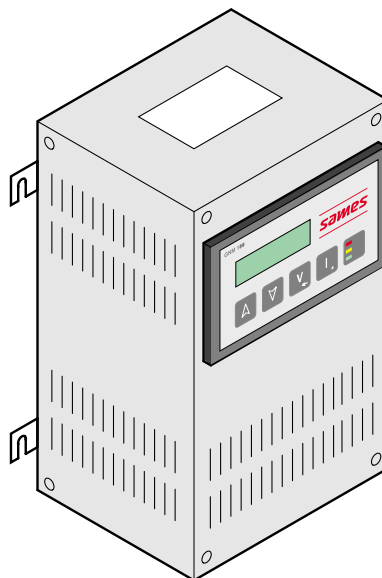




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DES00752

# User manual

## GNM 100-A Automatic mode of operation

This product is protected by French patents N° 2724787 et 2724786 which have been extended to cover Europe and the United States.

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# GNM 100-A

## Automatic mode of operation

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## 1. Introduction



**WARNING : Safety warning: the GNM 100 must never be installed in an explosive atmosphere. This means it must be installed outside the coating booth at a minimum distance of 1.5 meters (5 feet) from the nearest opening.**

The **GNM 100-A** is a control module (controller) for controlling the high voltage generated by the units hereafter called “high voltage units”. The controller has to be used with SAMES high voltage units. The model referred as the **GNM 100-A** is enclosed in a ventilated case which conforms to IP 20, reference number 858224. The “A” version is for the installation of racks and electrical control panels. This type of GNM is designed to be installed in the back of the metallic cabinet with the help of fourlegs (leg contact/cabinet back) metallic hooks on GNM box designed for that.

**The back of the cabinet must be connected to earth (cable up or equal to 6 mm<sup>2</sup>).**

For an other configuration (for example installation on a door of a panel) the box must absolutely be connected to earth of installation through a cable or a metallic braiding of cable with a gauge up or equal to 6 mm<sup>2</sup>.



**WARNING : Customer is responsible the checking which local fire & safety standards apply for his operation. For a use in cabinet, the room temperature must be below 45°C.**

**We strongly advise you not to place the GNM close to any source of heat, which would increase its inner temperature and engender a working defect.**

**However, if the GNM has to be located in such conditions, provide for an air conditioning device.**

**The maximum temperature is 45°C for a use with a 90 KV/ 100µA high voltage unit (HVU).**

**This maximum temperature depends on the supplied power, therefore on the type of HVU/ sprayer which controls the GNM.**

**Storage temperature: 0°C to 70°C**

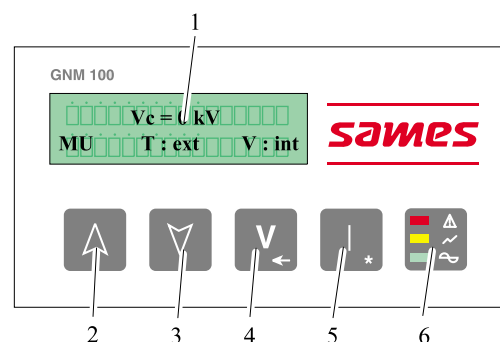
High voltage units for use in the automatic mode are: **UHT 108, 208, 152, 153, 037.**

## 2. Description

### 2.1. Presentation

The **GNM** is a control module equipped with a microprocessor. The operation of the controller and access to the function and parameters are through the front panel. The front panel contains a two line display, 5 buttons and 3 LED Lights.

1	Display screen
2	Increment parameter values (+.)
3	Decrement parameter values (-.)
4	Validation Enter / Next Screen
5	Previous Screen / Special Function*
6	Operating LED Lights



**Notes: \* - Special Functions are described in this manual in their appropriate sections.**

## Description of the Operating LED Lights

Green	<b>GNM</b> Power is ON
Orange	High Voltage is Triggered (HV ON)
Red	Fault

## 2.2. Specifications

### 2.2.1. Electrical input data

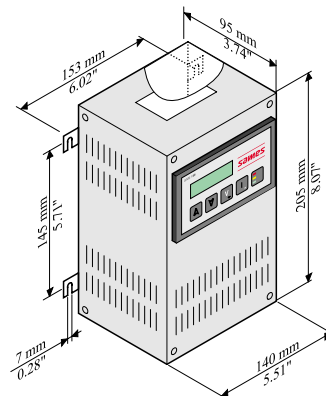
Input voltage	220 VAC +/- 20 V or 110 VAC +/- 20 V
Frequency	50 / 60 Hz
Max input power for <b>GNM 100-A</b>	80 VA
Impedance 0 - 10 V	~ 15 kΩ

### 2.2.2. Electrical output data

Max output voltage	60 V RMS
Frequency output	16-60 kHz
Max output current	1,1 A RMS

### 2.2.3. Size and weight

Protection	IP 20
Mass	2.2 kg



DES00753

### 2.2.4. Connecting Cables Specifications

#### A - Low Voltage Cable (**GNM** to high voltage unit)

- 22 Gauge Minimum, 0.34mm<sup>2</sup>, shielded
- 12 Pin Connector
- 30 Meters Maximum length, 100 feet.
- Male Plug Reference Number E4PTFS343

#### B - PLC Cable

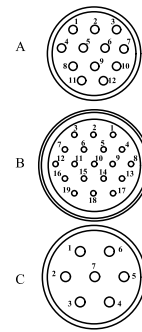
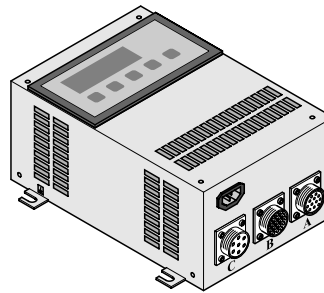
- 22 Gauge Minimum, 0.34mm<sup>2</sup>, shielded
- 19 Pin Connector
- 30 Meters Maximum Length, 100 feet.
- Female Plug Reference Number E4PTFS406

#### C - Atomizer Cable

- Cable: no specifications.
- 7 Pin Connector
- Male Plug Reference Number E4PTFS316

2.2.5. **GNM 100-A** module

A	12- pin plug (high voltage unit)
B	19- pin plug (PLC)
C	7- pin plug (atomizer)



DES00078

### 3. Operating principle



**WARNING :** Screens given herein are provided only as examples.

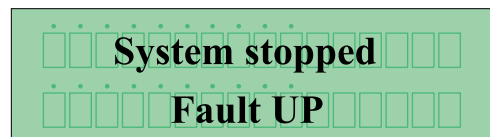
#### 3.1. Automatic high voltage unit selection




**WARNING :** The GNM periodically checks for the presence and type of high voltage unit with which it is connected.

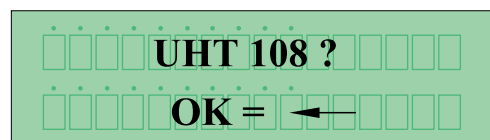
If the controller recognizes the high voltage unit, the unit remains in the automatic operating mode. If the high voltage unit is disconnected or the controller is unable to recognize the high voltage unit the controller will interpret the operation and display "Fault UP".

If the controller senses a different high voltage unit the controller will displays the high voltage units reference and request validation.



DES00082

Validation is done by pressing on key 4 



DES00081

### 3.2. Menus

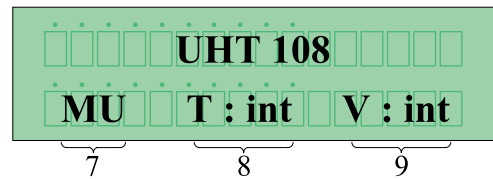
After having recognized the high voltage unit, the **GNM** gives access to the menus.

#### 3.2.1. User menu


This is displayed as follows:

The last line of the screen displays the **GNM's** operating mode.



7	Means the module is in User Menu
8	T = Type of trigger: int = internal - ext. = external
9	V = voltage set point: int = local - ext. = at a distance




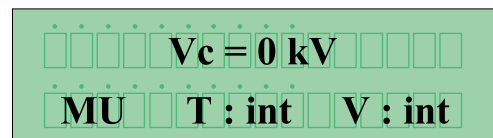
DES00084

To scroll the menu, press key 4 .

#### 3.2.1.1. Adjusting Voltage Set Point



Voltage adjustment set point is adjusted by pressing keys 2  and 3 .


Key 4  permits one to go to the next screen.

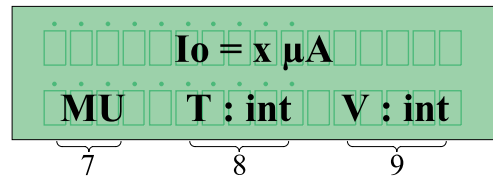


DES00085

#### 3.2.1.2. Adjusting Current Set Point

Current adjustment set point is adjusted by keys 2  and 3 .

Key 4  permits one to go to the next screen.

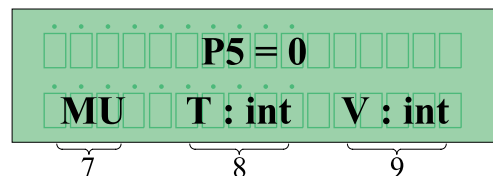


DES00087

#### 3.2.1.3. Parameter - **P5**: type of trigger

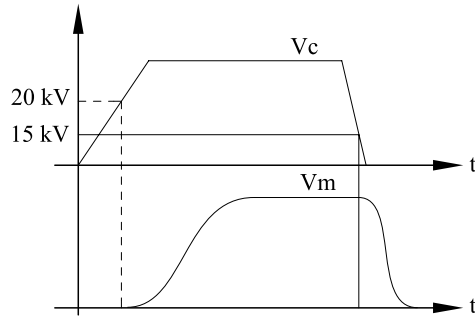
This selection defines the way the HV is triggered:

- **P5 = 0** triggering called «internal». High voltage is triggered only if the set point value is above 20Kv and will be released when the set point value is below 15 Kv.



DES00097

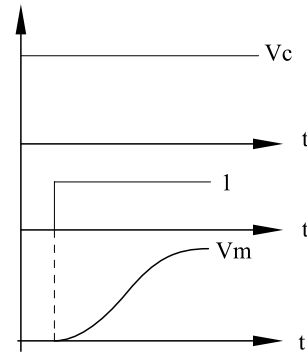
<b>Vc</b>	Voltage set point
<b>Vm</b>	Voltage Return



DES00088

- **P5 = 1** triggering called «external». «Discrete I/O» (dry contact, 12 or 24 V depending on type of connection, [see § 4.5 page 17](#)) for hard wiring diagrams.

<b>1</b>	Trigger
<b>Vc</b>	Voltage set point
<b>Vm</b>	Voltage Return



DES00089

#### 3.2.1.4. Display of the last 10 faults

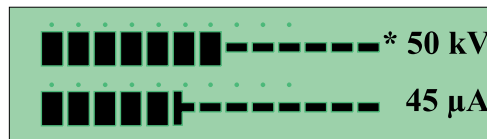
The 4 key permits one to go to the next screen. On the first line, one can read the last fault. Pressure on keys 2 and 3 permits one to scroll the 9 other faults upwards or downwards. The fault carrying the highest number is the most recent. To initiate the list again, press key 5 .



**WARNING :** An interruption in the power supply to the controller erase the list of faults.

#### 3.2.1.5. Display of Effective Voltage and Current when Trigger is Activated

When the generator is active and the high voltage is triggered the screen will display for example 50 Kv a 45  $\mu$ A current draw.



DES00086

#### 3.2.2. Calibrating menu



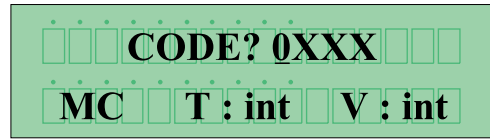
**WARNING :** This section is for the customer's trained personnel. Entry into the calibrating menu puts the HV out of service.

If no key is pressed for more than one minute, the user mode is automatically restored and the parameters are stored.



To have access to the calibrating menu, press keys 4  $\downarrow$  and 5  $\uparrow$  at the same time until the following screen appears:

The calibration menu permits access for adjustment of the **GNM** parameters. Access to the menu is done by means of a 4-number code. The "FATORY" code is «1111». Enter code by pressing 2  $\uparrow$  and 3  $\downarrow$  and validating key 4.



DES00090

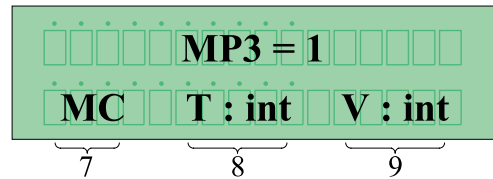
### 3.2.2.1. Code entry

Scroll the first figure upwards or downwards with keys 2  $\uparrow$  and 3  $\downarrow$ .

Select with key 4  $\downarrow$ , then go to the next figure etc. In case of an error, press key 5  $\uparrow$ ). Validate code with key 4  $\downarrow$ .

After having correctly entered and validated the code, one will read for example:

7	means that the module is in the calibration menu
8	T = trigger typeint = internal - ext. = external
9	V = voltage set pointint = local - ext. = distance



DES00091

### 3.2.2.2. Di/Dt Soft Parameters **MP3**, **P3**, **SP3**, **RP3**

The **Di/Dt** detects sharp changes in current and the sensitivity can be adjusted. The **GNM 100** is built with two **Di/Dt** control systems. The first **Di/Dt** control is detected by the analog portion of the circuit board and can not be disabled or adjusted. Its reference is called "Hard **Di/Dt**" and is set at a value of 50mA/s. The second **Di/Dt** control is referred to as the **Di/Dt** soft and can be adjusted to the user's specific application.

#### **MP3: Di/Dt** Soft Function

This is a switch that activates the **Di/Dt** soft programming circuitry.

<b>MP3</b> = 1	<b>Di/Dt</b> soft programming is enabled
<b>MP3</b> = 0	<b>Di/Dt</b> soft programming is disabled

#### **P3: Di/Dt** Soft Threshold Value

This value is the maximum change in current per time value the **Di/Dt** soft programming will allow before giving an error. This value is expressed in milli amperes per second (mA/s) and can be adjusted in the following range.

<b>P3</b>	Minimum adjustment	2 mA/s
<b>P3</b>	Maximum adjustment	24 mA/s

#### **SP3: Di/Dt** Soft Minimum Return Voltage Threshold

This value is minimum voltage return value that must be obtained before the **Di/Dt** soft programmed circuitry is enabled. This value is expressed in kilovolts (**kV**) and can be adjusted in the following range.

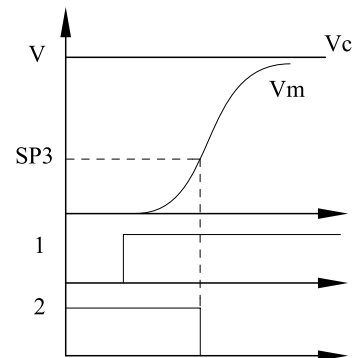
<b>SP3</b>	Minimum adjustment	0 kV
<b>SP3</b>	Maximum adjustment	10 kV

1	Trigger
2	<b>Di/Dt</b> soft is Disabled
<b>Vc</b>	Set point Voltage
<b>Vm</b>	Voltage Return

### RP3: Di/Dt Soft Ramp Function

This is a switch, which enables the Di/Dt soft threshold value to be in proportion to time. The effect of this switch is a greater amount of sensitivity, lower threshold value, during the initial few milliseconds when the high voltage is triggered.

<b>RP3 = 1</b>	Di/Dt soft ramp programming is enabled
<b>RP3 = 0</b>	Di/Dt soft ramp programming is disabled



DES00092

The system creates an imaginary ramp of voltage set points increased by one unit per each cycle of the program to reach the maximum voltage of the high voltage unit. During this imaginary voltage ramp, the level of the **Di/Dt** soft threshold value is correlated to the level of the imaginary voltage ramp by the relation:

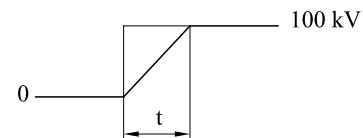
- **Di/Dt** Soft Threshold Value = **P3** \* Imaginary Set Point / high voltage unit's Maximum Voltage

The slope of the ramp is related to the value set in **P3** by the user and the maximum value of the calculation can not exceed the value set in **P3**

### 3.2.2.3. Parameter P4: Voltage Set Point Slope

This parameter adjusts the speed at which the high voltage reaches the desired set point or the maximum high voltage unit voltage. **P4**'s adjustment is linear and in increments of 0.7 milliseconds from 0 to 6.3 milliseconds.

<b>P4 = 0</b>	t = minimum
<b>P4 = 1</b>	t = 1 x 0,7 ms to go from 0 to 100 kV
<b>P4 = 2</b>	t = 2 x 0,7 ms to go from 0 to 100 kV



DES00213

The response is linear.

### 3.2.2.4. Parameter P6: Voltage Set Point Internal / External

This parameter is a switch in the controller for the origin for the voltage set point.

<b>P6 = 1</b>	Voltage Set Point External
<b>P6 = 0</b>	Voltage Set Point Internal

The external set point is obtained by the **GNM** from an analog input, PLC or other device. This external set point must be hard wired to the **GNM**, (see § 4.5.1 page 17). The front panel can not be used to adjust an external set point. The factory defaults impose an internal set point. The controller displays "Confide Trip" when there is a conflict between the internal and external settings.

### 3.2.2.5. Parameter P8: HV Enabling upon Start Up

This parameter is a switch that authorizes these high voltage to be enabled up on start up without regard to an external trigger. Authorizing the high voltage to be enabled upon start up is dangerous.

### 3.2.2.6. Parameter **P9**: Fault Accept by External Trigger

This parameter is a switch to authorize the recovery from a fault by the external trigger, available only if **P5** = 0.

### 3.2.2.7. Parameter **P15**: High Voltage Value Correction

This parameter can be used to adjust the displayed voltage on the front panel to correlate to the measured high voltage at the applicator tip. A small difference can exist between high voltage units because of the accuracy of the resistors used. This difference should not exceed +/- 3 kV.

### 3.2.2.8. Over-Current Programming Parameters **MP19**, **SP19**, **TP19**, **RP19**

The over-current programming evaluates the current draw while the controller is active. The **GNM 100** has two over-current protection schemes. The first scheme is to regulate the voltage when the current reaches its maximum value; this scheme is referred to as limitation and utilizes all of above-mentioned parameters. In the second scheme if the current exceeds the maximum allowable value the controller is faulted and the front panel displays "I overflow" and only utilizes the parameter **SP19**.

#### **MP19**: Current Management

This is a switch used to select which type of current management the user desires to use.

<b>MP19</b> = 0	Current Management by Limitation
<b>MP19</b> = 1	Current Management by Fault

The front panel display shows which current management scheme is in use by **Il** for limitation and **Io** for fault management. **Il** and **Io** are high voltage unit dependent and can be adjusted below their maximum values in the user menu.

#### **SP19**: Minimum Current Return Threshold

This value is the minimum current return value that must be obtained before the current management system is enabled.

This value is expressed in micrometers and the adjustment range depends on the characteristics of the high voltage unit. Increments are in multiples of one or five micro amperes

<b>SP19</b>	Minimum Adjustment	1 to 5 mA
<b>SP19</b>	Maximum Adjustment	<b>Io</b>

#### **TP19**: Fault Delay

This value is the maximum time during which the system accepts the return current above the value defined in **Io**. This value is expressed in milliseconds (ms) and incremented in steps of 4 milliseconds.

<b>TP19</b>	Minimum adjustment	4 ms
<b>TP19</b>	Maximum adjustment	996 ms

**RP19**: Current Ramp Function This is a switch, which enables the maximum allowable current to be lower during the initial voltage ramp.

<b>RP19</b> = 1	Enables the ramp programming
<b>RP19</b> = 0	Disables the ramp programming

The system creates an imaginary voltage ramp incremented by one unit per each cycle of the program until the maximum high voltage unit voltage or set point is reached. During this ramp the maximum allowable current draw is adapted to the imaginary voltage ramp by the relation:

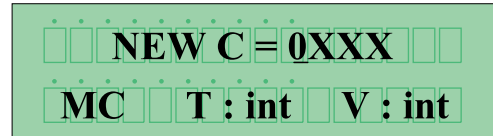
**Allowable Current =  $I_o$  \* Imaginary Set Point / high voltage units Maximum Voltage**

### 3.2.2.9. How to change the code in the calibration menu

The last stage of the calibrating menu permits entry into a personal code. The screen displays:

Follow the procedure [see § 3.2.2.1 page 9](#)

If the code '0000' is entered, no code is requested from the operator between the user menu and the calibrating menu.



DES00093

### 3.2.2.10. List of parameters

Symbol	Description	Adjustment range	Unit	Factory adjustment
P5	Internal or external trigger	0 / 1		1
MP3	Di/Dt surveillance authorization	0 / 1		1
P3	Di/Dt fault threshold adjustment	1 to 24	mA/s	--
SP3	Di/Dt inhibition limit	0 - 10	kV	--
RP3	Di/Dt ramp	0 / 1		1
P4	Set point ramp	0 to 9		--
P6	Internal / external set point	0 / 1		0
P8	HV enabled upon start up	0 / 1		0
P9	Fault accepted by external trigger	0 / 1		0
P15	Correction of the real HV value	0 to 16		8
MP19	management	0 / 1		--
SP19	high voltage unit return current threshold	5 to lo	μA	--
TP19	Delay before exceeding interruption	4 to 996	ms	--
RP19	Current ramp	0 / 1		--
NEWC	Adjustment of a new code	0000 to 9999		1111





-- = Specific for each high voltage unit.

### CEE Parameters

Type	UHT 108	PI 660	UHT 208	MHT 371	UHT 152	SRV 416	UHT 153
Umax (kV)	100	60	100	85	100	85	85
Imax (μA)	200	60	500	100	200	80	100
MP3	1		1	1	0	0	1
P3	12		12	12			12
SP3	10		10	10			10
RP3	1		1	1			1
P4	3	1	3	1	2	1	2
P6	0	0	0	0	0	0	0
P8	0	0	0	0	0	0	0
P15	8		8	8	8		8
MP19	1	0	1	1	1	0	1
SP19	35		35	20	35		20
TP19	12		12	12	12		12
RP19	1		1	1	1		1

### 3.2.3. Return to «Factory» parameters

It is possible to return to the factory parameters as follows:

- Power off generator
- Press simultaneously on keys 4  and 5 
- Power on unit
- The **GNM** displays the software version
- Release keys 4  and 5 .
- The start up screen described in section page 6 appears



**WARNING :** All values modified earlier are replaced by the «factory» values.

### 3.3. Faults

The last fault is immediately displayed. All faults cut the high voltage.

There are two types of faults: minor faults and major faults.

- Minor faults are reset by the ON/OFF function of the trigger.
- Major faults require:
  - 1 - Trigger STOP
  - 2 - ON / OFF on the **GNM** main power
  - 3 - Trigger ON



DES00094

**Caution:** for internal trigger [see § 3.2.2.4 page 10](#)

#### 3.3.1. Fault screens

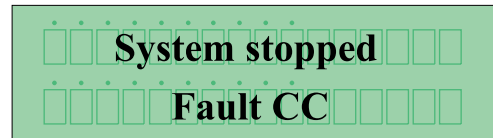
Major faults:

Fault temperture	Excessive case temperature <a href="#">see § 3.3.4 page 14</a>
Fault UP	high voltage unit not recognized
Fault CC	Low voltage output short-circuit <a href="#">see § 3.3.5 page 14</a>
Fault Reg. Freq	Bad frequency regulation <a href="#">see § 3.3.6 page 14</a>
Fault $\mu$ P	Micro calculator fault
Fault Supply	Bad regulation of internal supply

Minor faults:

Config Trip	configuration error
V Limit Trip	voltage disjunction fault ( $V > V_{max}$ of the high voltage unit). <a href="#">see § 3.3.2 page 14</a>
I Limit Trip	current disjunction fault ( $I > I_{max}$ of the high voltage unit).
Soft <b>Di/Dt</b>	<b>Di/Dt</b> (Soft) fault
Hard <b>Di/Dt</b>	<b>Di/Dt</b> (Hard) fault
Coherence Trip	coherence fault <a href="#">see § 3.3.3 page 14</a>
I overflow	Current overflow fault
V overflow	Voltage overflow fault
Set up mode Trip	trigger activated and <b>GNM</b> in the calibrating menu
Trigger Trip	trigger activated when <b>GNM</b> powered

The following message is displayed, for example:



DES00083

### 3.3.2. V limit trip - I limit trip

These errors indicate that at a certain moment, the voltage measured or the current measured has exceeded the maximum adjustment points of the high voltage unit for Vmax and Imax.

### 3.3.3. Coherence trip

This error indicates a gap between the theoretical value calculated and the HV value measured.

### 3.3.4. Fault tempeture

The **GNM** is equipped with a temperature sensor which creates a fault if the internal temperature exceeds roughly 70 °C / 158° F.

### 3.3.5. Fault CC

A low voltage short circuit causes a fault.

### 3.3.6. Fault reg freq

The **GNM** is equipped with an automatic tuner to put the board and the high voltage unit at the same frequency.

When matched there is no fault.

### 3.3.7. Fault supply

The voltage and supply current in DC internal current is surveilled by the **GNM**. If a value becomes too high, a major error is signalled.

### 3.3.8. Starting up of the HV after a minor fault

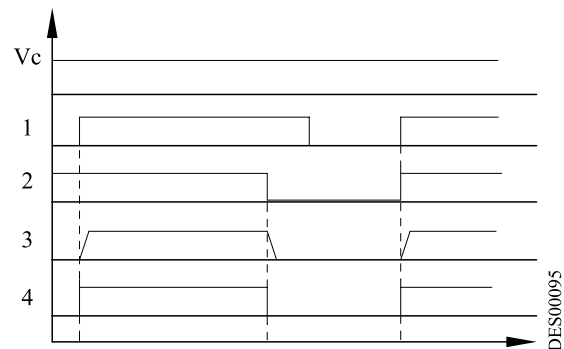
In external trigger mode:

1	external trigger
2	fault
3	H.V.
4	trigger copy

In internal trigger mode

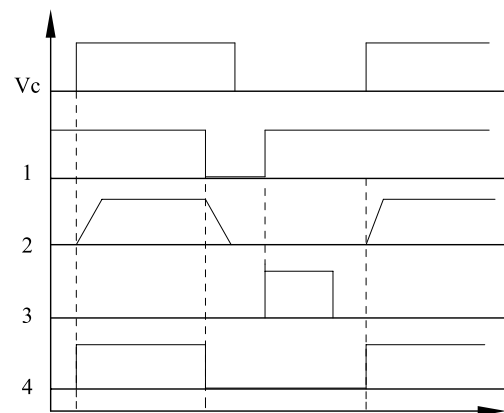
With **P9** = 0:

With **P9** = 1 :



DES00095

1	fault
2	H.V.
3	accept
4	trigger copy



DES00100

**3.4. Di / Dt**  
[see § 3.2.2.2 page 9](#)

**3.5. "I" Overflow**  
[see § 3.2.2.8 page 11](#)

## 4. Low voltage connections

### 4.1. Supply

The **GNM** can be supplied with 220 V or 110 V voltage, 50-60 Hz. Selection takes place by means of a switch located on the main printed circuit.

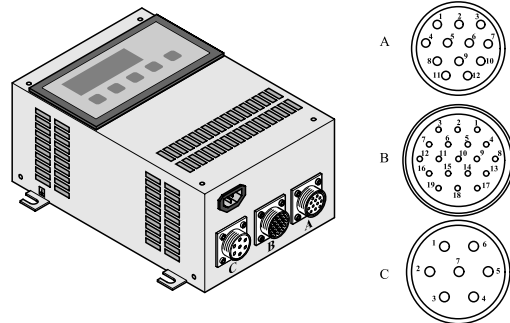
### 4.2. Low voltage connectors



**WARNING :** [see RT Nr 6169](#) for use with a high voltage unit UHT 153.

#### 4.2.1. GNM 100-A module

A	Connecting plug (12 pins)
B	Connecting plug (19 pins)
C	Connecting plug (7 pins)

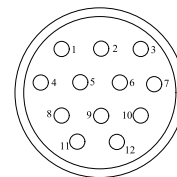


DES00078

### 4.3. Connecting plug (12 pins A)

Connection to the high voltage unit.

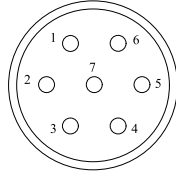
N° of pins	Signal
1	earth
2	input + photo coupler
3	+ 15 V
4	earth
5	input + photo coupler
6	high voltage unit recognition
7	high voltage unit recognition (earth)
8	shielding
9	high voltage unit transformer
10	high voltage unit transformer
11	return I HV
12	return U HV



DES000595

#### 4.4. Connecting plug (7 pins C)

Connection to the controls of the atomizer (e.g. electro valve). It is possible to use the 4, 5 and 6-pins (trigger copy for the PLC).



DES000597

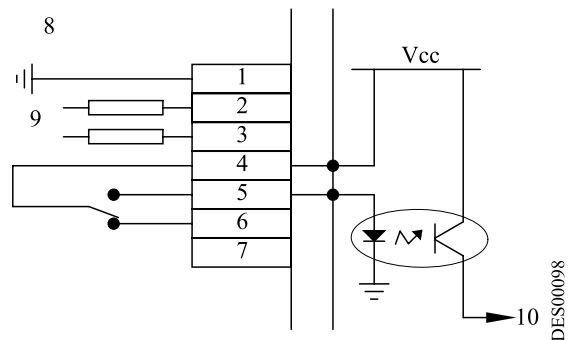
N° of pins	Signal
1	earth
2	phase 1, output protected
3	phase 2, output protected
4	common to trigger image relay
5	trigger image relay contact normally closed
6	trigger image relay contact normally open
7	not connected



**WARNING :** This relay is for passing low currents. If a high current is used this contact can no longer be used for low currents.

Example of a PLC cabling:

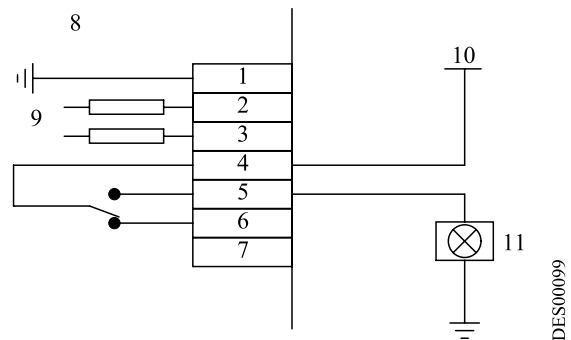
1 to 7	<b>GNM case</b>
8	Inside <b>GNM</b>
9	Main supply output protected by fuses
10	PLC input



DES00098

Cabling for "HV ON" signalling light,

1 to 7	<b>GNM case</b>
8	Inside <b>GNM</b>
9	Main supply output protected by fuses
10	220 VAC or 110 VAC
11	Light on



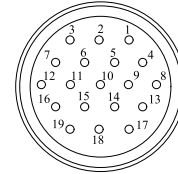
DES00099



#### 4.5. Connecting plug (19 pins B)

Connection to an PLC:

N° of pins	Signal
1	Earth
2	Not connected
3	Not connected
4	Input 4 / 20 mA
5	Earth 4 / 20 mA or 0 / 10 V
6	Input 0 / 10 V
7	Image output Vm (100 kV = ~ 5 V)
8	Earth
9	Image output Im (500 $\mu$ A = ~ 5 V)
10	Input + photo coupler
11	+ 15 V / 50 mA max. protected
12	Earth
13	Input + photo coupler
14	Relay OK board contact normally closed
15	Relay OK board contact normally open
16	OK board common relay
17	Not connected
18	Not connected
19	Not connected



The mass is joined to the earth through the board.

##### 4.5.1. Analog input

Cabling on external adjustment points can be 4/20 mA or 0-10 V.

##### 4.5.1.1. 4/20 mA adjustment point

This scale setting has to be done in a PLC. To do this, apply an adjustment point of 8 mA and another adjustment point of 16 mA and read the HV value on the **GNM** screen. A simple calculation permits one to fine the corresponding point.

#### 4.5.1.2. 0/10 V adjustment point

Scale setting is done inside the **GNM**.

10 V corresponds to 100 kV. For a high voltage unit on which the maximum voltage is below 100 kV, the adjustment point is automatically revealed at its maximum value.

#### 4.5.2. Control of **V<sub>m</sub>** and **I<sub>m</sub>** outputs

Copies of **V<sub>m</sub>** and **I<sub>m</sub>** are only given as indications.

They are not calibrated inside the GNM and differences can exist.

##### 4.5.2.1. Control of the **V<sub>m</sub>** output

The **V<sub>m</sub>** scale is 0-5 V for 0-100 kV.

The minimum impedance of the measure equipment has to be 50 kΩ.

##### 4.5.2.2. Control of the **I<sub>m</sub>** output

The **I<sub>m</sub>** scale is 0-5 V for 0-500 μA.

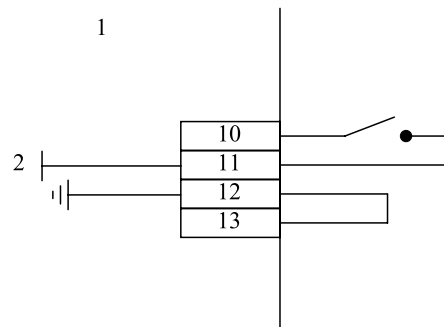
The minimum impedance of the measure equipment has to be 50 kΩ.

#### 4.5.3. Wiring of external trigger

Control of the external trigger can be done in two ways:

- Dry contact,
- Using external voltage between 12 and 24 Vdc ([see § 4.5.3.2 page 18](#)).

##### 4.5.3.1. Dry contact. There are two possibilities:



DES00101

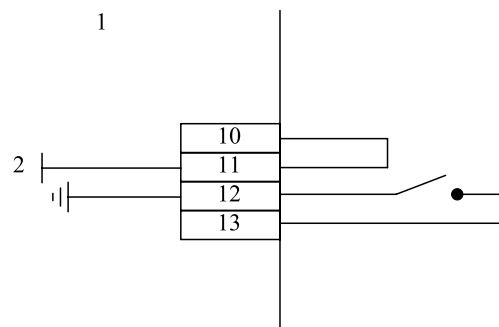
or :

1	Inside <b>GNM</b>
2	+ 15 Vdc; 50 mA max
10 to 13	<b>GNM</b> case

##### 4.5.3.2. Using external voltage

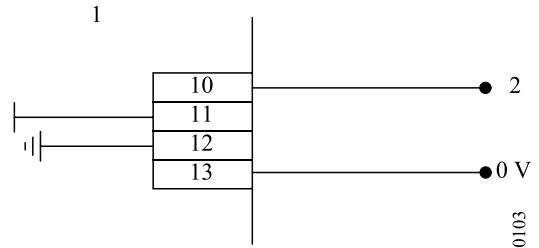
The external voltage is between 12 and 24 Vdc.

Input impedance roughly 1 kΩ.



DES00102

0 V	Supply return 12 to 24 V
1	Inside <b>GNM</b>
2	+ 12 to 24 V dc
10 to 13	<b>GNM</b> case



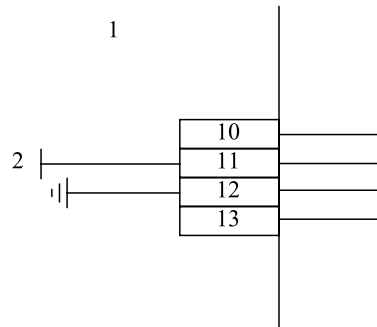
DES00103



**WARNING :** Inputs 10 and 13 are opto-coupled inputs. They are therefore isolated from the earth. Make sure that the 0 V of the 12 to 24 V supply is at a potential close to the earth.

4.5.3.3. In the case where P8 = 1,  
The trigger has to be connected as follows:

1	Inside <b>GNM</b>
2	+ 15 Vdc; 50 mA max
10 to 13	<b>GNM</b> case



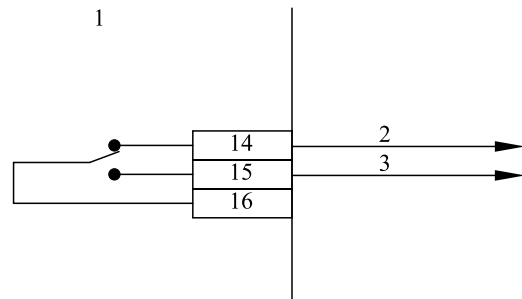
DES00104

4.5.4. Using information relative to the faults  
The closed contact of the OK board relay signals that the board is under voltage and that there is no fault.



**WARNING :** This relay is for passing low currents. If a high current is used this contact can no longer be used for low currents.

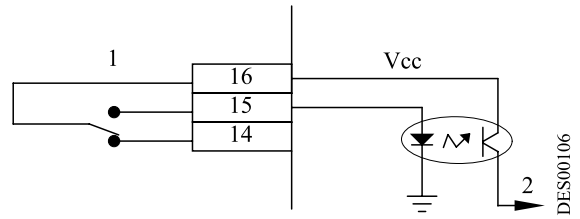
1	Inside <b>GNM</b>
2	OK board
3	No OK board
14 to 16	<b>GNM</b> case



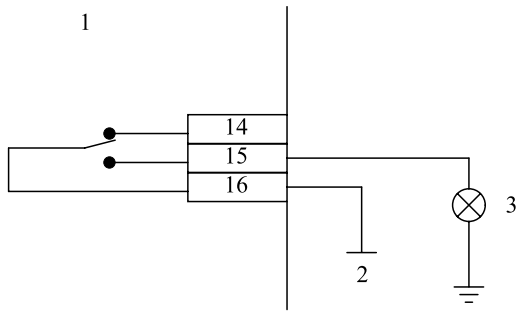
DES00105

Liaison wiring with an PLC:

1	Inside <b>GNM</b>
2	PLC input
14 to 16	<b>GNM</b> case



Wiring of a HV fault signalling lamp:

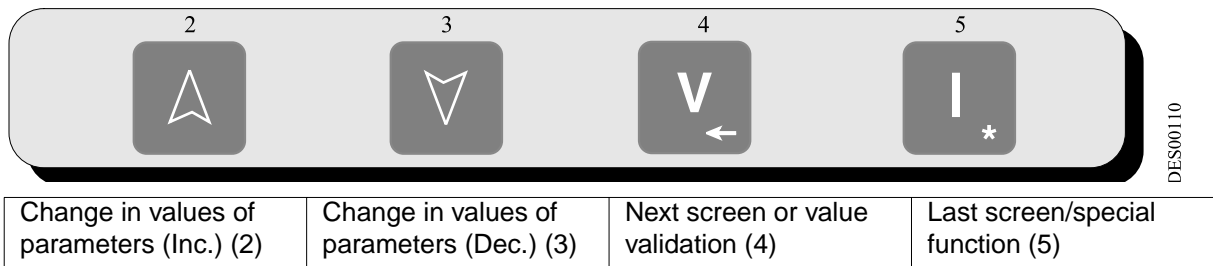


1	Inside <b>GNM</b>
2	220 VAC oR 110 VAC
3	Fault
14 to 16	<b>GNM</b> case

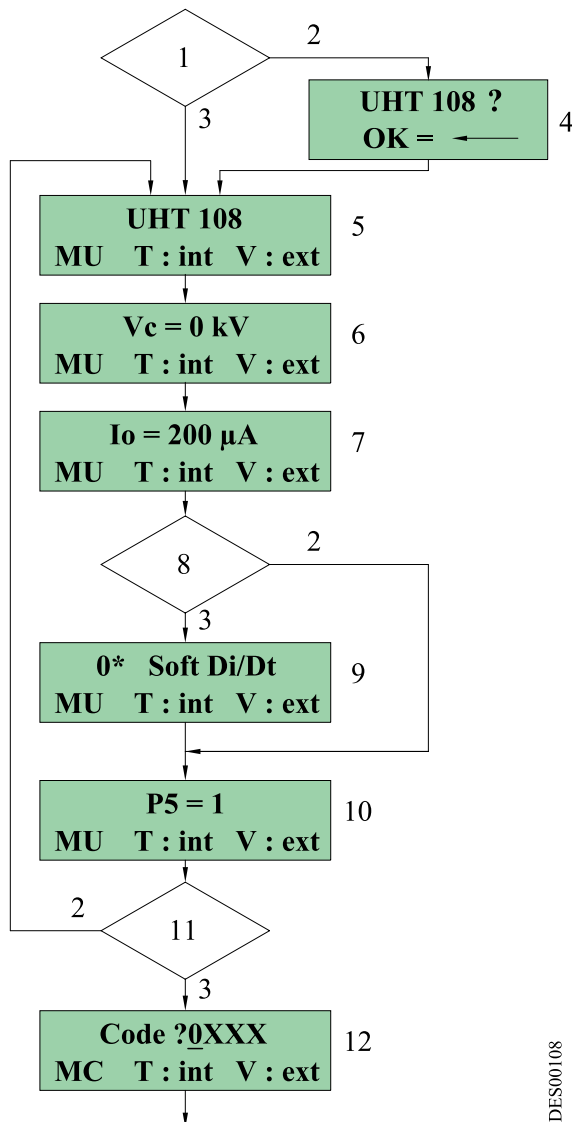
DES00107

## 5. List of parameters

(diagrams in this chapter to be taken only as guide lines)



DES00110



DES00108

1	Same high voltage unit as last start up ? no.
2	no.
3	yes.
4	After validation with key 4 <b>V</b> , the parameters of this new high voltage unit are automatically selected and all old adjustments are lost. User must confirm new type of high voltage unit.

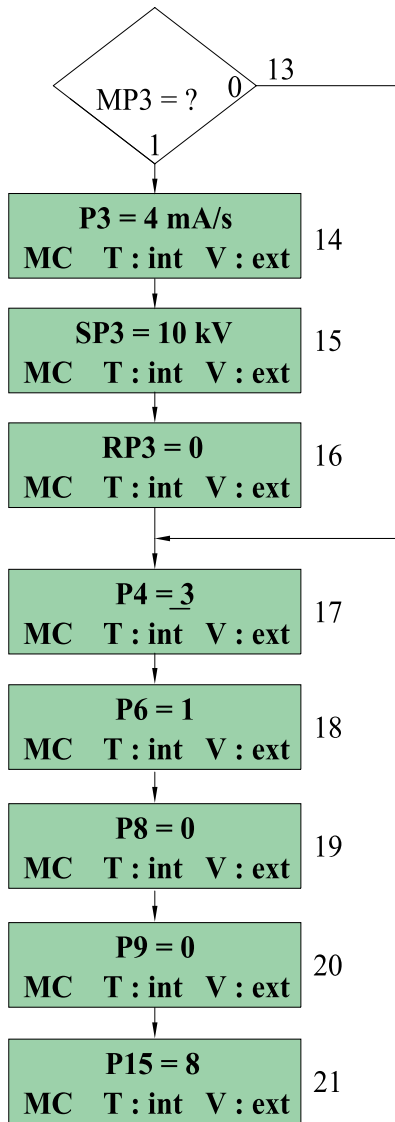
5	Initial menu (high voltage unit mode is displayed).
6	Voltage set point adjustment (kV).
7	Current II limitation adjustment (μA), or current disjunction current adjustment (μA).

8	Is there a storage fault?
9	Display of faults, scrolling by keys 2 <b>A</b> and 3 <b>V</b> , cancellation with key 5 <b>I</b> .

10	Type of trigger: 0 = internal - 1 = external.
----	---

11	Request for calibrating menu.
12	Calibrating code entry.

Di / Dt soft function



13	<b>MP3=1</b> Di / Dt soft programming enabled <b>MP3=0</b> Di / Dt soft programming disabled
----	---

14	Adjustment of parameter <b>P3</b> .
----	-------------------------------------

15	Adjustment of parameter <b>SP3</b> .
----	--------------------------------------

16	Adjustment of parameter <b>RP3</b> .
----	--------------------------------------

17	Adjustment of parameter <b>P4</b> .
----	-------------------------------------

18	Adjustment of parameter <b>P6</b> .
----	-------------------------------------

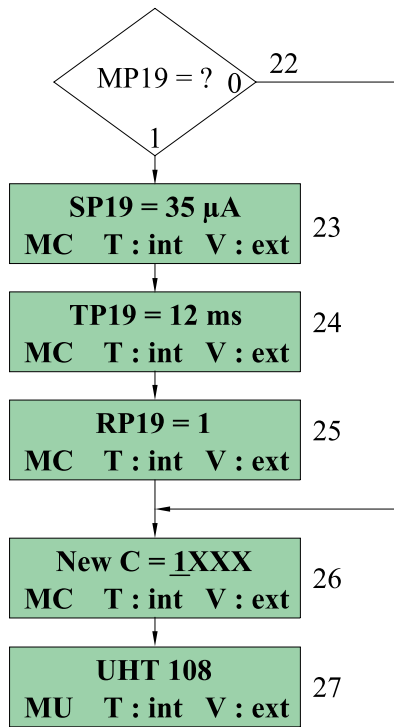
19	Adjustment of parameter <b>P8</b> .
----	-------------------------------------

20	Adjustment of parameter <b>P9</b> , available only if <b>P5 = 0</b>
----	--

21	Adjustment of parameter <b>P15</b> .
----	--------------------------------------

DES00111

Current management



22	<b>MP19 = 1</b> Current management by Fault <b>MP19 = 0</b> Current management by Limitation
----	---

23	Adjustment of parameter <b>SP19</b> .
----	---------------------------------------

24	Adjustment of parameter <b>TP19</b> .
----	---------------------------------------

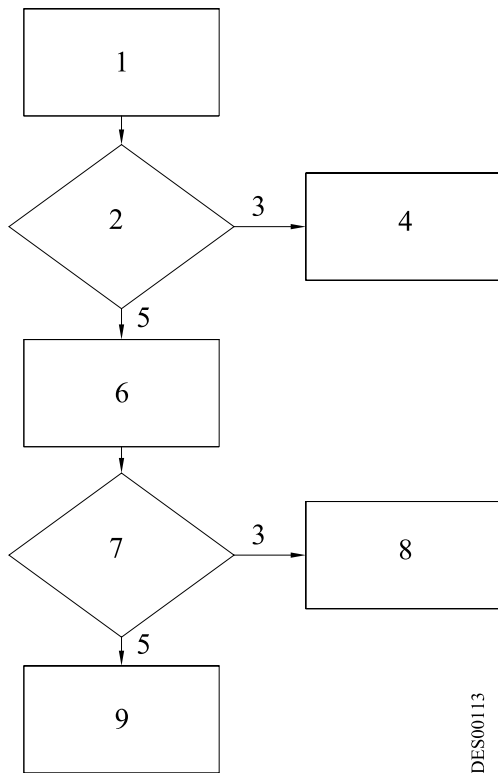
25	Adjustment of parameter <b>RP19</b> .
----	---------------------------------------

26	Modify the calibrating menu code, <a href="#">see § 3.2.2.1 page 9</a>
----	---

27	Return to user menu.
----	----------------------

DES00112

## 6. Trouble shooting



DES00113

1	<b>GNM</b> no power, display and green LED off.
---	---

2	<b>GNM</b> powered, display and green LED on.
---	---

3	No.
---	-----

4	Power on. <b>GNM</b>
---	----------------------

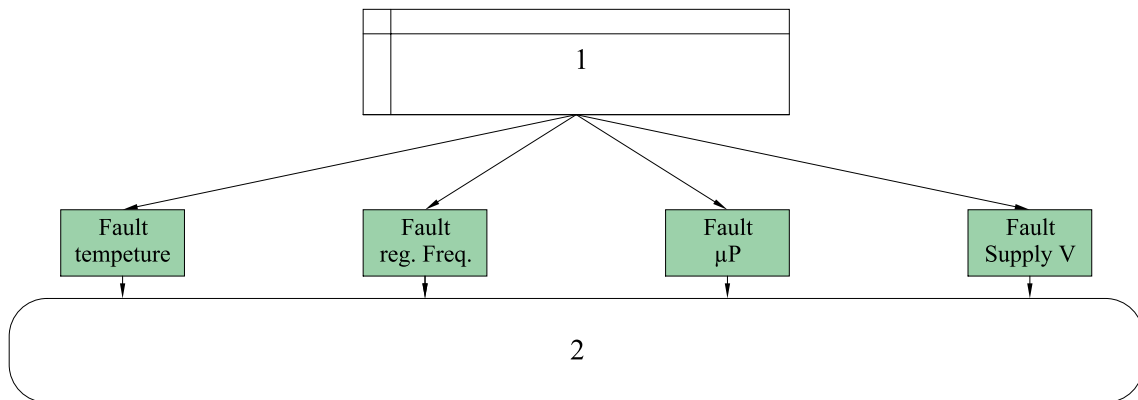
5	Yes.
---	------

6	Turn the <b>GNM</b> off for a minute then on again.
---	---

7	<b>GNM</b> power on, display and green LED on.
---	--

8	Replace the <b>GNM</b> .
---	--------------------------

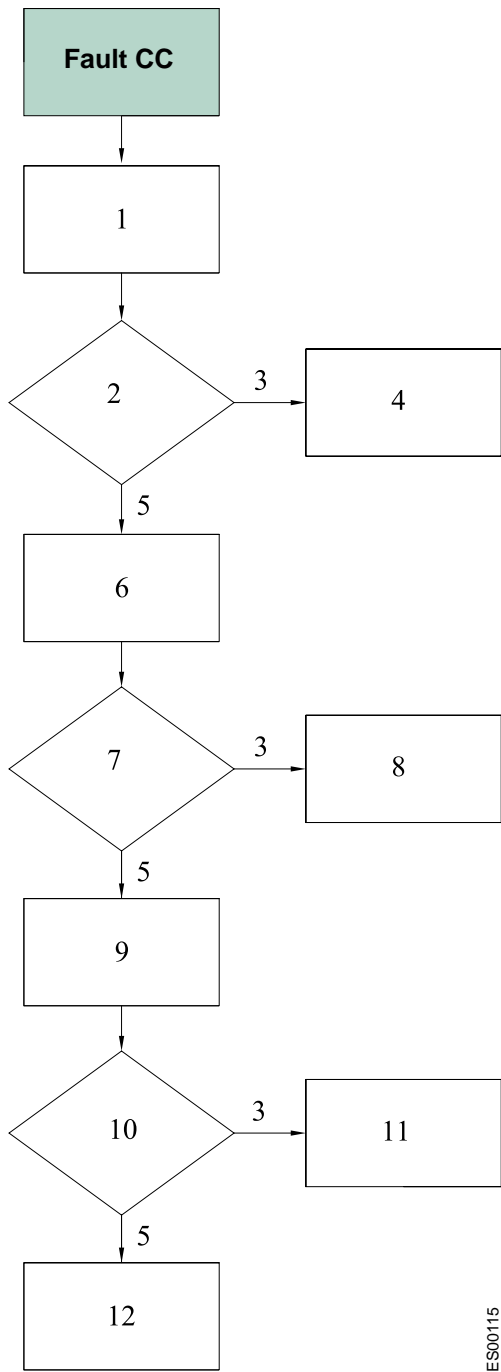
9	If an over voltage occurs, the <b>GNM 100</b> will automatically go in to protection mode.
---	--



DES00114

1	Major faults.
2	Replace the <b>GNM</b> .





1	Check the low voltage cable.
---	------------------------------

2	Problem with low voltage cable?
3	Yes.
4	Replace the low voltage cable.
5	No.
6	Check the connector's low voltage terminals.

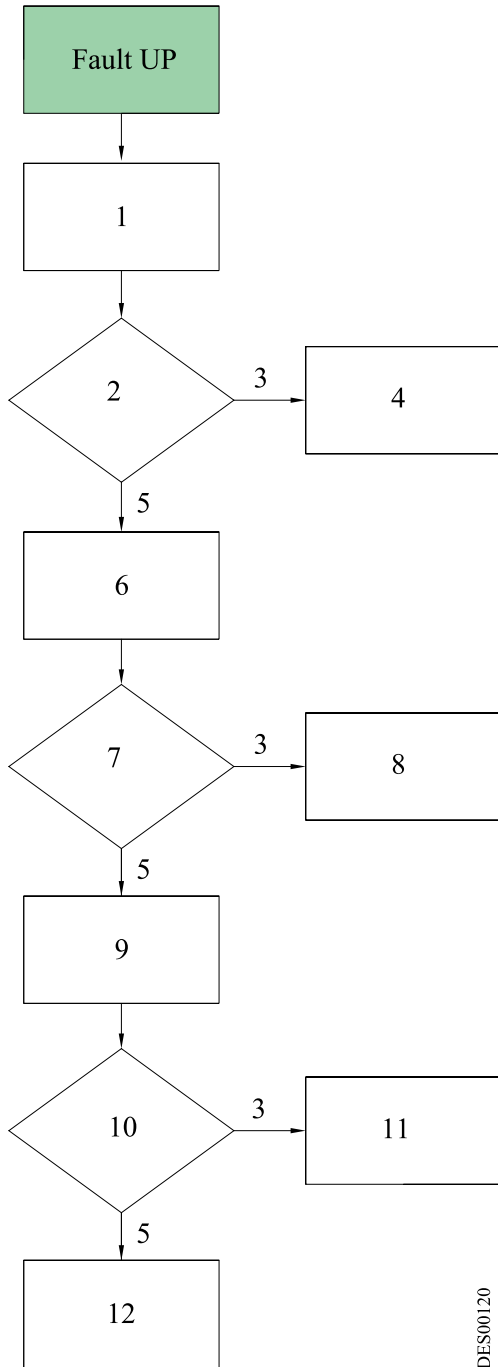
7	Problem with the connector terminals ?
8	Repair the low voltage terminals.

9	Replace the <b>GNM</b> .
---	--------------------------

10	<b>GNM</b> warning ?
11	<b>GNM</b> working.

12	Replace the high voltage unit.
----	--------------------------------

DES00115



DES00120

1	Check the low voltage cable ?
---	-------------------------------

2	Problem with low voltage cable ?
3	Yes.
4	Defective low voltage cable.
5	No.

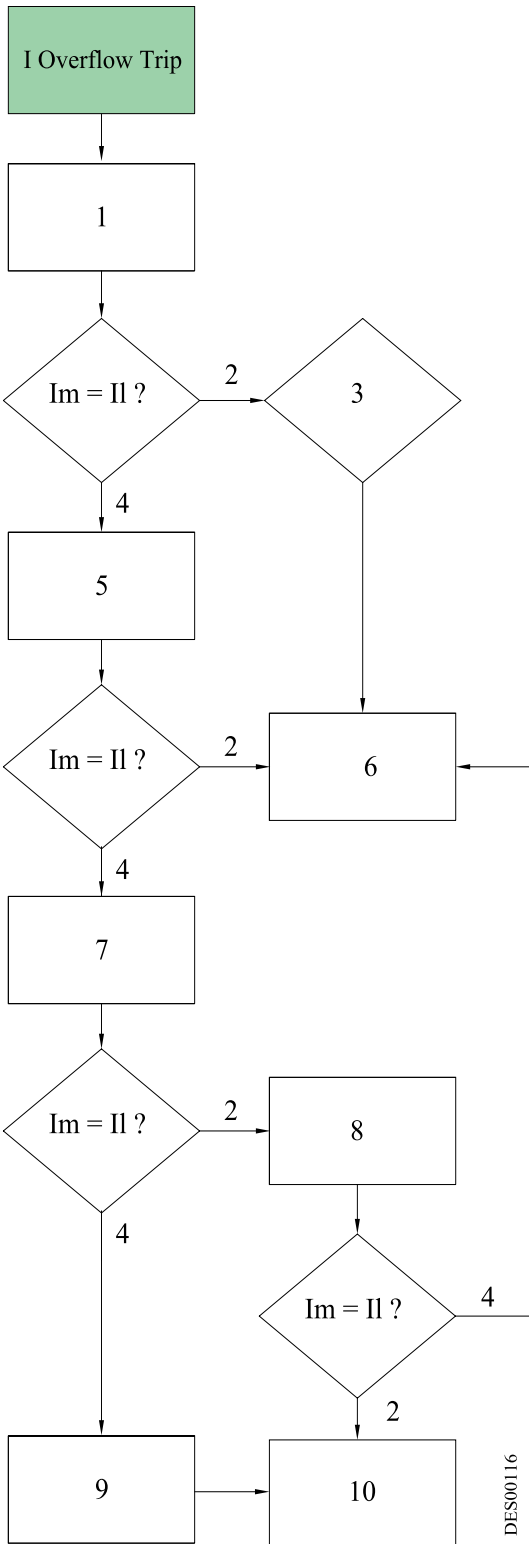
6	Check the connector low voltage terminals.
---	--

7	Defective connector terminal ?
8	Repair / replace the low voltage terminals.

9	Replace <b>GNM</b> .
---	----------------------

10	Has the problem disappeared?
11	<b>GNM</b> working.

12	Replace the high voltage unit.
----	--------------------------------



1	Adjust P19 at 0 and activate with trigger.
---	--

2	No.
3	In service, the system has already worked correctly, but current consumption has increased.
4	Yes.

5	Adjust II at maximum value.
---	-----------------------------

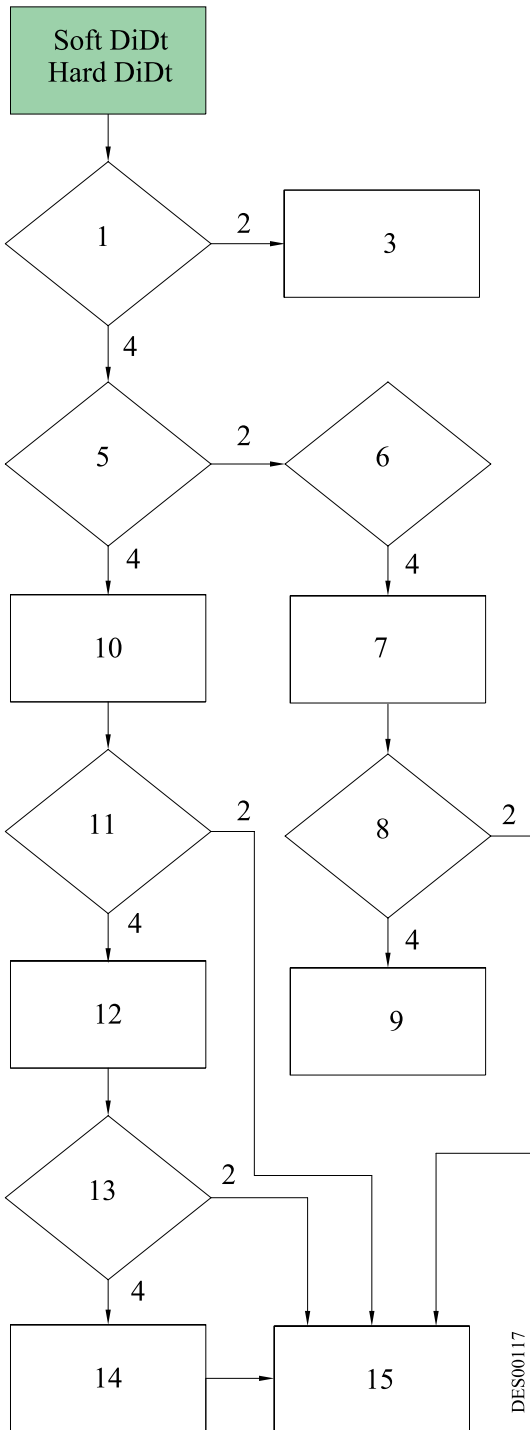
6	Maintenance necessary for the HV system: the paint hose becomes conductive, air arrival circuit.
---	--

7	Remove the HV from the high voltage unit if this is the case.
---	---

8	Replace HV cable.
---	-------------------

9	Replace high voltage unit.
10	<b>GNM</b> working.

DES00116



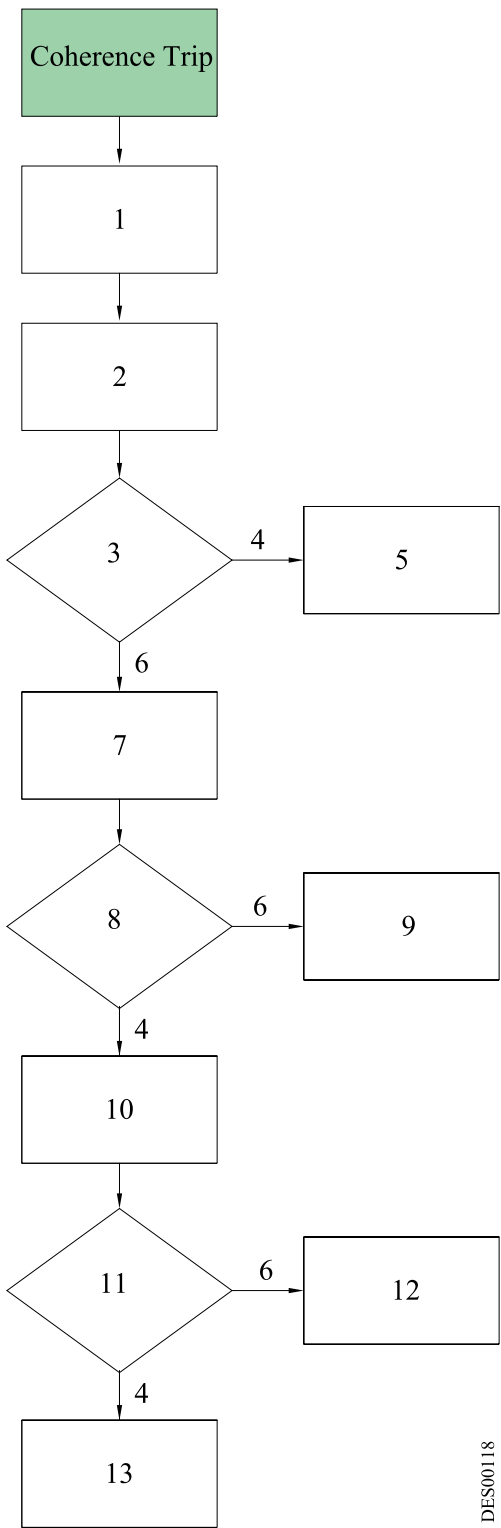
1	Target distance to close.
2	Yes.
3	Greater target distance required.
4	No.

5	Fault condition at start up ?
6	In service, the system has already worked correctly.
7	Check HV cable connections if this is the case. - length -HV contact -sufficient quantity of dielectric grease - black part of cable earthed?
8	Problem solved ?
9	Adjust parameter <b>P3</b> .

10	Apply dielectric grease on HV connection.
11	Problem solved ?
12	Check for contamination or condensation in paint machine / applicator.

13	Problem solved ?
----	------------------

14	Check if hose became conductive.
15	<b>GNM</b> working.



2	Measure the HV level at high voltage unit output.
---	---

3	Above 20 kV difference between <b>Vm</b> and measure?
4	No.
5	Carry out same controls for excess of I or Di/Dt.
6	Yes.
7	Check low voltage cable.

8	Problem with low voltage cable?
9	Replace / repair the low voltage cable.

10	Check the low voltage connections.
11	Problem with the low voltage connections ?
12	Replace / repair the low voltage connections.

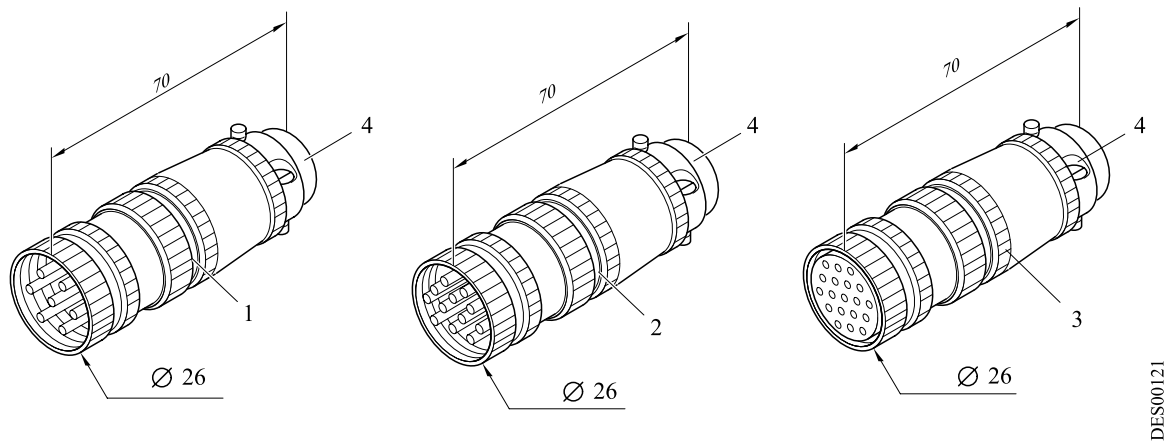
13	Replace the high voltage unit.
----	--------------------------------

DES00118

## 7. GNM references

Ref.	Part number	Description	Qty	Sold in units of
	858224	<b>GNM 100-A</b> - metal case (110-220V)	1	1

## 8. Plugs



DES00121

Ref.	Part number	Description	Qty	Sold in units of
1	E4PTFS316	Male plug 7 contacts	1	1
2	E4PTFS343	Male plug 12 contacts	1	1
3	E4PTFS406	Female plug 19 contacts	1	1
4	E4PTFA323	Cable clamp	1	1