────────┘
       ↕
  ┌────────────────┐      ┌──────────┐
  │ [Advanced      │ ───> │          │
  │  settings]     │      │          │
  │ Advanced output│      │          │
  │ control settings│     │          │
  │          7400  │      │          │
  └────────────────┘      └──────────┘
       ↕
  ┌────────────────┐      ┌──────────┐
  │ [Advanced      │ ───> │          │
  │  settings]     │      │          │
  │ Display settings│     │          │
  │          7500  │      │          │
  └────────────────┘      └──────────┘
       ↕
  ┌────────────────┐      ┌──────────┐
  │ [Advanced      │ ───> │          │
  │  settings]     │      │          │
  │ I/O settings   │      │          │
  │          7600  │      │          │
  └────────────────┘      └──────────┘
       ↕
  ┌────────────────┐      ┌──────────┐
  │ [Advanced      │ ───> │          │
  │  settings]     │      │          │
  │ Unit info      │      │          │
  │          7700  │      │          │
  └────────────────┘      └──────────┘
       ↕
  ┌────────────────┐      ┌──────────┐
  │ [Advanced      │ ───> │          │
  │  settings]     │      │          │
  │ Restore factory│      │          │
  │ settings: NO   │      │          │
  │          7800  │      │          │
  └────────────────┘      └──────────┘
```
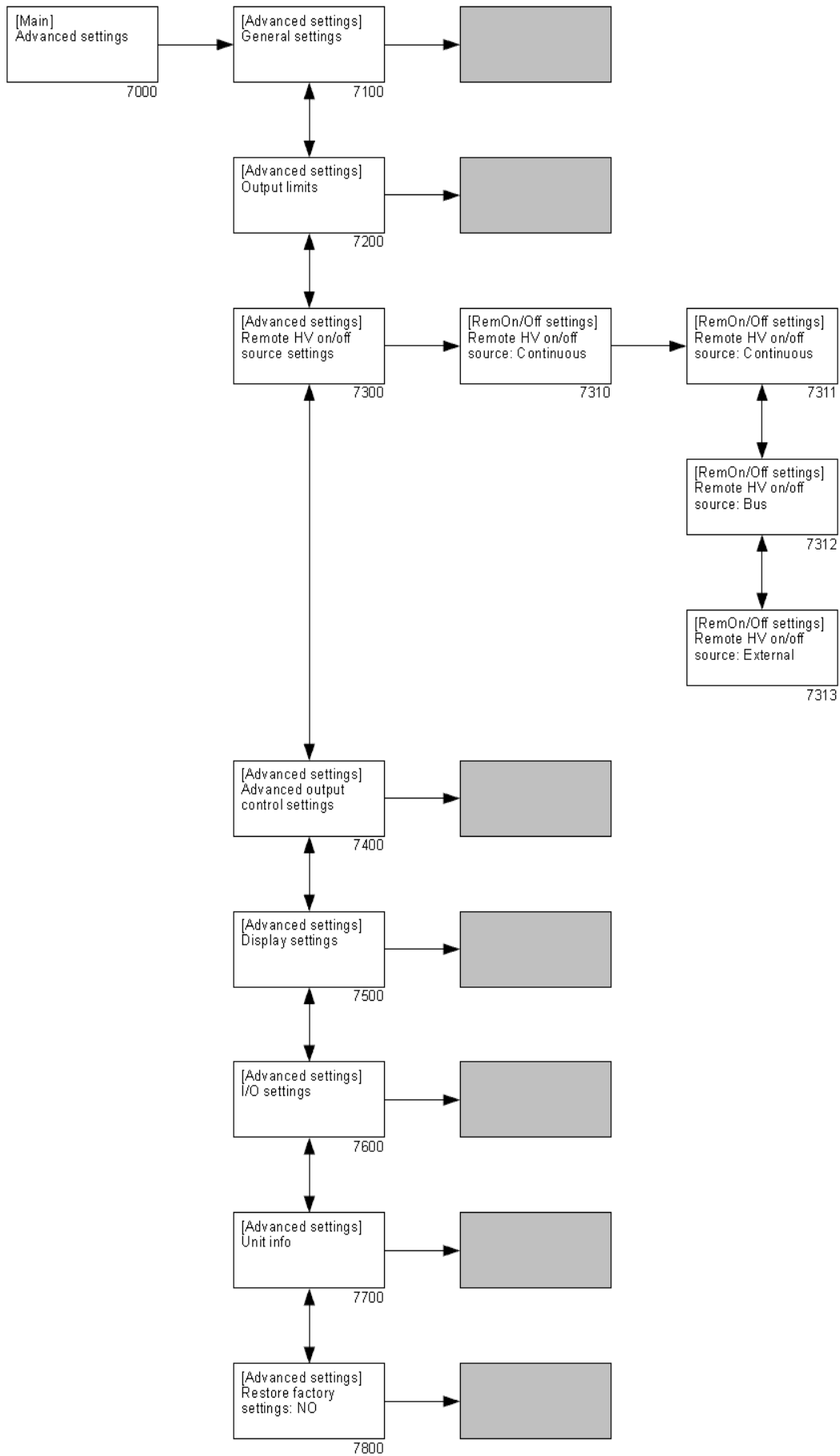
7000    Menu for changing advanced generator settings ("**[Advanced settings]**").

    7100    Submenu with general settings for the generator.

    7200    Submenu for limiting the HV output.

    7300    Submenu for the "**Remote HV on/off source settings**"
    ("**[Remote HV on/off settings]**").

        7310    Configuring the external on/off input mode.

            7311    External control is disabled, and the high voltage is immediately available on the output ("**Continuous**").

            7312    External control is disabled, and the high voltage output is activated via the anybus communication ("**Bus**"). This option is only available if the Fieldbus mode is activated.

            7313    External control is enabled, and the high voltage output is activated via the external input ("**External**").

    7400    Submenu for the Advanced Output Control mode settings.

    7500    Submenu for the display settings.

    7600    Submenu for the settings for the analogue I/O inputs and outputs.

    7700    Submenu with information about the generator.

    7800    Menu for restoring the factory settings for the generator.

```
┌─────────────────┐      ┌─────────────────┐      ┌──────────────┐
│ [Main]          │ ───▶ │ [Advanced settings] │ ──▶ │              │
│ Advanced settings│      │ General settings │      │              │
│            7000 │      │            7100 │      │              │
└─────────────────┘      └─────────────────┘      └──────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌──────────────┐
                         │ [Advanced settings] │ ──▶ │              │
                         │ Output limits   │      │              │
                         │            7200 │      │              │
                         └─────────────────┘      └──────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌──────────────┐
                         │ [Advanced settings] │ ──▶ │              │
                         │ Remote HV on/off│      │              │
                         │ source settings │      │              │
                         │            7300 │      │              │
                         └─────────────────┘      └──────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐      ┌─────────────────────┐
                         │ [Advanced settings] │ ──▶ │ [AdvOutC settings] │ ──▶ │ [AdvOutC settings]  │
                         │ Advanced output │      │ Setpoint voltage│      │ Setpoint voltage    │
                         │ control settings│      │ start: - 5.0 kV │      │ start: - 0.0, 1.0 kV ...│
                         │            7400 │      │            7410 │      │ Uuser limit kV  7411│
                         └─────────────────┘      └─────────────────┘      └─────────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────────┐
                                                  │ [AdvOutC settings] │ ──▶ │ [AdvOutC settings]  │
                                                  │ Setpoint voltage│      │ Setpoint voltage    │
                                                  │ max: - 15.0 kV  │      │ max: - 0.0, 1.0 kV ...│
                                                  │            7420 │      │ Uuser limit kV  7421│
                                                  └─────────────────┘      └─────────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [AdvOutC settings] │ ──▶ │ [AdvOutC settings] │
                                                  │ High level:     │      │ High level:     │
                                                  │ 80 %            │      │ 0 ... 100 %     │
                                                  │            7430 │      │            7431 │
                                                  └─────────────────┘      └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [AdvOutC settings] │ ──▶ │ [AdvOutC settings] │
                                                  │ Trigger level:  │      │ Trigger level:  │
                                                  │ 10 %            │      │ 0 ... 100 %     │
                                                  │            7440 │      │            7441 │
                                                  └─────────────────┘      └─────────────────┘

                         ┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │ ──▶ │ [Display settings] │ ──▶ │ [Display settings] │
                         │ Display settings│      │ Readout stretched:│    │ Readout stretched:│
                         │                 │      │ 0.7 seconds     │      │ 0.0 ... 5.0 seconds│
                         │            7500 │      │            7510 │      │            7511 │
                         └─────────────────┘      └─────────────────┘      └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [Display settings] │ ──▶ │ [Display settings] │
                                                  │ Limit LED stretched:│   │ Limit LED stretched:│
                                                  │ 0.7 seconds     │      │ 0.5 ... 5.0 seconds│
                                                  │            7520 │      │            7521 │
                                                  └─────────────────┘      └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [Display settings] │ ──▶ │ [Display settings] │
                                                  │ Display readout:│      │ Display readout:│
                                                  │ KV & mA         │      │ KV & mA         │
                                                  │            7530 │      │            7531 │
                                                  └─────────────────┘      └─────────────────┘
                                                                                   ▲
                                                                                   ▼
                                                                          ┌─────────────────┐
                                                                          │ [Display settings] │
                                                                          │ Display readout:│
                                                                          │ % (percent)     │
                                                                          │            7532 │
                                                                          └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [Display settings] │ ──▶ │ [Display settings] │
                                                  │ Backlight:      │      │ Backlight:      │
                                                  │ 85 %            │      │ 0 ... 100 %     │
                                                  │            7540 │      │            7541 │
                                                  └─────────────────┘      └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐      ┌─────────────────┐
                                                  │ [Display settings] │ ──▶ │ [Display settings] │
                                                  │ Contrast:       │      │ Contrast:       │
                                                  │ 50 %            │      │ 0 ... 100 %     │
                                                  │            7550 │      │            7551 │
                                                  └─────────────────┘      └─────────────────┘

                         ┌─────────────────┐      ┌──────────────┐
                         │ [Advanced settings] │ ──▶ │              │
                         │ I/O settings    │      │              │
                         │            7600 │      │              │
                         └─────────────────┘      └──────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌──────────────┐
                         │ [Advanced settings] │ ──▶ │              │
                         │ Unit info       │      │              │
                         │            7700 │      │              │
                         └─────────────────┘      └──────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌──────────────┐
                         │ [Advanced settings] │ ──▶ │              │
                         │ Restore factory │      │              │
                         │ settings: NO    │      │              │
                         │            7800 │      │              │
                         └─────────────────┘      └──────────────┘
```

7000    Menu for changing advanced generator settings ("**[Advanced settings]**").

    7100    Submenu with general settings for the generator.

    7200    Submenu for limiting the HV output.

    7300    Submenu for the Remote HV on/off source settings.

    7400    Submenu for the Advanced Output Control mode settings (this menu is only available if **1400** and **7780** are active)
                                                   ("**[Advanced output control settings]**").

        7410    Set minimum (start) Setpoint for the voltage that is output when the analogue control input reaches the trigger level (see **7440**).

            7411    Set the minimum (start) Setpoint for the output voltage.

        7420    Set maximum Setpoint for the voltage that is output when the maximum level is reached (see **7430**).

            7421    Set the maximum Setpoint output voltage.

        7430    Set maximum level of the analogue control input.

            7431    Set the maximum level of the analogue control input.

        7440    Set threshold level of the analogue control input.

            7441    Set the threshold level of the analogue control input.

    7500    Submenu for the display settings ("**[Display settings]**").

        7510    Set delay time for displaying the most recently measured high voltage value after this has been reduced.

            7511    Set the display readout delay time.

        7520    Set delay time of the limit indicator indicating how long the limit indicator must remain illuminated after a limit situation is no longer present.

            7521    Set the limit indicator readout delay.

        7530    Set display mode for the display.

            7531    Voltages and currents are shown in kV and mA.

            7532    Voltages and currents are displayed as a % (percentage) of the maximum.

        7540    Set intensity of the display backlight.

            7541    Set the intensity of the display backlight.

        7550    Set contrast value for the display text.

            7551    Set the contrast value for the display text.

    7600    Submenu for the settings for the analogue I/O inputs and outputs.

    7700    Submenu with information about the generator.

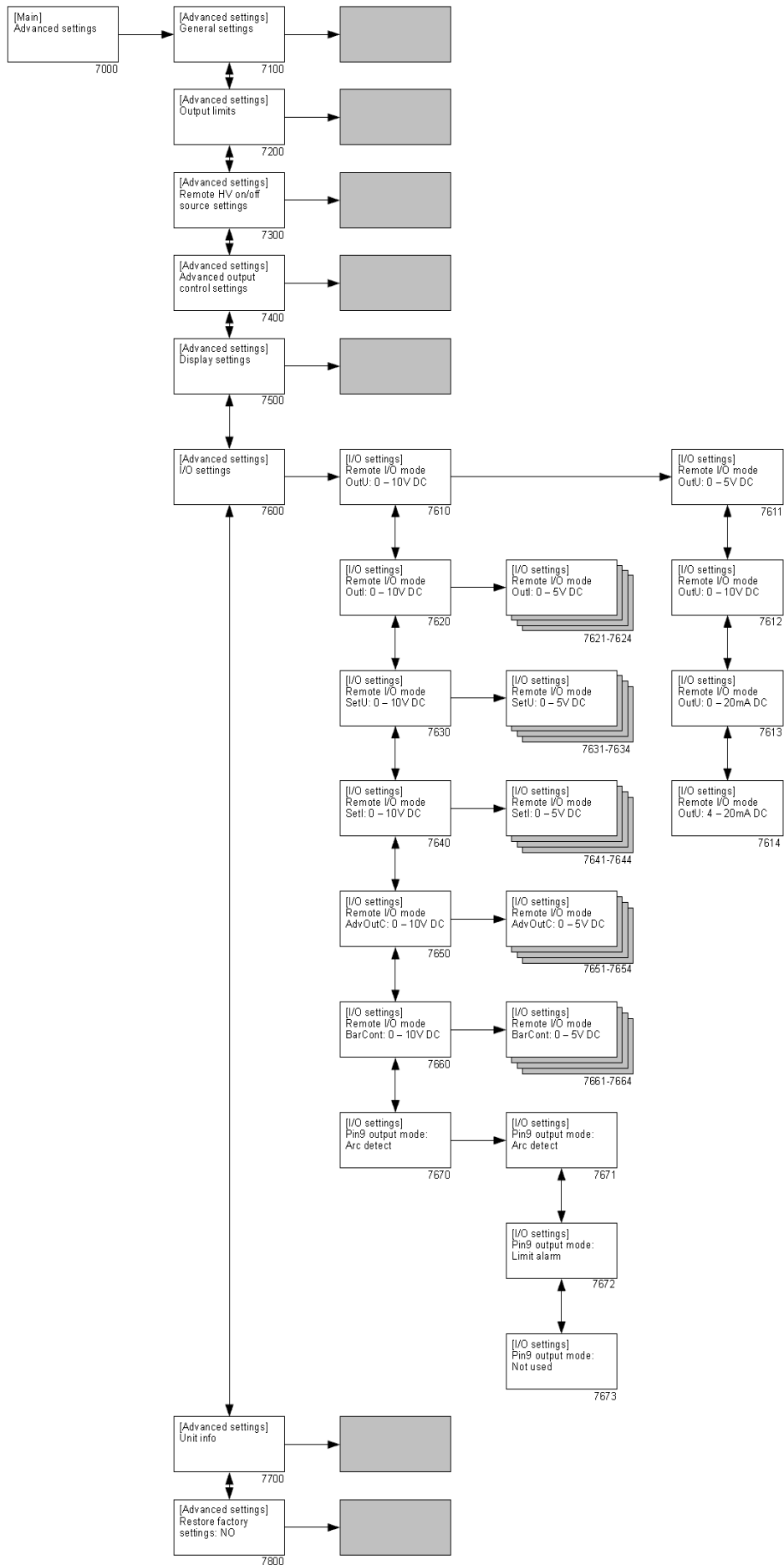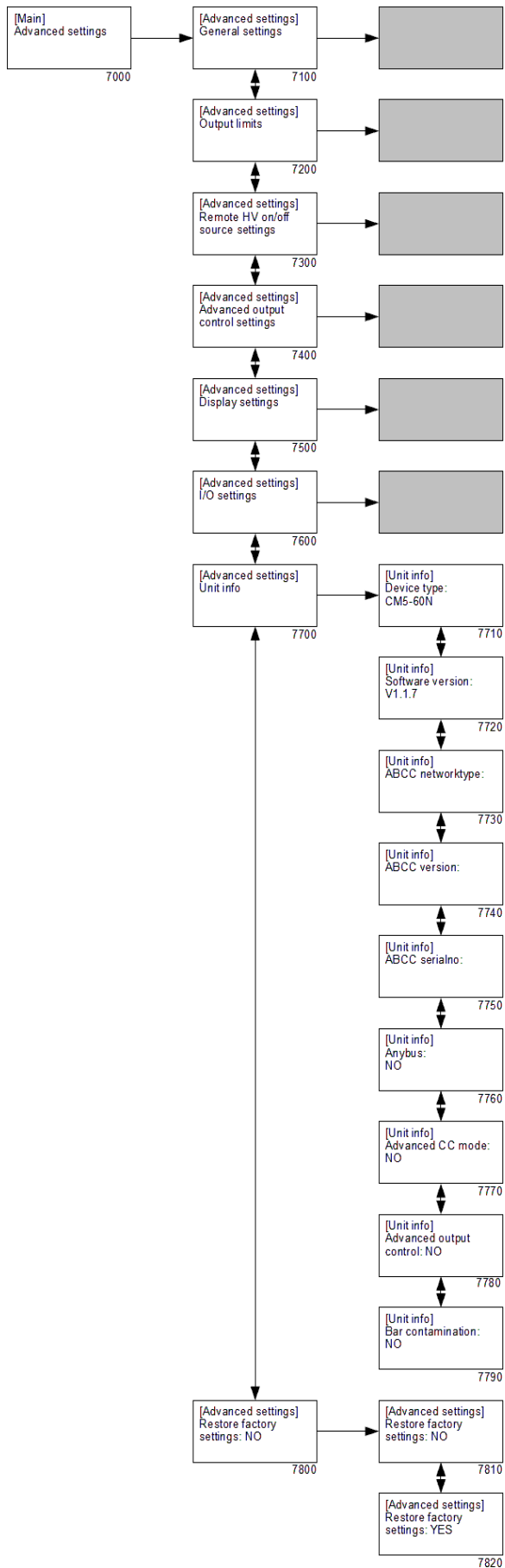    7800    Menu for restoring the factory settings for the generator.

```
[Main]                    [Advanced settings]          ┌──────────┐
Advanced settings    →    General settings        →    │          │
                                                        └──────────┘
              7000                          7100

                          [Advanced settings]          ┌──────────┐
                          Output limits           →    │          │
                                                        └──────────┘
                                           7200

                          [Advanced settings]          ┌──────────┐
                          Remote HV on/off        →    │          │
                          source settings              └──────────┘
                                           7300

                          [Advanced settings]          ┌──────────┐
                          Advanced output         →    │          │
                          control settings             └──────────┘
                                           7400

                          [Advanced settings]          ┌──────────┐
                          Display settings        →    │          │
                                                        └──────────┘
                                           7500

                          [I/O settings]               [I/O settings]
[Advanced settings]       Remote I/O mode         →    Remote I/O mode
I/O settings         →    OutU: 0 – 10V DC             OutU: 0 – 5V DC
              7600                         7610                        7611

                          [I/O settings]               [I/O settings]         [I/O settings]
                          Remote I/O mode         →    Remote I/O mode        Remote I/O mode
                          OutI: 0 – 10V DC             OutI: 0 – 5V DC        OutU: 0 – 10V DC
                                          7620                7621-7624                     7612

                          [I/O settings]               [I/O settings]         [I/O settings]
                          Remote I/O mode         →    Remote I/O mode        Remote I/O mode
                          SetU: 0 – 10V DC             SetU: 0 – 5V DC        OutU: 0 – 20mA DC
                                          7630                7631-7634                     7613

                          [I/O settings]               [I/O settings]         [I/O settings]
                          Remote I/O mode         →    Remote I/O mode        Remote I/O mode
                          SetI: 0 – 10V DC             SetI: 0 – 5V DC        OutU: 4 – 20mA DC
                                          7640                7641-7644                     7614

                          [I/O settings]               [I/O settings]
                          Remote I/O mode         →    Remote I/O mode
                          AdvOutC: 0 – 10V DC          AdvOutC: 0 – 5V DC
                                          7650                7651-7654

                          [I/O settings]               [I/O settings]
                          Remote I/O mode         →    Remote I/O mode
                          BarCont: 0 – 10V DC          BarCont: 0 – 5V DC
                                          7660                7661-7664

                          [I/O settings]               [I/O settings]
                          Pin9 output mode:       →    Pin9 output mode:
                          Arc detect                   Arc detect
                                          7670                              7671

                                                       [I/O settings]
                                                       Pin9 output mode:
                                                       Limit alarm
                                                                          7672

                                                       [I/O settings]
                                                       Pin9 output mode:
                                                       Not used
                                                                          7673

                          [Advanced settings]          ┌──────────┐
                          Unit info               →    │          │
                                                        └──────────┘
                                           7700

                          [Advanced settings]          ┌──────────┐
                          Restore factory         →    │          │
                          settings: NO                 └──────────┘
                                           7800
```

```
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ [Main]          │─────▶│ [Advanced settings] │────▶│                 │
│ Advanced settings │     │ General settings │      │                 │
│            7000 │      │            7100 │      │                 │
└─────────────────┘      └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│                 │
                         │ Output limits   │      │                 │
                         │            7200 │      │                 │
                         └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│                 │
                         │ Remote HV on/off │      │                 │
                         │ source settings 7300 │   │                 │
                         └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│                 │
                         │ Advanced output │      │                 │
                         │ control settings 7400 │  │                 │
                         └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│                 │
                         │ Display settings │      │                 │
                         │            7500 │      │                 │
                         └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│                 │
                         │ I/O settings    │      │                 │
                         │            7600 │      │                 │
                         └────────┬────────┘      └─────────────────┘
                                  ▲
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│ [Unit info]     │
                         │ Unit info       │      │ Device type:    │
                         │            7700 │      │ CM5-60N    7710 │
                         └────────┬────────┘      └────────┬────────┘
                                  ▲                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ Software version:│
                                  │               │ V1.1.7     7720 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ ABCC networktype:│
                                  │               │            7730 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ ABCC version:   │
                                  │               │            7740 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ ABCC serialno:  │
                                  │               │            7750 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ Anybus:         │
                                  │               │ NO         7760 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ Advanced CC mode:│
                                  │               │ NO         7770 │
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ Advanced output │
                                  │               │ control: NO 7780│
                                  │               └────────┬────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │ [Unit info]     │
                                  │               │ Bar contamination:│
                                  │               │ NO         7790 │
                                  │               └─────────────────┘
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │ [Advanced settings] │────▶│ [Advanced settings] │
                         │ Restore factory │      │ Restore factory │
                         │ settings: NO 7800│     │ settings: NO 7810│
                         └─────────────────┘      └────────┬────────┘
                                                           ▼
                                                  ┌─────────────────┐
                                                  │ [Advanced settings] │
                                                  │ Restore factory │
                                                  │ settings: YES   │
                                                  │            7820 │
                                                  └─────────────────┘
```

7000    Menu for changing advanced generator settings ("**[Advanced settings]**").

    7100    Submenu with general settings for the generator.

    7200    Submenu for limiting the HV output.

    7300    Submenu for the Remote HV on/off source settings.

    7400    Submenu for the Advanced Output Control mode settings.

    7500    Submenu for the display settings.

    7600    Submenu for the settings for the analogue I/O inputs and outputs.

    7700    Submenu with information about the generator ("**[Unit info]**").

        7710    Information about the type of generator.

        7720    Information about the firmware version of the software.

        7730    Network information about the connected Anybus module.

        7740    Version information about the connected Anybus module.

        7750    Serial number of the connected Anybus module.

        7760    Option for indicating whether the Anybus module is activated.

        7770    Option for indicating whether the Advanced Current Control module is activated. (AdvCC)

        7780    Option for indicating whether the Advanced Output Control module is activated. (AdvOutC)

        7790    Option for indicating whether the Bar Contamination module is activated.

    7800    Menu for restoring the factory settings for the generator.

        7810    Default option to prevent unintentional resetting of the factory settings.

        7820    By activating this option the factory settings are reset.

☞**Note:**

During the resetting of the factory settings, the user password is NOT reset. In order to reset the user password, the procedure in section **6.16** must be followed.

# 7. Functional check

After switching on the generator, the limit indicator light flashes for 1 to 2 seconds. The background lighting of the display then slowly illuminates and the following information is briefly displayed: the generator type, the firmware version, and in some cases the set bus address and other relevant information.

After a short time the main screen of the generator is displayed. Once the generator is working normally, the limit indicator only illuminates if there is a problem with the high voltage, namely if the set voltage or current cannot be supplied to the output. The operation of the generator can also be checked via the operating signal. As soon as high voltage is supplied to the generator output this signal becomes active.

Possible causes of overload are:
- Fouling of the charging bar/electrode.
- Direct contact between conductive material and the emitters.
- The charging bar has been fitted too close to conductive (machine) parts.

When the generator is operating in fieldbus mode with problem-free communication, this can be seen by the rotating dash on the screen (see section **0**).

# 8. Maintenance

 **Warning:**
- **Disconnect the power supply before carrying out work on the unit.**

- Keep the generator free of moisture, dust, dirt and chemicals.
- Regularly check the earthing of the generator.
- Regularly check the high voltage connectors and cables for damage.
- The generator does not contain any parts that require regular maintenance.
- For maintenance to the connected bars/electrodes, see the accompanying manual.

# 9. Faults

 **Warning:**
- **Disconnect the power supply before carrying out work on the unit.**
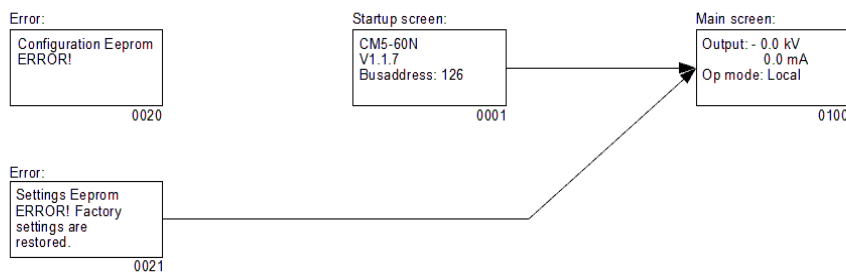


0001    Start-up screen showing information about the generator.

0020    Error message that appears when generator data has become corrupted and can no longer be corrected by the generator itself.

0021    Error message that appears when user settings have become corrupted. The generator will now start up with default (standard) settings. It is necessary to configure the generator so that it works correctly again.

0100    Main screen. This shows the currently measured voltage and current, but also information about the modes of the generator that have been set.

Table1: faults

| Signalling | Problem | Cause | Solution |
|---|---|---|---|
| Limit indicator remains flashing | Problem with the generator firmware. | Generator is faulty. | Send the generator for repair, see section **10**. |
| No output voltage Display is off | | No supply voltage | Switch on supply voltage. |
| | | Supply voltage too low | Problem has nothing to do with the CM5. |
| | | Fuse faulty at the rear of the generator | Replace the fuse. |
| | | Generator is faulty | Send the generator for repair, see section **10**. |
| No access to the menu. Depressed the [↵] key, but nothing happened. | | Access to the menu is locked. | Switch on the menu (see section **6.3**). |
| I cannot read the language on the screen | | The user language has been changed from English to German, Italian or French. | Switch the user language back to English (see section **6.4**). |
| No output voltage Display is on "⚡" indicator on | | No setpoint has been entered. | Enter setpoint (see section **6.8**). |
| | | Generator is faulty | Send the generator for repair, see section **10**. |
| No output voltage Display is on "⚡" indicator off | | The generator is operating in remote mode with the bus remote active. The output is not activated. | Switch on the high voltage via the bus. To do this see the CM5 interface description for the serial bus that is being used. |
| | | The external remote function is enabled, but there is no signal to switch on the generator. | Switch off the external remote control (see menu **7300**), or switch the generator to local mode (see menu **1100**), remote mode (see menu **1200**) or send a signal to the external remote HV on/off input. |
| | | The generator is faulty. | Send the generator for repair, see section **10**. |
| Display is on Communication is working No checking via the bus | | Generator is operating in local or remote mode. | Enable the fieldbus mode (see menu **1300**). |
| Setpoint cannot be set in 'local mode' | | The generator is locked. | Unlock the generator (see section **0** and menu **7110**). |
| | | Generator is faulty. | Send the generator for repair, see section **10**. |
| Limit indicator lights up | Generator is overloaded | Sparking or short circuit in connected equipment | Check connected equipment. |

| | | | |
|---|---|---|---|
| Generator is operating in VC or AdvOutC mode | | Emitter point in contact with earth | Prevent the emitter point from making contact with earth. |
| | | Generator overloaded | Reduce output voltage or increase distance between the charging bar/electrode and material. |
| Limit indicator lights up<br>Generator is operating in CC or AdvCC mode | | Maximum set voltage reached | Increase the maximum voltage or lower the maximum current. |
| | | Emitter point in contact with earth | Prevent the emitter point from making contact with earth. |
| | | Generator overloaded | Reduce output current or increase distance between the charging bar/electrode and material. |
| External remote input is not responding | | Connection problems | Connect the wiring correctly, see section **5.7**. |
| | | No signal to the remote input | Control the input with the correct signal, see section **5.7**. |
| | | External remote mode not enabled | Enable external remote for the active operating mode (see section **6.17**, menu **7310**, **6320** and **6330)**. |
| | | External remote mode is enabled. | Send the generator for repair, see section **10**. |
| There is no bus communication<br>A "E" flashes on the display | | The bus master is not operational. | Start up the bus master or restart the system. |
| | | Incorrect bus address set. | Set the correct bus address. |
| | | Problems with cabling. | Check the cabling, connectors and the terminating resistances of the bus. |
| Generator is in locked mode ("🔒")<br>and will not unlock<br>The "🔒" symbol flashes on the screen several times | | The generator has been locked by the superuser. | Get the superuser to unlock the generator using the menu, see menu **7110**. |
| The display shows the text "**Settings Eeprom ERROR! Factory settings are restored.**" during start-up | | Error occurred whilst saving information. | Depress the [↵] key and restore the generator settings. If the problem persists, send the generator for repair. See section **10**. |

| "**Configuration Eeprom ERROR!**" appears on the display during start-up | | An error has occurred in the Eeprom. | Send the generator away for repair (see section **10**). |
|---|---|---|---|
| "**Remote ADC input error!**" appears on the display | | The signal voltage is too high on one of the analogue control inputs. | Check whether the analogue control signals are correctly configured (see menus **7630**, **7640**, **7650** and **7660**). |
| "**Too many ARCs error!**" appears on the display | | Too many arcs have occurred in too short a time. | Reduce the set high voltage. |
| "**Communication error!**" appears on the display | | A communication problem has occurred with the Anybus module. | Check the cabling, connectors and the terminating resistances of the bus. |

# 10. Repairs

 **Warning:**
- **Disconnect the power supply before carrying out work on the unit.**
- **Electrical installation and repairs must be carried out by a skilled electrical engineer in accordance with the applicable national and local regulations.**

Please contact Simco-Ion Europe or your regional agent in the event of any problems.
Simco-Ion Europe recommends that you return the generator if repairs are required.

Request an RMA number for any returns by sending an e-mail to service@simco-ion.nl.
Pack the generator properly and clearly state the reason for return.


# 11. Disposal

Observe the applicable local environmental and other regulations when disposing of the equipment.

Spare parts

| Part number | Description |
|---|---|
| 21.05.10.0000 | Spring connector for CM5 |
| 39.00.23.6025 | 25-pin sub-D connector with housing for remote I/O |
| 69.99.63.0315 | Rear panel fuse 3.15 AT |
| 69.72.70.4800 | Anybus-Compact Com Profibus |
| 69.72.70.xxxx | Anybus-Compact Com CANopen |
| 69.99.90.0050 | Sealing caps |
| 69.74.70.0150 | Brackets |

Spare parts can be obtained from the agent in your region or from Simco-Ion Europe.

Simco-Ion Europe
Postbus 71
NL-7240 AB Lochem
Telefoon   +31-(0)573-288333
Telefax    +31-(0)573-257319
E-mail     general@simco-ion.nl
Internet   http://www.simco-ion.nl

# Appendix I: Factory settings (after resetting)

The CM5 has the following factory settings:

| | |
|---|---|
| Operating mode: | Local |
| Control mode: | VC (=Voltage Control) |
| Voltage setpoint: | 0.0 kV |
| Current limit: | 2.5 mA (or 5.0 mA) |
| Lock mode: | Unlocked |
| User password: | **Unchanged** |
| Bus address: | 126 |
| User voltage limit: | 60.0 kV (or 30.0 kV) |
| User current limit: | 2.5 mA (or 5.0 mA) |
| Remote HV on/off source (Local mode): | Continuous |
| Remote HV on/off source (Remote mode): | Continuous |
| Remote HV on/off source (Fieldbus mode): | Bus |
| Remote limit control: | Local controlled |
| Advanced output control: | Continuous |
| Advanced output control: | |
|     Setpoint voltage start: | 5,0 kV |
|     Setpoint voltage max: | 15,0 kV |
|     High level: | 80% |
|     Trigger level: | 10% |
| Readout stretched: | 0.7 sec. |
| Limited LED stretched: | 0.7 sec. |
| Display readout: | kV & mA |
| Backlight: | 85% |
| Contrast: | 50% |
| Remote I/O mode OutU: | 0 – 5V DC |
| Remote I/O mode OutI: | 0 – 5V DC |
| Remote I/O mode SetU: | 0 – 5V DC |
| Remote I/O mode SetI: | 0 – 5V DC |
| Remote I/O mode AdvOutC: | 0 – 5V DC |
| Remote I/O mode BarCont: | 0 – 5V DC |
| Pin9 output mode: | Limit alarm |

# Appendix II: Standard settings (as simple charging generator (ECM))

The CM5 has the following factory settings:

| | |
|---|---|
| Operating mode: | Local |
| Control mode: | VC (=Voltage Control) |
| Voltage setpoint: | 0.0 kV |
| Current limit: | 2.5 mA (or 5.0 mA) |
| Lock mode: | Unlocked |
| User password: | **Unchanged** |
| Bus address: | 126 |
| User voltage limit: | 60.0 kV (or 30.0 kV) |
| User current limit: | 2.5 mA (or 5.0 mA) |
| Remote HV on/off source (Local mode): | Continuous |
| Remote HV on/off source (Remote mode): | Continuous |
| Remote HV on/off source (Fieldbus mode): | Bus |
| Remote limit control: | Local controlled |
| Advanced output control: | Continuous |
| Advanced output control: | |
|     Setpoint voltage start: | 5,0 kV |
|     Setpoint voltage max: | 15,0 kV |
|     High level: | 80% |
|     Trigger level: | 10% |
| Readout stretched: | 0.7 sec. |
| Limited LED stretched: | 0.7 sec. |
| Display readout: | kV & mA |
| Backlight: | 85% |
| Contrast: | 50% |
| Remote I/O mode OutU: | 0 – 5V DC |
| Remote I/O mode OutI: | 0 – 5V DC |
| Remote I/O mode SetU: | **0 – 10V DC** |
| Remote I/O mode SetI: | **0 – 10V DC** |
| Remote I/O mode AdvOutC: | 0 – 5V DC |
| Remote I/O mode BarCont: | 0 – 5V DC |
| Pin9 output mode: | Limit alarm |

# Appendix III: Standard settings (CM5 with Anybus module)

The CM5 with Anybus module has the following factory settings:

| | |
|---|---|
| Operating mode: | **Fieldbus** |
| Control mode: | VC (=Voltage Control) |
| Voltage setpoint: | 0.0 kV |
| Current limit: | 2.5 mA (or 5.0 mA) |
| Lock mode: | Unlocked |
| User password: | **Unchanged** |
| Bus address: | 126 |
| User voltage limit: | 60.0 kV (or 30.0 kV) |
| User current limit: | 2.5 mA (or 5.0 mA) |
| Remote HV on/off source (Local mode): | Continuous |
| Remote HV on/off source (Remote mode): | Continuous |
| Remote HV on/off source (Fieldbus mode): | Bus |
| Remote limit control: | Local controlled |
| Advanced output control: | Continuous |
| Advanced output control: | |
|     Setpoint voltage start: | 5,0 kV |
|     Setpoint voltage max: | 15,0 kV |
|     High level: | 80% |
|     Trigger level: | 10% |
| Readout stretched: | 0.7 sec. |
| Limited LED stretched: | 0.7 sec. |
| Display readout: | kV & mA |
| Backlight: | 85% |
| Contrast: | 50% |
| Remote I/O mode OutU: | 0 – 5V DC |
| Remote I/O mode OutI: | 0 – 5V DC |
| Remote I/O mode SetU: | **0 – 5V DC** |
| Remote I/O mode SetI: | **0 – 5V DC** |
| Remote I/O mode AdvOutC: | 0 – 5V DC |
| Remote I/O mode BarCont: | 0 – 5V DC |
| Pin9 output mode: | Limit alarm |

# Appendix IV: Operating signal

| Power | Operating mode | Remote HV on/off mode | Local setpoint | Fieldbus setpoint | Remote setpoint | External remote HV on/off | Run button | Limited error | Operating |
|---|---|---|---|---|---|---|---|---|---|
| Off | * | * | * | * | * | * | * | * | 0 |
| On | Local setpoint | Disabled | 0 kV | * | * | * | * | * | 0 |
| On | Local setpoint | Disabled | ≥ 1 kV | * | * | * | * | 0 | 1 |
| On | Local setpoint | Disabled | ≥ 1 kV | * | * | * | * | 1 | 0 |
| On | Local setpoint | Enabled | 0 kV | * | * | * | * | * | 0 |
| On | Local setpoint | Enabled | ≥ 1 kV | * | * | 0 | 0 | * | 0 |
| On | Local setpoint | Enabled | ≥ 1 kV | * | * | 0 | 1 | 0 | 1 |
| On | Local setpoint | Enabled | ≥ 1 kV | * | * | 0 | 1 | 1 | 0 |
| On | Local setpoint | Enabled | ≥ 1 kV | * | * | 1 | * | 0 | 1 |
| On | Local setpoint | Enabled | ≥ 1 kV | * | * | 1 | * | 1 | 0 |
| On | Fieldbus setpoint | Disabled | * | 0 kV | * | * | * | * | 0 |
| On | Fieldbus setpoint | Disabled | * | ≥ 1 kV | * | * | * | 0 | 1 |
| On | Fieldbus setpoint | Disabled | * | ≥ 1 kV | * | * | * | 1 | 0 |
| On | Fieldbus setpoint | Enabled | * | 0 kV | * | * | * | * | 0 |
| On | Fieldbus setpoint | Enabled | * | ≥ 1 kV | * | 0 | 0 | * | 0 |
| On | Fieldbus setpoint | Enabled | * | ≥ 1 kV | * | 0 | 1 | 0 | 1 |
| On | Fieldbus setpoint | Enabled | * | ≥ 1 kV | * | 0 | 1 | 1 | 0 |
| On | Fieldbus setpoint | Enabled | * | ≥ 1 kV | * | 1 | * | 0 | 1 |
| On | Fieldbus setpoint | Enabled | * | ≥ 1 kV | * | 1 | * | 1 | 0 |
| On | Remote setpoint | Disabled | * | | 0 kV | * | * | * | 0 |
| On | Remote setpoint | Disabled | * | | ≥ 1 kV | * | * | 0 | 1 |
| On | Remote setpoint | Disabled | * | | ≥ 1 kV | * | * | 1 | 0 |
| On | Remote setpoint | Enabled | * | | 0 kV | * | * | * | 0 |
| On | Remote setpoint | Enabled | * | | ≥ 1 kV | 0 | 0 | * | 0 |
| On | Remote setpoint | Enabled | * | | ≥ 1 kV | 0 | 1 | 0 | 1 |
| On | Remote setpoint | Enabled | * | | ≥ 1 kV | 0 | 1 | 1 | 0 |
| On | Remote setpoint | Enabled | * | | ≥ 1 kV | 1 | * | 0 | 1 |
| On | Remote setpoint | Enabled | * | | ≥ 1 kV | 1 | * | 1 | 0 |

* = Don't care.

# Appendix V: Connector connections

Connector connections for the 25-pin sub-D connector at the rear of the generator:

Pin 1   = External remote HV on/off + (plus)

Pin 2   = Remote I setpoint

Pin 3   = Remote U setpoint

Pin 4   = Remote U output

Pin 5   = Remote I output

Pin 6   = +24 V DC input voltage (**optional**, power supply for fieldbus)

Pin 7   = +12 V DC output voltage

Pin 8   = Not used

Pin 9   = Limit alarm OC (Open Collector) / Arc Detect OC (Open Collector)

Pin 10  = Operating OC (Open Collector)

Pin 11  = Not used

Pin 12  = Not used

Pin 13  = Not used

Pin 14  = External remote HV on/off - (minus)

Pin 15  = Ground

Pin 16  = Ground

Pin 17  = Ground

Pin 18  = Ground

Pin 19  = Ground

Pin 20  = 0 V (of +12V DC output voltage)

Pin 21  = Not used

Pin 22  = Limit alarm OE (Open Emitter) / Arc Detect OE (Open Emitter)

Pin 23  = Operating OE (Open Emitter)

Pin 24  = Ground

Pin 25  = Ground
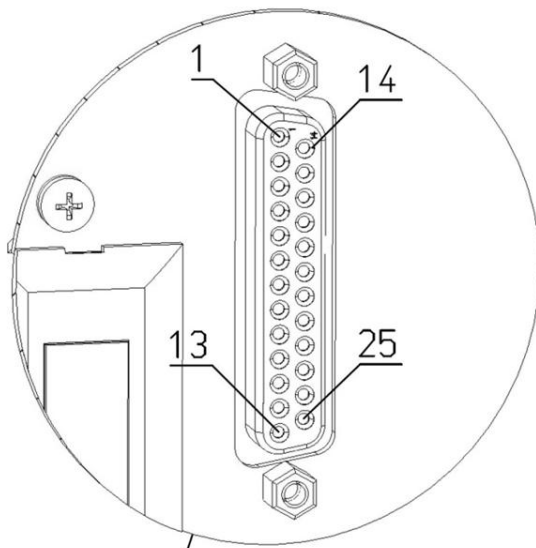
SUD-D female 25P

# Appendix VI: Quick Init installation configuration examples

Using a few examples, some common generator settings will be set using the Quick Init menu.

☞**Note:**

These examples can only be carried out when a generator comes from the factory or if the factory settings have been reset.

Example 1.

Via the Quick Init menu the generator must be configured as follows:
- The generator must operate in Local mode.
- The generator must operate in Voltage Control (VC) mode.
- The External Remote HV On/Off mode is not used.

Step 1: Switch the generator on. After a short time the following text will appear:
        "**[Initial setup]**"
        "**Language:**"
        "**English**"
Step 2: Press the [▲] and/or [▼] key until the desired user language flashes on the display.
Step 3: Press [↵]. The following text will appear (in the language selected in step 2):
        "**[Initial setup]**"
        "**Use as standard ECM:**"
        "**YES**"
Step 4: Depress the [▲] and/or [▼] key until the flashing text "**YES**" changes to "**NO**".
Step 5: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Operating mode:**"
        "**Local**"
Step 6: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Control mode:**"
        "**VC**"
Step 7: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Remote HV on/off**"
        "**source: Continuous**"
Step 8: Depress [↵]. The CM5 generator will now start up in the set configuration.

<u>Example 2.</u>

Via the Quick Init menu the generator must be configured as follows:
- The generator must operate in Local mode.
- The generator must operate in Current Control (CC) mode.
- The External Remote HV On/Off mode is not used.

Step 1: Switch the generator on. After a short time the following text will appear:
        "**[Initial setup]**"
        "**Language:**"
        "**English**"
Step 2: Press the [▲] and/or [▼] key until the desired user language flashes on the display.
Step 3: Press [↵]. The following text will appear (in the language selected in step 2):
        "**[Initial setup]**"
        "**Use as standard ECM:**"
        "**YES**"
Step 4: Depress the [▲] and/or [▼] key until the flashing text "**YES**" changes to "**NO**".
Step 5: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Operating mode:**"
        "**Local**"
Step 6: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Control mode:**"
        "**VC**"
Step 7: Depress the [▲] and/or [▼] key until the flashing text "**VC**" changes to "**CC**".
Step 8: Depress [↵]. The following text appears:
        "**[Initial setup]**"
        "**Remote HV on/off**"
        "**source: Continuous**"
Step 9: Depress [↵]. The CM5 generator will now start up in the set configuration.

# Appendix VII: Examples - Changing the existing CM5 configuration

In the following examples a number of parameters will be changed in an already configured CM5 generator.

<u>Example 3: Resetting the factory settings.</u>

Note: if access to the menu is locked (default CM), first switch the menu on. See section **6.3**.

Step 1:   The generator is active in the main display. Depress [↵]. The following text appears:
        "**[Main]**"
        "**Operating mode:**"
        "**Local**"      (this text may be different, depending on the chosen configuration)
Step 2:   Depress the [▲] and/or [▼] key until the following text appears on the screen:
        "**[Main]**"
        "**Advanced settings**"
Step 3:   Depress [↵]. The following text appears:
        "**[Advanced settings]**"
        "**General settings**"
Step 4:   Depress the [▲] and/or [▼] key until the following text appears on the screen:
        "**[Advanced settings]**"
        "**Restore factory**"
        "**settings: NO**"
Step 5:   Depress [↵]. The text "**NO**" now starts to flash.
Step 6:   Depress the [▲] and/or [▼] key until the flashing text "**NO**" changes to "**YES**".
Step 7:   Depress [↵]. The following text appears:
        "**Factory settings**"
        "**are restored.**"
Step 8:   Depress [↵] or wait 2 seconds. The CM5 will then restart, after which the generator can be configured again using the Quick menu.

Example 4: Changing the control mode from VC to CC.

In the following example the control mode of the generator will be changed from Voltage Controlled (VC, Constant Voltage) to constant Current Control (CC).

Step 1: Depress [↵]. The following text appears:
   "**[Main]**"
   "**Operating mode:**"
   "**Local**"  (this text may be different, depending on the chosen configuration)

Step 2: Depress the [▲] and/or [▼] key until the following text appears on the screen:
   "**[Main]**"
   "**Control mode:**"
   "**VC**"

Step 3: Depress [↵]. The text "**VC**" now starts to flash.

Step 4: Depress the [▲] and/or [▼] key until the flashing text "**VC**" changes to "**CC**".

Step 5: Depress [↵]. The text "**CC**" now no longer flashes (the setting has been changed). The following text appears:
   "**[Main]**"
   "**Control mode:**"
   "**CC**"

Step 6: Depress the [**ESC**] key to exit the menu. The generator will now show the main screen again.

Example 5: Switching on the External Remote HV On/Off mode in order to be able to remotely switch the generator on and off via analogue machine control.

In this example the External Remote HV On/Off source input is switched from Continuous mode to the mode controlled via the External input. See section **5.7**.

Step 1: Depress [↵]. The following text appears:
        "**[Main]**"
        "**Operating mode:**"
        "**Local**"      (this text may be different, depending on the chosen configuration)

Step 2: Depress the [▲] and/or [▼] key until the following text appears on the screen:
        "**[Main]**"
        "**Advanced settings**"

Step 3: Depress [↵]. The following text appears:
        "**[Advanced settings]**"
        "**General settings**"

Step 4: Depress the [▲] and/or [▼] key until the following text appears on the screen:
        "**[Advanced settings]**"
        "**Remote HV on/off**"
        "**source settings**"

Step 5: Depress [↵]. The following text appears:
        "**[RemOn/Off settings]**"
        "**Remote HV on/off**"
        "**source: Continuous**"

Step 6: Depress [↵]. The text "**Continuous**" now starts to flash.

Step 7: Depress the [▲] and/or [▼] key until the flashing text "**Continuous**" changes to "**External**".

Step 8: Depress [↵]. The text "**External**" now no longer flashes (the setting has been changed). The following text appears:
        "**[RemOn/Off settings]**"
        "**Remote HV on/off**"
        "**source: External**"

Step 9: Depress the [**ESC**] key to exit this menu item. The following text appears:
        "**[Advanced settings]**"
        "**Remote HV on/off**"
        "**source settings**"

Step 10: Depress the [**ESC**] key again to exit this menu item. The following text appears:
        "**[Main]**"
        "**Advanced settings**"

Step 11: Depress the [**ESC**] key again to now exit the menu. The generator will now show the main screen again.

# Appendix VIII: Advanced Current Control (optional)

Operational modes.

The generator operates in an intelligent CC mode, with the ability to switch back to the stand-by state when no object is present below the connected electrodes.

Operation in Advanced Current Control (AdvCC) mode.
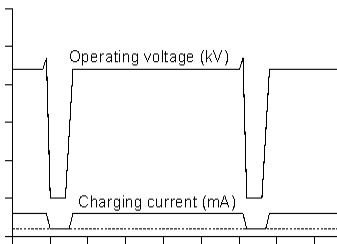


In the Advanced Current Control (Advanced CC or AdvCC mode the generator will again operate in CC (Constant Current) mode. However, the generator, due to variations in the output voltage, will be able to detect whether an object has left the electrodes and whether it can switch back to a lower current control value. In this stand-by mode a new object will be detected and the generator will be able to switch back again to the preset current value in order to allow proper charging of the object.

# Appendix IX: Advanced Output Control (optional)

Operating modes

In this mode the high voltage that is set depends on an analogue control signal, e.g. speed control of the machine.

Operation in Advanced Output Control (AdvOutC) mode.
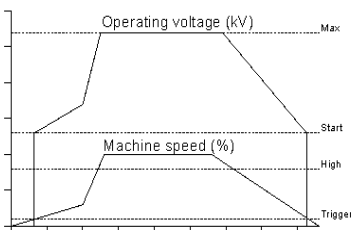


In the Advanced Output Control mode the generator is engaged in voltage controlled charging (see VC mode). However, in this control mode the emitted high voltage depends on a control voltage. This will usually be related to the speed of a machine. In this mode a minimum and maximum voltage are specified in combination with a threshold and a maximum for the control voltage. As soon as the analogue control voltage is higher than the threshold voltage, the minimum set high voltage is supplied to the output of the generator. This will be increased linearly until the maximum set output voltage, as the control voltage, reaches the maximum level.

# Appendix X:  Factory password



**Note**
**Keep this document in a safe place.**

When resetting the user password you are asked to enter a factory password (see **6.16**). This password is:

**7240.**