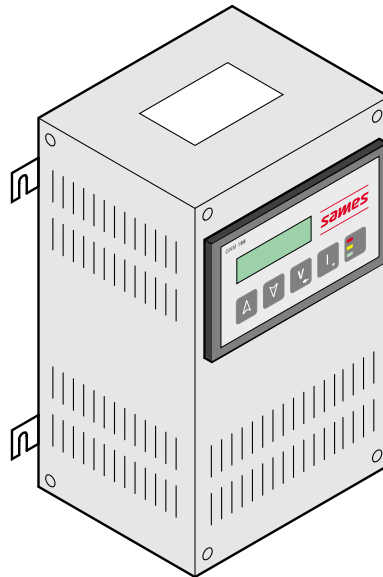




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DES00752

User manual

GNM 100-A US non FM Automatic mode of operation

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GNM 100-A US non FM

Automatic mode of operation

1. Introduction	5
2. Description	5
2.1. Presentation	5
2.2. Specifications	6
2.2.1. Electrical input data	6
2.2.2. Electrical output data	6
2.2.3. Size and weight	6
2.2.4. Connecting Cables Specifications	6
2.2.5. GNM 100-A module	7
3. Operating principle	7
3.1. Automatic high voltage unit selection	7
3.2. Menus	8
3.2.1. User menu	8
3.2.2. Calibrating menu	10
3.2.3. Return to «Factory» parameters	14
3.3. Faults	14
3.3.1. Fault screens	14
3.3.2. V limit trip - I limit trip	15
3.3.3. Coherence trip	15
3.3.4. Fault temperture	15
3.3.5. Fault CC	15
3.3.6. Fault reg freq	15
3.3.7. Fault supply	15
3.3.8. Starting up of the HV after a minor fault.	16
3.4. Di / Dt	16
3.5. "I" Overflow	16
4. Low voltage connections	16
4.1. Supply	16
4.2. Low voltage connectors	17
4.3. Connecting plug (12 pins A)	17
4.4. Connecting plug (7 pins C)	17
4.5. Connecting plug (19 pins B)	18
4.5.1. Analog input.	19
4.5.2. Control of Vm and Im outputs	19
4.5.3. Wiring of external trigger	19
4.5.4. Using information relative to the faults.	21
5. List of parameters	22
6. Trouble shooting	25
7. GNM references	31
8. Plugs	31

9. Connecting plugs	32
9.1. Connecting plug (7 pins C)	32
9.2. Connecting plug (12 pins A)	32
9.3. Connecting plug (19 pins B)	33

1. Introduction



CAUTION : Safety warning: the GNM 100-A 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 1527937.

This type of GNM is designed to be installed in the back of the metallic cabinet with the help of four legs (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 mm²).

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 mm².



CAUTION : 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 152, 153.**

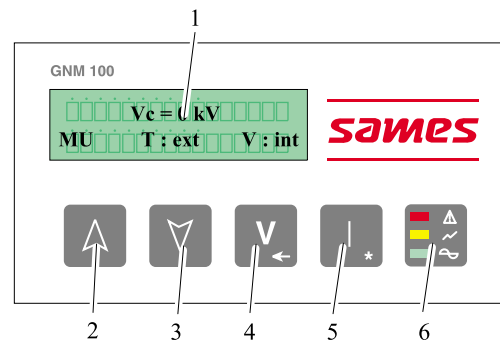
2. Description

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.

Description of Front Panel	
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	GNM Power is ON
Orange	High Voltage is Triggered (HV ON)
Red	Fault

2.2. Specifications

2.2.1. Electrical input data

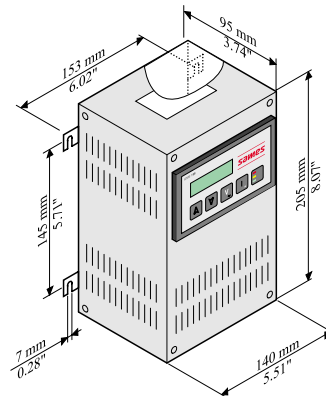
Input voltage	110 V _{AC} +/-20 V
Frequency	60 Hz
Max input power for GNM 100-A	80 VA
Impedance 0 - 10 V	~ 15 kΩ

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

	GNM 100-A
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, 0.34mm², shielded
- 12 Pin Connector
- 30 Meters Maximum length, 100 feet.
- Male Plug Reference Number E4PTFS343

B - PLC Cable

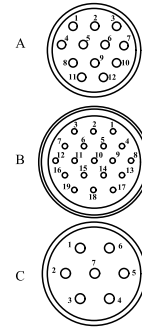
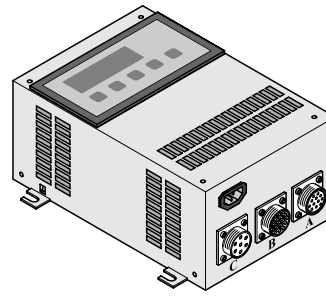
- 22 Gauge Minimum, 0.34mm², shielded
- 19 Pin Connector
- 30 Meters Maximum Length 100 feet.
- Female Plug Reference Number E4PTFS406

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



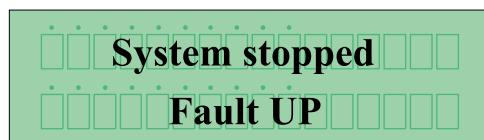
CAUTION : Screens given herein are provided only as examples.

3.1. Automatic high voltage unit selection



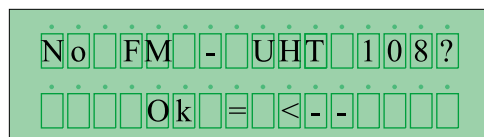
CAUTION : The GNM periodically checks for the presence and type of high voltage unit with which it is connected.

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".




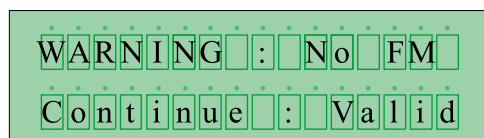
DES00082

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




DES00598

Validation is done by pressing on key 4  (see § 2.1 page 5).



DES00599

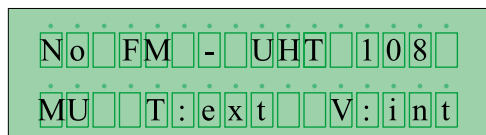
Validation is done by pressing on key 4  (see § 2.1 page 5).

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.



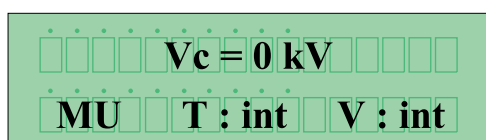
DES000600

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

To scroll the menu, press key 4 (see § 2.1 page 5).

3.2.1.1. Adjusting Voltage Set Point

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

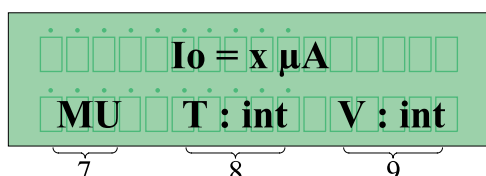


DES000605

Key 4 permits one to go to the next screen (see § 2.1 page 5).

3.2.1.2. Adjusting Current Set Point

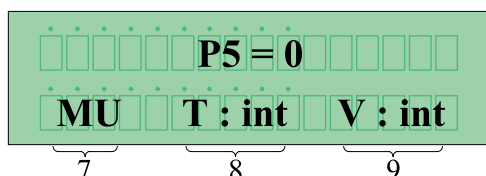
Current adjustment set point is adjusted by keys 2 and 3 .



DES000607

Key 4 permits one to go to the next screen (see § 2.1 page 5).

3.2.1.3. Parameter - P5: type of trigger



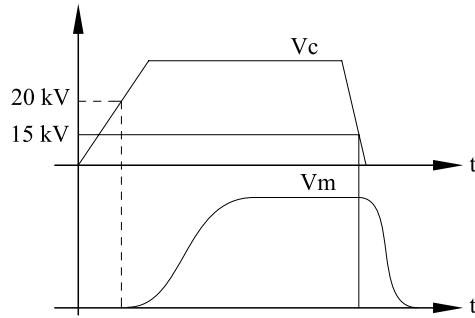
DES000607

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.

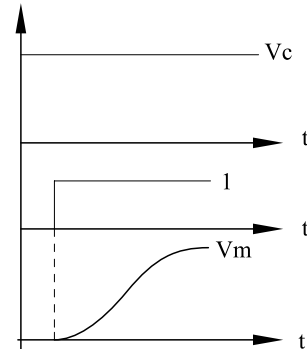
Vc	Voltage set point
Vm	Voltage Return

- P5 = 1 triggering called «external». «Discrete I/o» (dry contact, 12 or 24 V depending on type of connection, [see § 4.5 page 18](#)) for hard wiring diagrams.



DES00088

1	Trigger
Vc	Voltage set point
Vm	Voltage Return



DES00089

3.2.1.4. Display of the last 10 faults

The 4 key permits one to go to the next screen ([see § 2.1 page 5](#)).

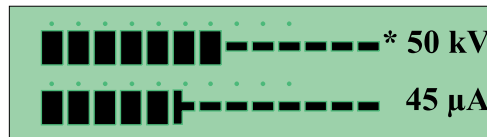
On the first line, one can read the last fault. Pressure on keys 2 and 3 ([see § 2.1 page 5](#)) permits one to scroll the 9 other faults upwards or downwards. The fault carrying the highest number is the most recent. To initiate the list again, press key 5 ([see § 2.1 page 5](#)).



CAUTION : 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 μ A current draw.



DES00086

3.2.2. Calibrating menu



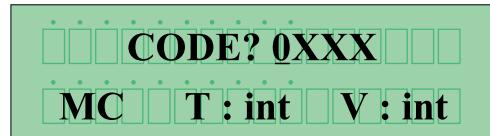
CAUTION : This section is for the customer's trained personnel. Entry into the calibrating menu puts the HV out of service.

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 and 5 (see § 2.1 page 5) 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 "FACTORY" code is «1111».

Enter code by pressing 2 and 3 and validating with key 4 (see § 2.1 page 5).



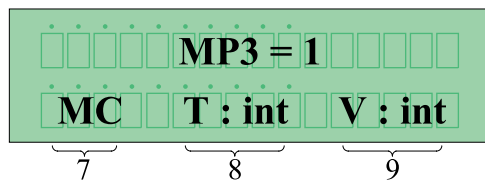
DES00090

3.2.2.1. Code entry

Scroll the first figure upwards or downwards with keys 2 and 3 (see § 2.1 page 5).

Validate with key 4 (see § 2.1 page 5), then go to the next figure etc. In case of an error, press key 5 . Validate code with key 4 (see § 2.1 page 5).

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



DES00091

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

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 -A 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.

MP3 = 1	Di / Dt soft programming is enabled
MP3 = 0	Di / Dt 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.

P3	Minimum adjustment	2 mA/s
P3	Maximum adjustment	24 mA/s

SP3: Di / Dt Soft Minimum Return Voltage Threshold

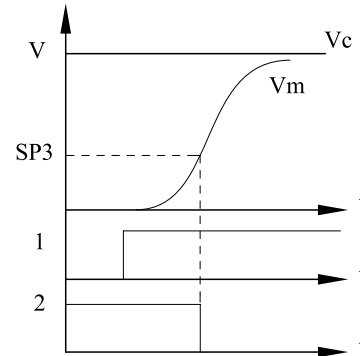
This value is minimum voltage return value that must be obtained before the Di / Dt soft programmed circuitry is enabled. This value is expressed in kilovolts (kV) and can be adjusted in the following range.

SP3	Minimum adjustment	0 kV
SP3	Maximum adjustment	10 kV

1	Trigger
2	Di / Dt soft is Disabled
Vc	Set point Voltage
Vm	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.



DES00092

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

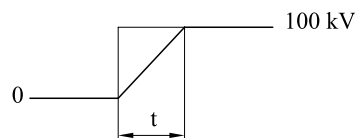
The system creates an imaginary ramp of voltage set points increased by one unit per each cycle of the program to reach the maximum voltage of the high voltage unit. During this imaginary voltage ramp, the level of the Di / Dt soft threshold value is correlated to the level of the imaginary voltage ramp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

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

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.



DES00213

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

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 available only if P5 = 0.

P6 = 1	Voltage Set Point External
P6 = 0	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 § 4.2 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 "Config

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 the 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 k. Available only if P5 = 0

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 GNM100 A 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.

MP19 = 0	Current Management by Limitation
MP19 = 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 microamperes

SP19	Minimum Adjustment	1 to 5 mA
SP19	Maximum Adjustment	Io

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.

TP19	Minimum adjustment	4 ms
TP19	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.

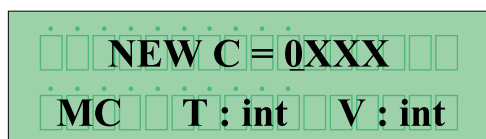
RP19 = 1	Enables the ramp programming
RP19 = 0	Disables the ramp programming

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 = $I_o * \text{Imaginary Set Point} / \text{high voltage units Maximum Voltage}$

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:



DES00093

For the procedure [see § 3.2.2.1 page 10](#)



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

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 I_0	μ A	--
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.

Parameters (not FM)

Type	UHT 152	UHT 153
Umax (kV)	100	100
I_{max} (μA)	200	100
MP3	0	1
P3		12
SP3		10
RP3		1
P4	2	2
P6	0	0
P8	0	0
P15	8	8
MP19	0	0
SP19		
TP19		
RP19		

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 **V_c** and 5 **I_r** (see § 2.1 page 5) Power on unit
- The GNM displays the software version
- Release keys 4 **V_c** and 5 **I_r** (see § 2.1 page 5).
- The start up screen described in section page 6 appears



CAUTION : 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

Caution: for internal trigger see § 3.2.2.4 page 11.

3.3.1. Fault screens

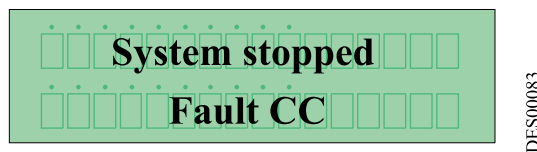
Major faults:

Fault temperture	Excessive case temperature see § 3.3.4 page 15
Fault UP	high voltage unit not recognized
Fault CC	Low voltage output short-circuit see § 3.3.5 page 15
Fault Reg. Freq	Bad frequency regulation see § 3.3.6 page 15
Fault µP	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). see § 3.3.2 page 15
I Limit Trip	current disjunction fault ($I > I_{max}$ of the high voltage unit).
Soft Di / Dt	Di / Dt (Soft) fault
Hard Di / Dt	Di / Dt (Hard) fault
Coherence Trip	coherence fault see § 3.3.3 page 15
I overflow	Current overflow fault
V overflow	Voltage overflow fault
Set up mode Trip	trigger activated and GNM in the calibrating menu
Trigger Trip	trigger activated when GNM powered

The following message is displayed, for example:



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 V_{max} and I_{max} .

3.3.3. Coherence trip

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

3.3.4. Fault temperature

The **GNM** is equipped with a temperature sensor which creates a fault if the internal temperature exceeds roughly $70\text{ }^{\circ}\text{C}$ / $158\text{ }^{\circ}\text{F}$.

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.

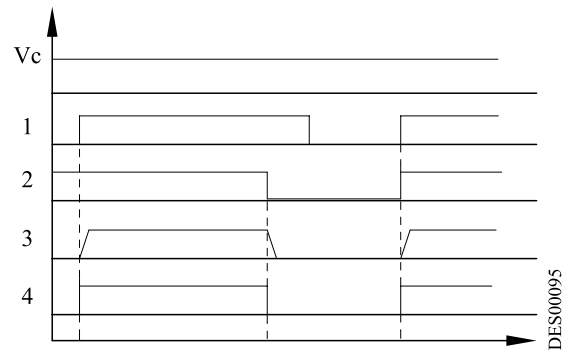
3.3.7. Fault supply

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

3.3.8. Starting up of the HV after a minor fault
In external trigger mode:

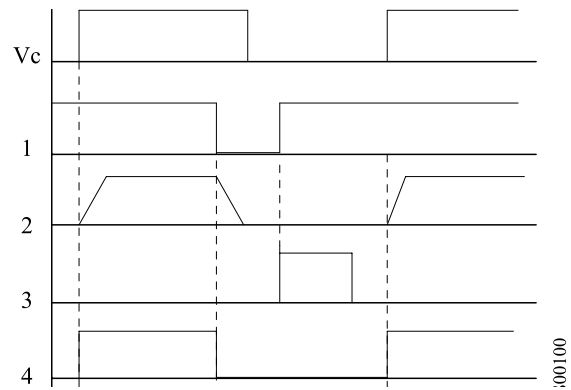
1	external trigger
2	fault
3	H.V.
4	trigger copy

In internal trigger mode With **P9 = 0**:

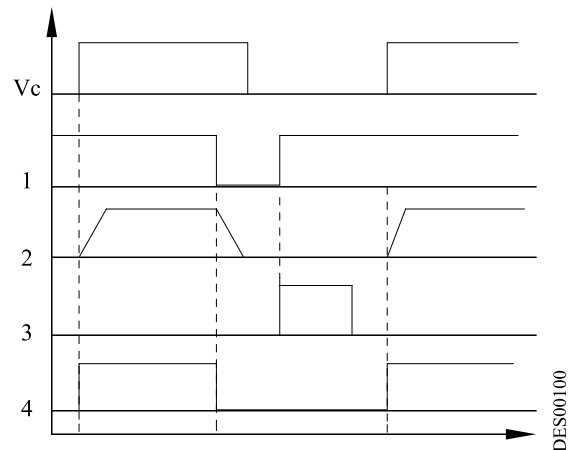


1	fault
2	H.V.
3	trigger copy

With **P9 = 1** :



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



3.4. Di / Dt
[see § 3.2.2.2 page 10](#)

3.5. "I" Overflow
[see § 3.2.2.8 page 12](#)

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



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

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

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).

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

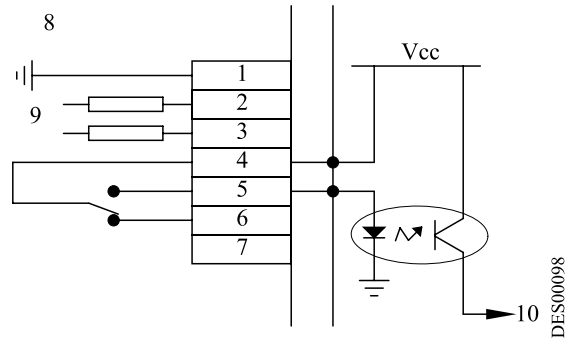


CAUTION : This relay is for passing low currents. If a high current is used this contact can no longer be used for low currents.

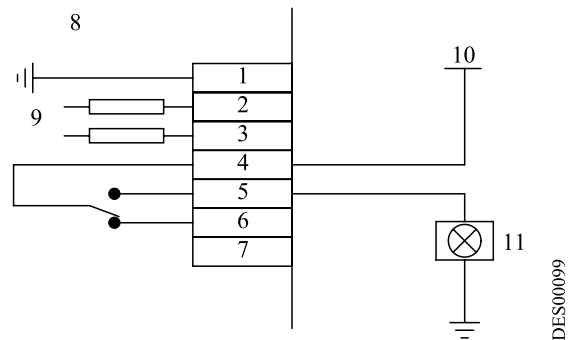
Example of a PLC cabling:

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

Cabling for "HV ON" signalling light,



1 to 7	GNM case
8	Inside GNM
9	Main supply output protected by fuses
10	220 V _{AC} or 110 V _{AC}
11	Light on



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 µA = ~ 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 find 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 leveled at its maximum value.

4.5.2. Control of Vm and Im outputs

Copies of Vm and Im are only given as indications. They are not calibrated inside the **GNM** and differences can exist.

4.5.2.1. Control of the Vm output

The Vm 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 Im output

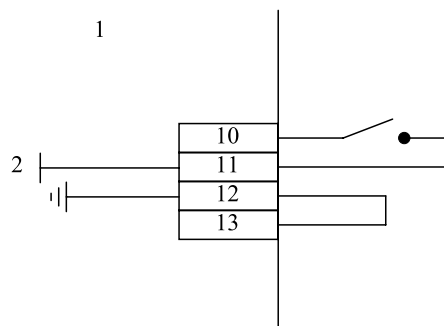
The Im scale is 0-5 V for 0-500 μA. The minimum impedance of the measure equipment has to be 50 kΩ.

4.5.3. Wiring of external trigger

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

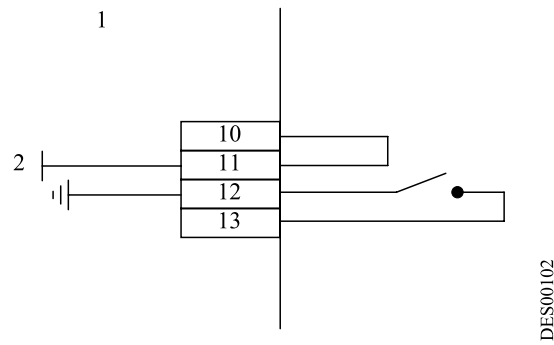
- Dry contact,
- Using external voltage between 12 and 24 Vdc [see § 4.5.3.2 page 20](#).

4.5.3.1. Dry contact. There are two possibilities:



DES00101

or :

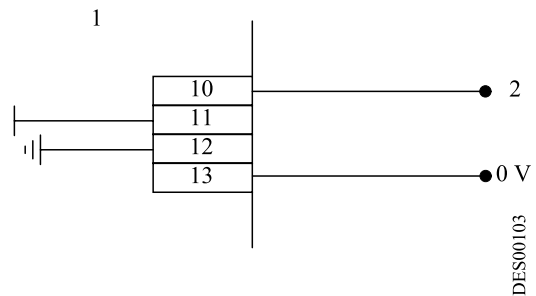


1	Inside GNM
2	+ 15 Vdc; 50 mA max
10 to 13	GNM case

4.5.3.2. Using external voltage

The external voltage is between 12 and 24 Vdc.
Input impedance roughly 1 kΩ.

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



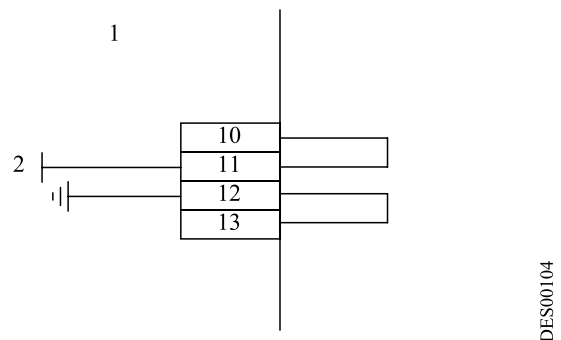
CAUTION : Inputs 10 and 13 are opto-coupled inputs. They are therefore isolated from the earth.

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 GNM
2	+ 15 Vdc; 50 mA max
10 to 13	GNM case



4.5.4. Using information relative to the faults

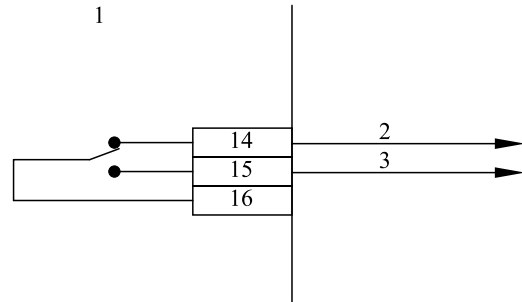
The closed contact of the OK board relay signals that the board is under voltage and that there is no fault.



CAUTION : 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 GNM
2	OK board
3	No OK board
14 to 16	GNM case

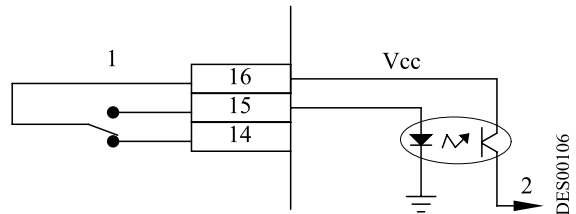
Liaison wiring with an PLC:



DES00105

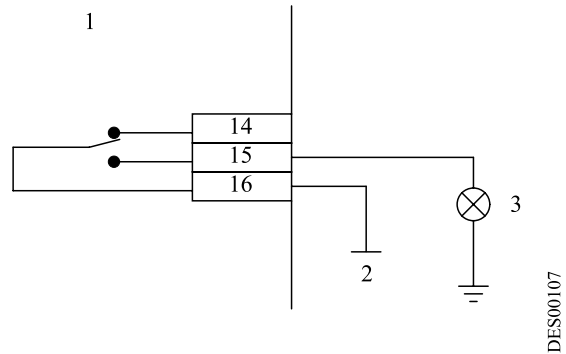
1	Inside GNM
2	PLC input
14 to 16	GNM case

Wiring of a HV fault signalling lamp:



DES00106

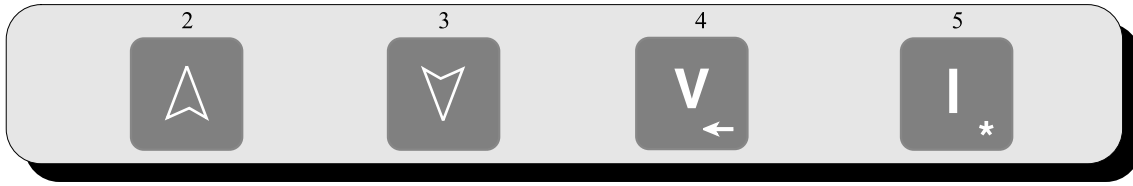
1	Inside GNM
2	220 V _{AC} oR 110 V _{AC}
3	Fault
14 to 16	GNM case



DES00107

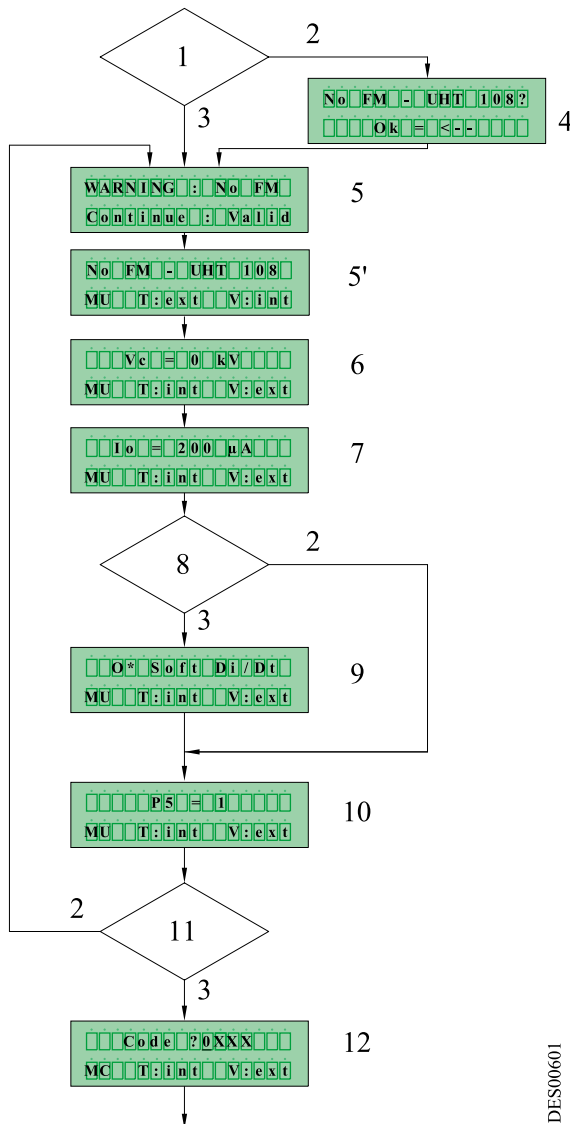
5. List of parameters

(diagrams in this chapter to be taken only as guidelines)



DES00110

Change in values of parameters (inc.) (2)	Change in values of parameters (dec.) (3)	Next screen or value validation (4)	Last screen/special function (5)
---	---	-------------------------------------	----------------------------------



1	Same high voltage unit as last start up ? no.
2	no.
3	yes.
4	After validation with key 4 V (see § 2.1 page 5), 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	Important warning
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).

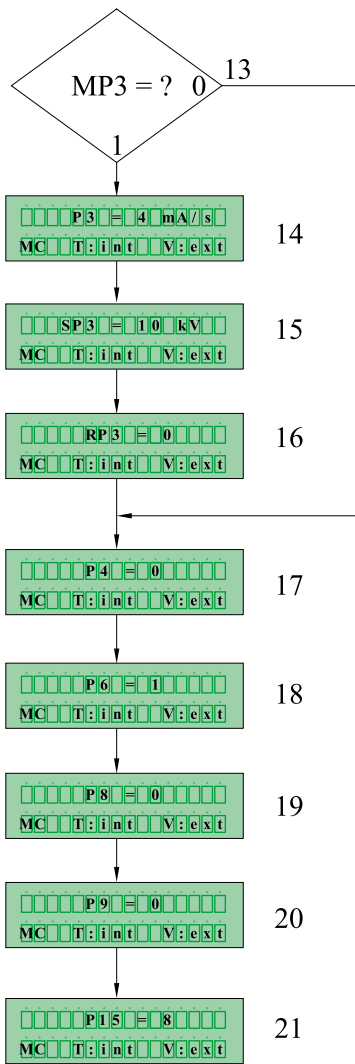
8	Is there a storage fault?
9	Display of faults, scrolling by keys 2 ▲ and 3 ▼ , cancellation with key 5 I .

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

11	Request for calibrating menu.
12	Calibrating code entry.

DES00601

Di / Dt soft function



1	MP3 = 1 Di / Dt soft programming enabled
3	MP3 = 0 Di / Dt soft programming disabled

14	Adjustment of parameter P3 .
----	-------------------------------------

15	Adjustment of parameter SP3 .
----	--------------------------------------

16	Adjustment of parameter RP3 .
----	--------------------------------------

17	Adjustment of parameter P4 .
----	-------------------------------------

18	Adjustment of parameter P6 .
----	-------------------------------------

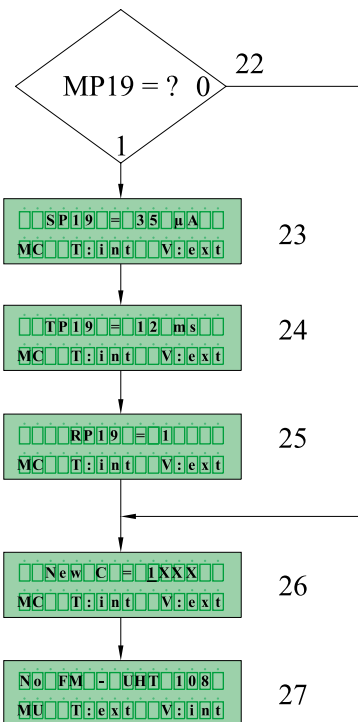
19	Adjustment of parameter P8 .
----	-------------------------------------

20	Adjustment of parameter P9 , * available only if P5 = 0.
----	--

21	Adjustment of parameter P15 .
----	--------------------------------------

DES00602

Nota: * Only applies if P5 = 0
[see § 3.2.1.3 page 8](#) Current management



22	MP19 = 1 Current management by Fault MP19 = 0 Current management by Limitation
----	---

23	Adjustment of parameter SP19 .
----	---------------------------------------

24	Adjustment of parameter TP19 .
----	---------------------------------------

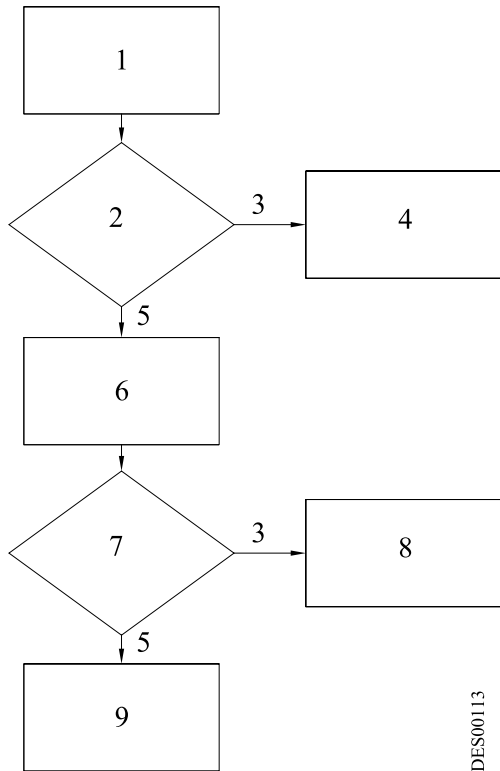
25	Adjustment of parameter RP19 .
----	---------------------------------------

26	Modify the calibrating menu code, see § 3.2.2.1 page 10 .
----	---

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

DES00603

6. Trouble shooting



1	GNM no power, display and green LED off.
---	---

2	GNM powered, display and green LED on.
---	---

3	No.
---	-----

4	Power on. GNM
---	----------------------

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

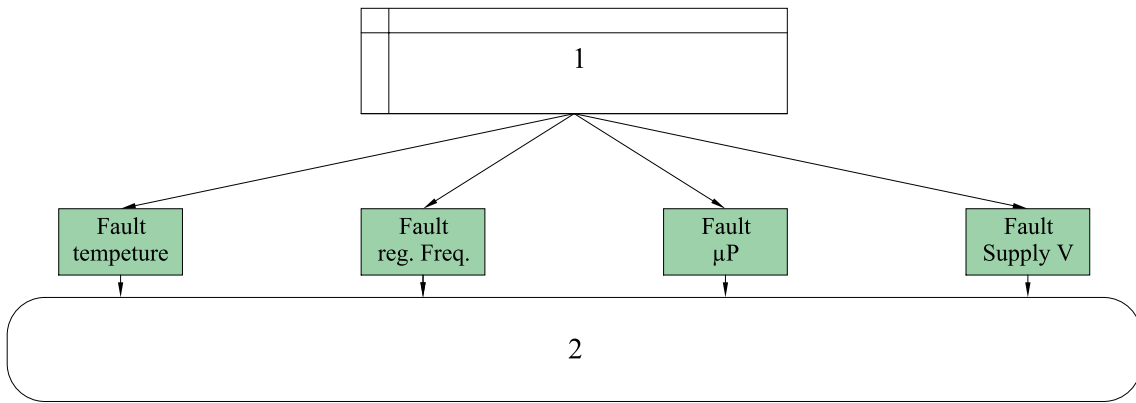
6	Turn the GNM off for a minute then on again.
---	---

7	GNM power on, display and green LED on.
---	--

8	Replace the GNM .
---	--------------------------

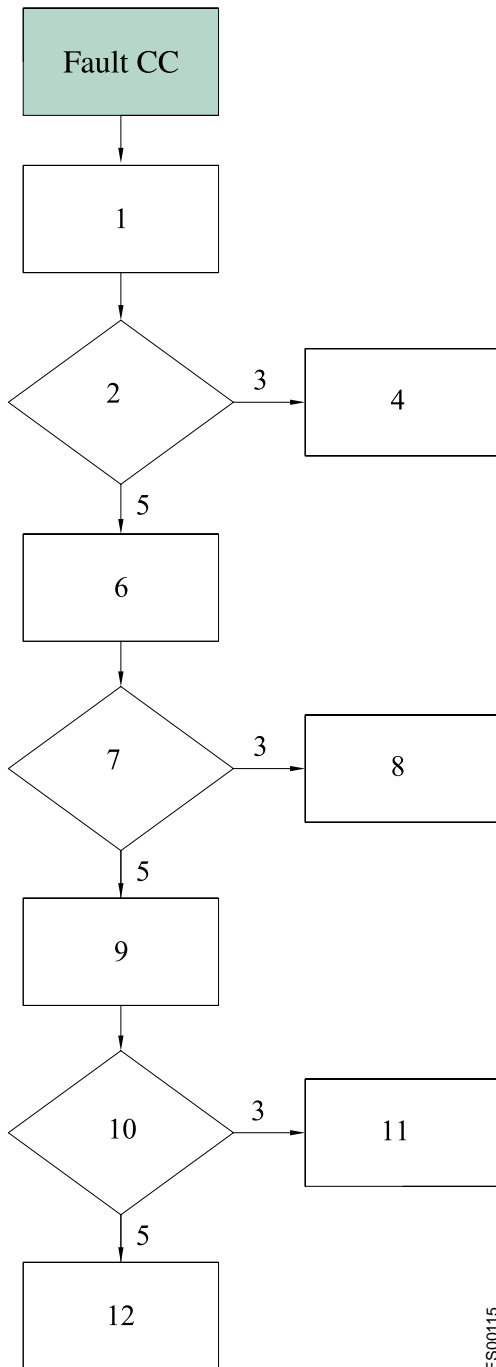
9	If an over voltage occurs, the GNM 100 -A will automatically go in to protection mode.
---	---

DES00113



DES00114

1	Major faults.
2	Replace the GNM .



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.
---	--

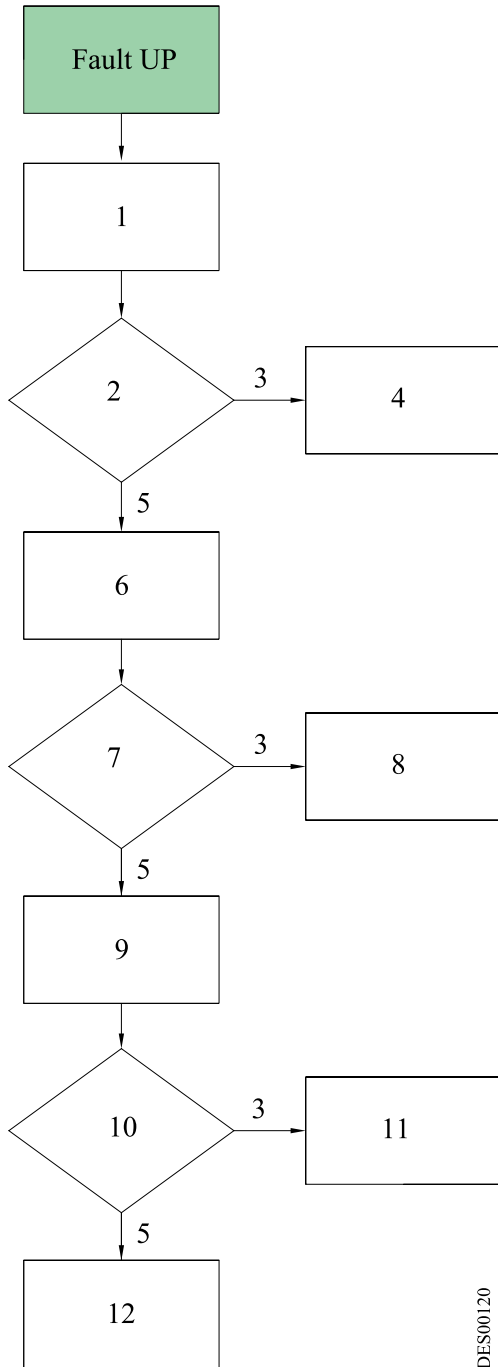
7	Problem with the connector terminals ?
8	Repair the low voltage terminals.

9	Replace the GNM .
---	--------------------------

10	GNM warning ?
11	GNM 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.

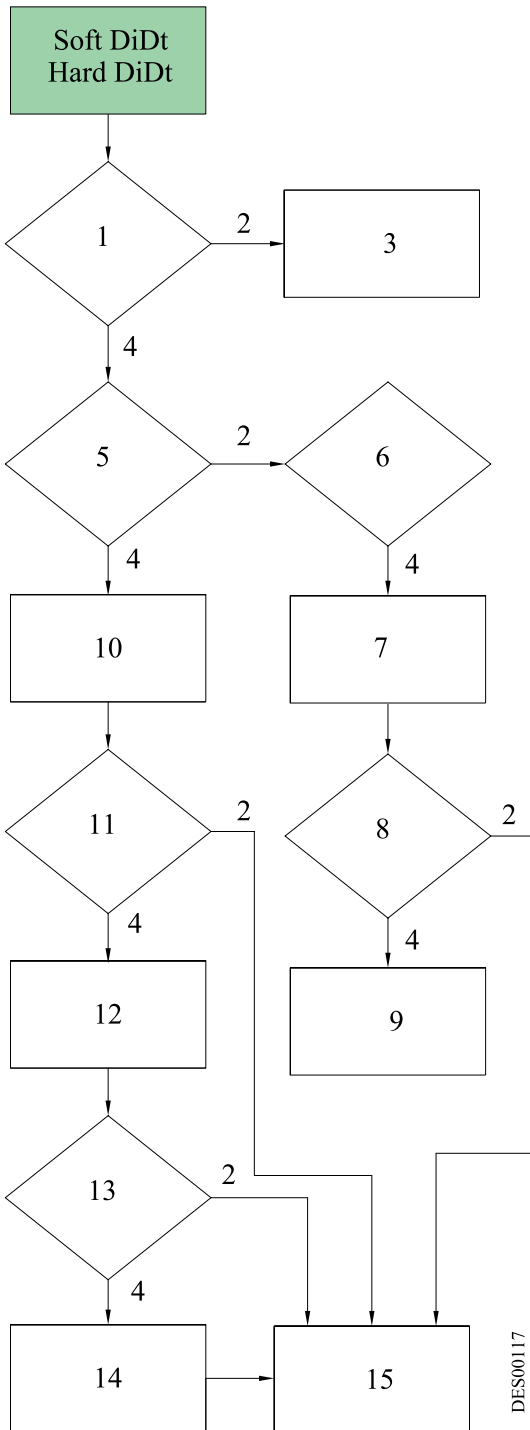
6	Check the connector low voltage terminals.
---	--

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

9	Replace GNM .
---	----------------------

10	Has the problem disappeared?
11	GNM working.

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



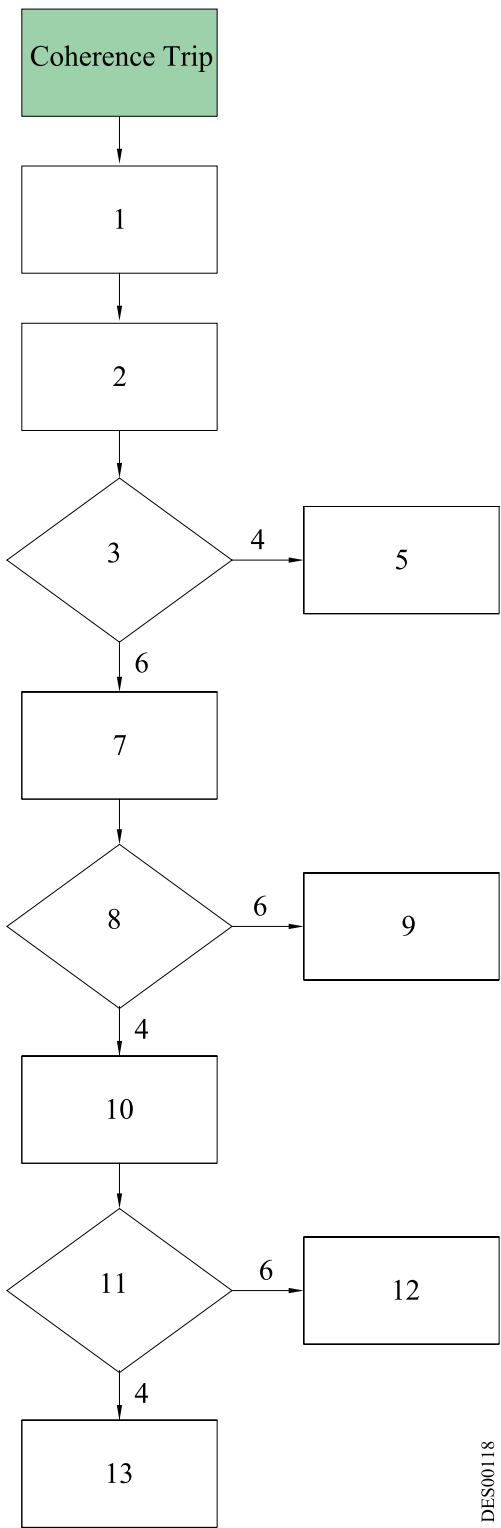
1	Target distance to close.
2	Yes.
3	Greater target distance required.
4	No.

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 P3 .

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	GNM working.



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

3	Above 20 kV difference between V_m 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.

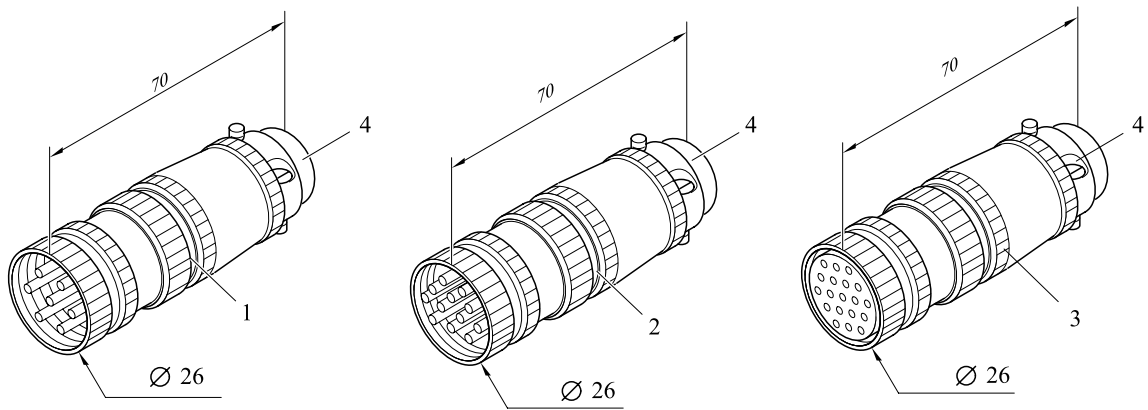
13	Replace the high voltage unit.
----	--------------------------------

DES00118

7. GNM references

Ref.	Part number	Description	Qty	Sold in units of
	1527937	GNM 100-A - US not FM metal case (110 V)	1	1
	1527746	GNM 100-A - US not FM metal case (220V)	1	1

8. Plugs



DES00121

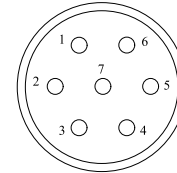
Ref.	Part number	Description	Qty	Sold in units of
1	E4PTFS316	Male plug 7 contacts	1	1
2	E4PTFS343	Male plug 12 contacts	1	1
3	E4PTFS406	Female plug 19 contacts	1	1
4	E4PTFA323	Cable clamp	1	1

9. Connecting plugs

9.1. 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).

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

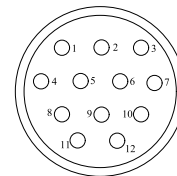


DES00597

9.2. 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

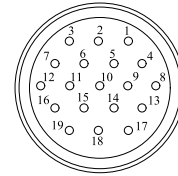


DES00595

9.3. 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 μ 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



DES00596