



User manual

GNM 200 A ($V \geq 5.90$) **Automatic mode of operation**

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GNM 200 A ($V \geq 5.90$)

Automatic mode of operation

1. Module marking	5
2. Introduction	5
3. Description	7
3.1. Presentation	7
3.2. Specifications	7
3.2.1. Electrical Input Data	7
3.2.2. Electrical Output Data	7
3.2.3. Dimensions and Weight	8
3.2.4. Connection Cable Specifications	8
4. Operating Principle	8
4.1. Automatic Selection of the HVU	8
4.2. Menus	9
4.2.1. User Menu	9
4.2.2. Configuration Menu	12
4.3. Faults	18
4.3.1. Fault Screens	19
4.3.2. HVU Data Version	20
4.3.3. Memory Chip	20
4.3.4. Check-sum	20
4.3.5. HVU Connection	20
4.3.6. Remote mode fault	20
4.3.7. "Forbidden HVU"	20
4.3.8. Network HVU fault	20
4.3.9. HVU Temp. Fault	21
4.3.10. Flt. Sht-Circuit	21
4.3.11. Fault Regulation Frequency	21
4.3.12. Fault Micro	21
4.3.13. Power Supply Voltage Fault	21
4.3.14. Memory HVU Temp. Fault	21
4.3.15. New Working HVU	21
4.3.16. Factory Datas	21
4.3.17. V Limit Trip - I Limit Trip	21
4.3.18. Coherence U fault	21
4.3.19. Dynamic Coherence	21
4.3.20. Coherence I fault	21
4.3.21. Trigger ON Fault	22
4.3.22. Analogue Setpoint	22
4.3.23. Configuration Mode	22
4.3.24. Soft Di/Dt Fault - Hard Di/Dt Fault	22
4.3.25. Current Overflow	22
4.3.26. Low Voltage Fault	22
4.3.27. Fault collision	23
4.3.28. Current consumption-related faults	23
4.3.29. Fault Management: HV performance after a type B fault	24

5. Low Voltage Connections - - - - -	26
5.1. Power Supply	26
5.2. GNM 200 Module	26
5.3. 12-pin connector (A)	26
5.4. 7-Pin Plug (C)	27
5.5. 19-pin plug (B) : I/O (Inputs /Outputs)	28
5.5.1. Analog input	28
5.5.2. Measured Voltage and Current Outputs	29
5.5.3. External Trigger Wiring	29
5.5.4. Using Fault Data	31
6. User Menu Diagram - - - - -	32
7. Request Configuration Menu Diagram - - - - -	33
8. GNM 200 References - - - - -	34
9. Connectors - - - - -	34

1. Module marking

SAMES KREMLIN Meylan France

CE 0080

GNM 200 A

P/N: 1517071, 1517070, 1517069 ou 1524481

ISSeP05ATEX032X* (for automatic electrostatic paint spraying equipment without HV cable).

ISSeP06ATEX032X* (for automatic electrostatic paint spraying equipment with HV cable).



II (2) GD

[EEx > 350mJ]

Note that the marking may contain other EC type test certification numbers, since the GNM can be used on other types of equipment.

This marking indicates that the control module must be installed in a **non-explosive atmosphere** and is a safety-related component of the atomizer/HVU assembly (installed in an explosive atmosphere) to which it is connected. The operation of the equipment is described in the atomizer user manual.

"X" indicates that a safety distance must be respected between the HV components of the atomizer and all grounded parts. The safety distance is specified in the atomizer user manual and is mandatory to ensure safe operation of the equipment.



WARNING : Customer is responsible the checking which local fire & safety standards apply for his operation.

2. Introduction



WARNING : The GNM 200 should never be installed in an explosive atmosphere. It must be installed inside a booth at least 1.5m (4.9 feet) from the nearest openings.

The GNM 200 control module controls the HV generated by an HV module. This voltage is transformed into the operating voltage known as the High Voltage Unit (HVU). The GNM 200 can only be used with SAMES KREMLIN high voltage units.

There are four different part numbers depending on:

- The voltage required: 110V or 230V
- The HVU detection types
 - Or the use of detection resistor type HVUs
 - Or the use of HVUs equipped with a detection memory integrated circuit.

The GNM 200 is a module, classified IP 20.

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 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.



WARNING :

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).

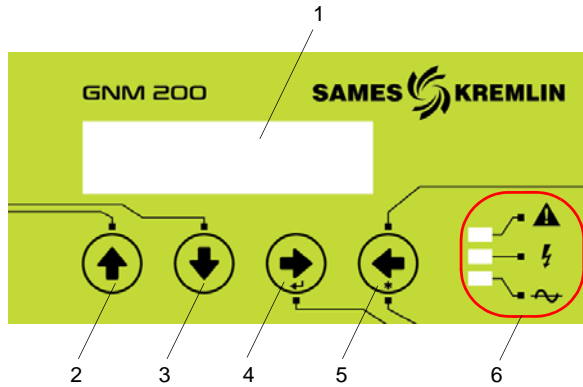
This maximum temperature depends on the supplied power, therefore on the type of HVU/ sprayer which controls the GNM.

Storage temperature: 0°C to 70°C

3. Description

3.1. Presentation

The GNM 200 control module is fitted with a microcontroller. The operating controls and function and setting keys are on the front panel, which also accommodates a 2-line display screen, 4 buttons and 3 LEDs.



1	Screen display
2	To increment setting values
3	To decrement setting values
4	Next screen / Confirm
5	Previous screen / Special function*
6	Operation LEDs

Remarks: * The special functions are described in the relevant chapters of this manual.

Description of operation LEDs

Green	GNM 200 power ON
Orange	High voltage ON (HV ON)
Red	Fault

3.2. Specifications

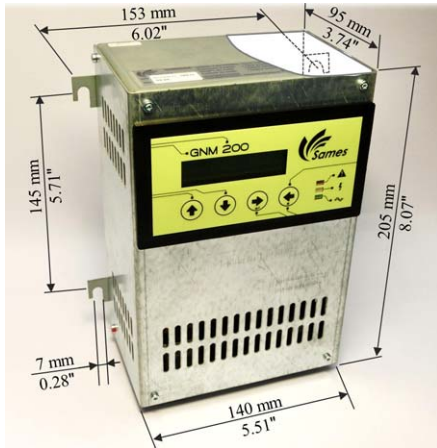
3.2.1. Electrical Input Data

Input voltage	230 VAC +/- 20 V (see § 8 page 34)
	110 VAC +/- 10 V (see § 8 page 34)
Frequency	50 Hz à 60 Hz
Max. input power for GNM 200	80 VA
Impedance 0 - 10 V	~ 15 kΩ

3.2.2. Electrical Output Data

Max. output voltage	60 V RMS
Frequency output	16-60 kHz
Max. output current	1.1 A RMS

3.2.3. Dimensions and Weight



	GNM 200
Protection factor	IP 20
Weight	2.2 kg

3.2.4. Connection Cable Specifications

A – Low voltage cable (GNM 200 to HVU)

- See the user manual of the HVU used
- 12-pin male plug ([see § 5 page 26](#)) and ([see § 9 page 34](#))

B – I/O cables (ex PLC)

- Shielded cables for the analogue signals
- 19-pin female plug ([see § 5 page 26](#)) and ([see § 9 page 34](#))

C - Cable for 7-pin connector

- Cable: no specifications
- 7-pin male plug ([see § 5 page 26](#)) and ([see § 9 page 34](#))

4. Operating Principle



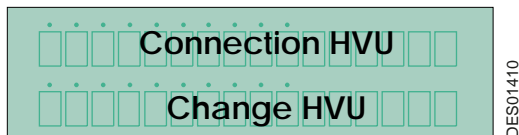
WARNING : The screens shown in this document are only given as examples

4.1. Automatic Selection of the HVU

The GNM 200 regularly checks for the presence of HVU to which it is connected.

If the HVU is disconnected, the following message appears:

At startup



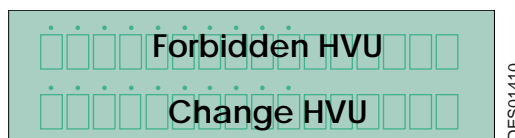
DES01410

In operation



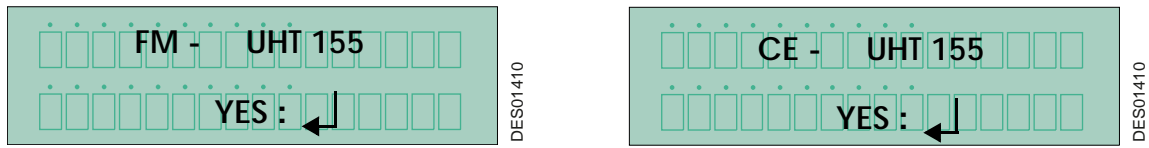
DES01410

If the program is not authorized to use HVU detection, the following message appears



DES01410

If the controller detects a new HVU family, it displays the reference of this HVU and requests confirmation.



UHT 155 is the name of the HVU. **FM** indicates that it is FM-approved and **CE** that it is CE-approved.

The display is confirmed by pressing key 4 [see § 3.1 page 7](#). After confirmation, the "factory" settings ([see § 4.2.2.14 page 17](#)) are loaded in the GNM 200:

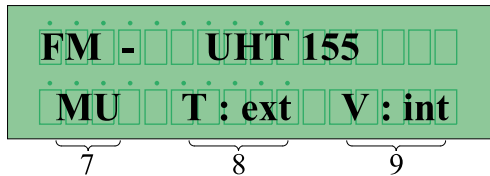
- Either by the detection memory integrated circuit of the VHU
- Or by the GNM program.

4.2. Menus

Once it has identified the HVU, the GNM 200 opens the user menu.

4.2.1. User Menu

The screen display is:



The second line of the screen shows the operating mode of the GNM 200.

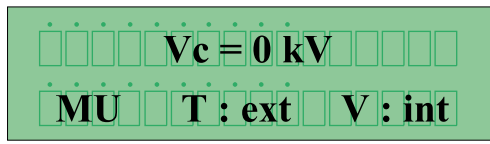
7	The module has opened the User Menu
8	T = Type of trigger: int = internal - ext = external
9	V = Voltage setpoint: int = local - ext = external

Press key 4 to scroll through the menu [see § 3.1 page 7](#)

4.2.1.1. Adjusting the Voltage Setpoint

The internal voltage setpoint is adjusted using keys 2 and 3 [see § 3.1 page 7](#)

Press key 4 to scroll through the menu [see § 3.1 page 7](#).






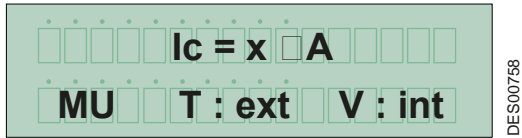
- Vc as an internal setpoint (V: int)
- Va as an external setpoint (V: ext)

If the external setpoint is used for pilot, the external setpoint is displayed.

Press key 4 [see § 3.1 page 7](#) to move to the next screen.

4.2.1.2. Adjusting the Current Setpoint (or current limitation)

The current setpoint is adjusted using keys 2  and 3 .
Press key 4 to scroll through the menu  [see § 3.1 page 7](#)






This screen display depends on the configuration of the HVU connected.



WARNING : For an installation with internal charge (solventborn or waterborn insulated circuit) the I_c setpoint must be systematically higher than I_o .

4.2.1.3. Adjusting the Current Setpoint Overflow (or current disjunction)

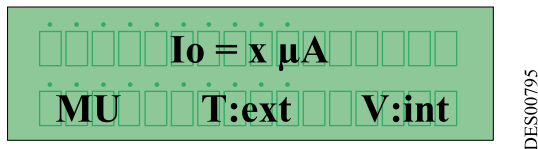
The current setpoint overflow is adjusted via keys 2  and 3 .
Press key 4 to scroll through the menu  [see § 3.1 page 7](#)

This screen display depends on the configuration of the HVU connected.





WARNING : For an installation with internal charge (solvantborn or waterborn insulated circuit) the I_c setpoint must be systematically higher than I_o .

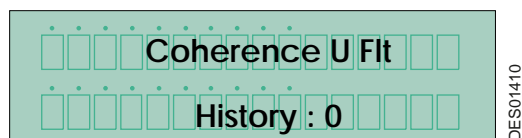
Safety: The value of this adjustment must be lower or equal to the value I_c ([see § 4.2.1.2 page 10](#)).



4.2.1.4. Display of the Last 96 Events (Faults)

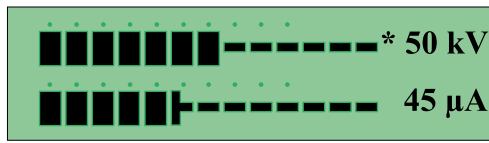
The last fault appears on the first line "History 0". The other 95 faults can be displayed by pressing key 2  or key 3  [see § 3.1 page 7](#) to scroll up or down. The fault with the lowest number is the most recent.

This screen is displayed if at least one event is recorded:



4.2.1.5. HV Voltage and Current Display when the Trigger is Activated.

If the high voltage is active, the screen displays, for example, 50 kV (voltage) and 45 μ A (current).



DES00086

The "*" sign indicates the regulation mode used by the system.

* x kV	Voltage regulation
* x μ A	Current limitation

4.2.2. Configuration Menu

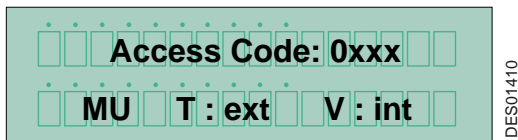


WARNING : The actions in this chapter should only be carried out by the customer's qualified personnel.






When the Configuration Menu is opened, the high voltage switches off. If no key is pressed for more than one minute, user mode is automatically restored and all the settings that have been changed are stored.

The Configuration Menu is used to access GNM 200 parameter setting. A 4-figure code is required to enter the menu. The "FACTORY CODE" is "1111".

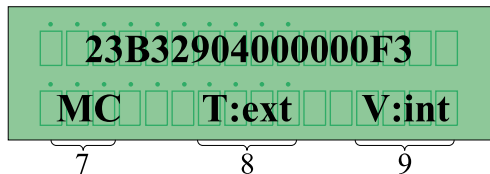
To access the Configuration Menu, press keys 4  and 5  [see § 3.1 page 7](#) simultaneously until the following screen appears:



4.2.2.1. Code Entry

The first figure can be scrolled up or down using keys 2  and 3  [see § 3.1 page 7](#). Select by pressing key 4  [see § 3.1 page 7](#), then go onto the next figure, etc. To correct a mistake, press key 5 . Press key 4 to confirm the code  [see § 3.1 page 7](#). Once the code is correctly entered and confirmed, the program opens the "Configuration Menu" and displays:

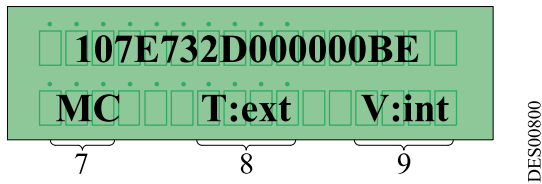
4.2.2.2. HVU with detection memory



7	The module has opened the Configuration Menu
8	T = Type of trigger: int = internal - ext = external
9	V = Voltage setpoint: int = local - ext = remote

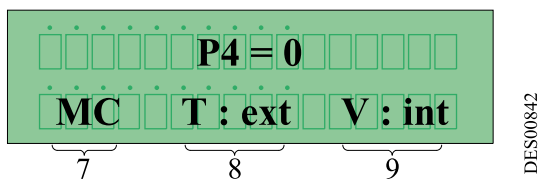
This screen is only available on HVUs with a memory chip. Each chip has an individual production number (16 hexadecimal characters). The HVU characteristics are stored in this memory. (The number above is only an example: it is different for each HVU).

4.2.2.3. HVU with detection memory and temperature sensor



This screen is only available on HVUs with a memory chip and a temperature sensor. Each chip has an individual production number (16 hexadecimal characters). The GNM 200 analyses the data continuously in order to monitor temperature changes and check that protection devices operate (for example, if the HVU temperature exceeds its maximum setpoint). (The number above is only an example: it is different for each HVU).

4.2.2.4. Parameter – P4 : Acknowledgement Mode



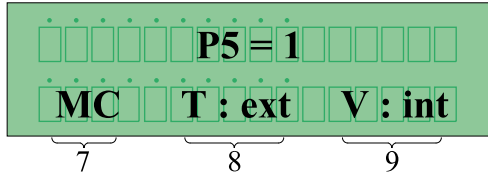
Parameter P4 defines the acknowledgement mode for a type B fault ([see § 4.3.1 page 19](#)).

P4 = 0	The fault is acknowledged on the trailing edge of the trigger.
P4 = 1	The fault is acknowledged on the leading edge of the trigger.

4.2.2.5. Parameter – P5 : Type of Trigger



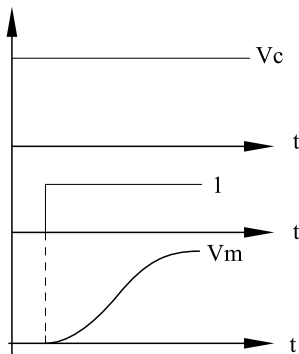
WARNING : This parameter is factory set to 1 (external trigger). This inhibits the HV supply while a voltage setpoint is active and there is no external gate signal



DES00834

This parameter defines how the high voltage is triggered:

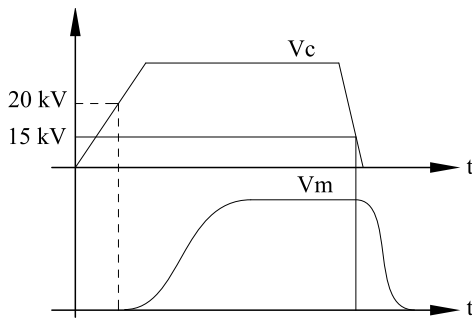
- **P5 = 1 "external" trigger.** This operating mode covers most types of use. The HV supply is triggered by a digital On/Off input. (12 or 24 V dry contact, depending on connection, [see § 5 page 26](#) for wiring diagrams).



DES0089

1	Trigger
Vc	Voltage setpoint
Vm	Voltage return

- **P5 = 0 "internal" trigger.** The high voltage is only activated if the setpoint is greater than 20kV and will switch off when the setpoint value is less than 15 kV.



DES0088

Vc	Voltage setpoint
Vm	Voltage return



WARNING : Before setting this parameter to "0", you must make sure that it corresponds to the operating mode being used; otherwise the HV supply will be delivered through the voltage setpoint rather than the trigger.

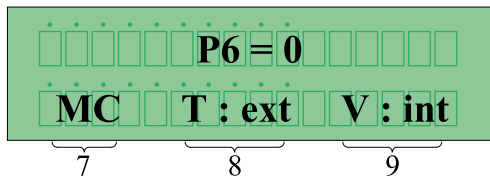
If necessary, refer to the electrical drawing of the system to check that there is no external trigger.

Only certain systems such as used in the automobile industry use a dedicated program with an internal trigger and analogue setpoint management.

A configuration error will generate a trigger fault message. Trigger closed on power-up or simultaneous presence of the internal and external triggers.

4.2.2.6. Parameter – P6: Internal/External Voltage Setpoint

This parameter defines the voltage origin and setpoint.

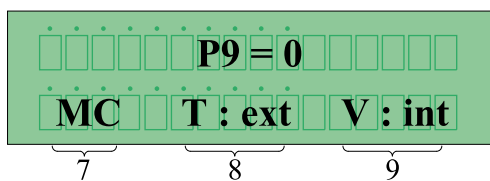


P6 = 1	External voltage setpoint
P6 = 0	Internal voltage setpoint

The external setpoint corresponds to the signal on the dedicated analogue input of the GNM 200. This external setpoint must be wired to the GNM 200, (see § 5.5.1 page 28 wiring chapter) and is transmitted by a PLC or other device. The front panel can no longer be used to adjust the setpoint and displays the setpoint read on the analogue input. The factory settings impose the internal setpoint by default.

4.2.2.7. Parameter P9: Resetting a fault using the external trigger input

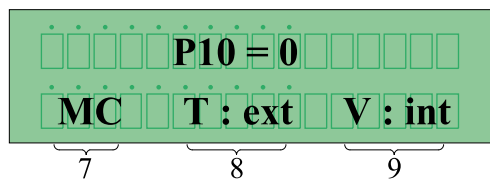
This parameter is available if the internal trigger is active (P5=0).



This parameter is used to reset a fault using the external trigger input instead of the internal trigger (see § 4.3.29.2 page 25).

4.2.2.8. Parameter P10: Type of Analogue Input

This parameter is only available if P6=1.



This parameter is used to calibrate the external setpoint signal on the analogue input.

The type of analogue input is selected from the following 3 possibilities:

0	Voltage (0-10V)
1	Current (0-20mA)
2	Current (4-20mA)

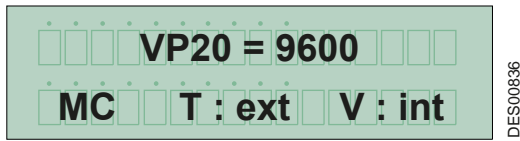
Connector B selects the voltage input or the current input from 2 possibilities:

Voltage	Pin 6 of B connector
Current	Pin 4 of B connector

4.2.2.9. Remote Mode

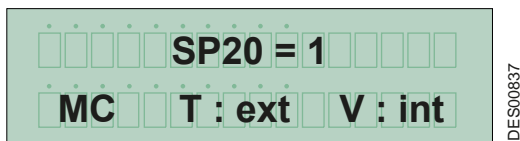
The GNM 200 can be controlled and monitored remotely via an RS232 serial link. This RS232 link has the following format: 8 data bits, 1 stop bit, no parity.

- Parameter VP20: RS232 Transmission Rate



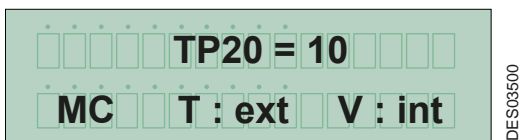
The serial link is independent of the HVU connected. It has a factory setting of 9600 bauds. It can be set at 1200 – 2400 – 4800 – 9600 – 14400 – 19200 – 38400 bauds.

- Parameter SP20: RS232 Recognition Number (Slave)



The GNM 200 recognition (slave) number for serial link management can be from 1 to 30. For the protocol contact SAMES KREMLIN.

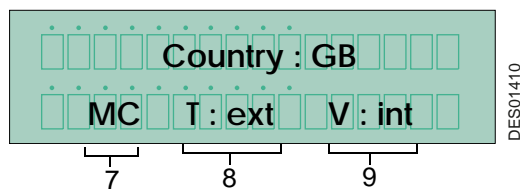
- Parameter TP20 : Time Out



Time Out: maximum time limit to detect a communication failure in Remote mode.

4.2.2.10. Display Language

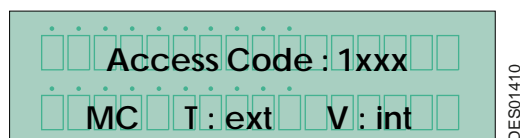
The GNM 200 display language can be changed. The available languages are:



US	English (US)
GB	English (GB)
FR	French
DE	German
ES	Spanish
PT	Portuguese
IT	Italian



4.2.2.11. Configuration Menu Code

This screen is used to display and modify the code for opening the Configuration Menu:



Follow the procedure described in [see § 4.2.2.1 page 12](#).

4.2.2.12. Return to the User Menu



It is possible to return to the User Menu from any point of the Configuration Menu. To do so, press keys 4  and 5  [see § 3.1 page 7](#) simultaneously until the User Menu appears. ([see § 4.2.1 page 9](#))

4.2.2.13. Return to Factory Settings



WARNING : This operation must only be performed by a qualified and authorized person. It is essential to make sure that this action will not affect the operation of the installation. All values that have been changed will be replaced by the factory settings. The former values are permanently erased and the system may become unoperational.

Return to the factory settings is only possible when the GNM 200 is started up.

Press keys 4  and 5  [see § 3.1 page 7](#) simultaneously until the message "Factory settings" appears.

4.2.2.14. List of Parameters

For the GNM 200 control modules

Symbol	Meaning	Setting range	Factory Setting
Access code	Access code for the various menus	0000 to 9999	1111
Country	Languages	US - GB - FR - DE - ES - PT - IT	US
P4	Acknowledgement mode	0 / 1	0
P5	Type of trigger	0 / 1	1
P6	Type of analogue signal	0 / 1	0
P9	Acknowledgement by external trigger (if P5=0)	0 / 1	0
P10	Type of analogue setpoint (if P6 = 1)	0 to 2	0
VP20	RS232 serial link speed	1200/38400	9600 Bauds
SP20	RS232 recognition (slave) number	1 to 30	1
TP20	Time Out remote mode (slave)	0 to 60	10 s

For the memory GNM, the factory parameters depend on the HVU rather than on the GNM.

4.3. Faults

The latest fault is displayed as soon as it occurs.

The high voltage is cut whenever a fault occurs.

Note: When the red LED is lit, this indicates a system fault. The screen displays a message that must be deleted by pressing key 4 ➡ [see § 3.1 page 7](#) to acknowledge that the fault message has been read and validated and the system reset. Otherwise, the message will be displayed each time the HV is switched off.

There are three types of fault: Startup faults, type A faults and type B faults.

- Startup faults can be reset by switching the mains power supply to the GNM 200 OFF then ON again.
- Type B faults can be reset by switching a trigger ON/OFF. Pressing key 4 ➡ [see § 3.1 page 7](#) only confirms that the message has been read.
- To reset after a type A fault:
 - 1 - the trigger must be switched OFF
 - 2 - the mains power supply to the GNM 200 must be switched OFF/ON
 - 3 - the trigger must be switched ON



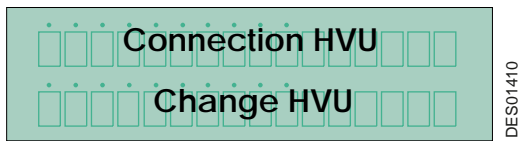
WARNING : for an internal trigger [see § 4.2.2.5 page 14](#).

4.3.1. Fault Screens

For the meaning of the fault [see § 4.3.2 page 20](#) to [see § 4.3.29 page 24](#)

Startup faults:

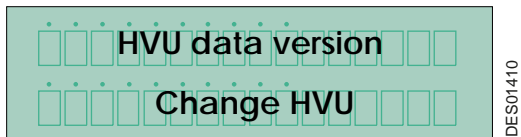
If HVU is disconnected, the following message appears:



For the memory HVU, the faults in the table below may appear at startup.

HVU data version	Wrong version of the data
No memory chip	Memory chip not programmed
Check-summ	Check-summ incorrect
Forbidden HVU	The HVU is unusable on this system.
Network HVU FLT	Serial link problem

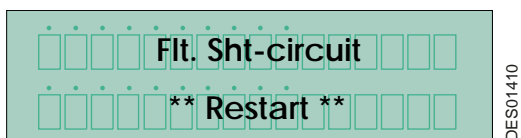
For example, the following message is displayed:



Type A faults:

Supply Temperat.	Unit temperature too high
Flt. Sht-Circuit	Short circuit on low voltage output
Fault Regul Freq	Frequency regulation problem
Fault micro	Microcontroller fault
Fault supply	Problem in the power electronics
Connection HVU	HVU connection fault
Remote Fault	RS 232 Serial link failure

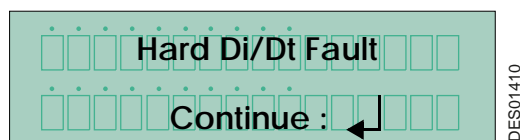
For example, the following message may be displayed



Type B faults:

HVU Temp. Fault	HVU temperature greater than permitted temperature
New Working HVU	New family of HVU connected
Factory Datas	Return to factory data
V Limit Trip	Circuit breaking fault ($V > V_{max}$ of HVU) see § 4.3.23 page 22
I Limit Trip	Circuit breaking fault ($I > I_{max}$ of HVU)
Coherence U Fault	Deviation too great between the model and the measured voltage.
Dyn. Coherence	Dynamic coherence error
Coherence I Fault	No current return to the GNM.
Trigger ON Fault	Trigger closed on startup of the GNM 200
Analog Value Flt	Value reading on analogue input with $P6 = 0$
Calibration Mode	Trigger closed in configuration mode
Soft Di/Dt Fault	Current increase too fast
Hard Di/Dt Fault	Current increase too fast
I Overflow Fault	Current measured greater than permitted current
Low Voltage Flt	Voltage measured less than the permitted low voltage
Fault collision	Current increase too fast starting from a current threshold.

For example, the following message may be displayed:



4.3.2. HVU Data Version

The "**HVU Data Version**" fault is activated when a new HVU is detected and the data version contained in the memory chip has not been updated for the GNM 200 program.

4.3.3. Memory Chip

The "**No memory chip**" fault is activated when the HVU memory chip is not programmed.

4.3.4. Check-sum

The "**Check-sum**" fault is activated when the HVU parameter check is not consistent with the GNM 200 check.

- *Interference in LV cable*

4.3.5. HVU Connection

The GNM 200 continuously checks that the HVU is connected. If it detects disconnection, the GNM 200 displays "**Connection HVU**".

- *LV cable fault or connection fault*

4.3.6. Remote mode fault

No action during time TP 20.

4.3.7. "Forbidden HVU"

The "**Forbidden HVU**" fault means that the HVU is incompatible with the GNM version being used.

4.3.8. Network HVU fault

On startup of the GNM, problem of data recovery.

- *Interference, communication problem.*

4.3.9. HVU Temp. Fault

The GNM 200 is fitted with a temperature sensor that activates a fault if the temperature inside the casing is greater than 70 °C / 158° F.

- *GNM fault or cabinet temperature too high.*

4.3.10. Flt. Sht-Circuit

This message is generated by the power electronic system. It indicates a current excess at the GNM output.

- *Cable or HVU fault.*

4.3.11. Fault Regulation Frequency

The GNM 200 optimises the power supplied to the HVU by tuning the HVU operating frequency. This fault appears if the GNM 200 cannot obtain the frequency tuning.

- *HVU fault.*

4.3.12. Fault Micro

This message appears if the microcontroller is in fault status.

- *GNM fault.*

4.3.13. Power Supply Voltage Fault

The GNM 200 monitors the power supply voltage and current from the power electronics. If it becomes too great, the GNM 200 displays "**Fault supply**".

- *GNM fault.*

4.3.14. Memory HVU Temp. Fault

The HVU temperature reading is in excess of the permitted temperature threshold.

- *HVU fault or cabinet temperature too high.*

4.3.15. New Working HVU

This message indicates that the GNM 200 is working with a new HVU that does not belong to the same family as the HVU previously used.

4.3.16. Factory Datas

This indicates that an operator has forced the factory settings during GNM 200 power-up.

4.3.17. V Limit Trip - I Limit Trip

This fault message appears if there is excessive voltage or current on the HVU.

- *Permanent faults: LV cable fault, connection fault, VHU not compatible.*

- *Transient faults: LV cable damaged (causing power transients) or interference in LV cable.*

4.3.18. Coherence U fault

This fault indicates a discrepancy (20 kV – factory setting) between the design HV value calculated by the GNM 200 and the actual voltage measured on the VHU .

- *Permanent faults: LV cable or VHU fault.*

- *Transient faults: ON/OFF/HV ON cycle too fast*

4.3.19. Dynamic Coherence

The GNM 200 has detected too much deviation between the power command and the high voltage applied to the HVU.

- *LV cable fault, a connection fault, or an unoperational HVU.*

4.3.20. Coherence I fault

The GNM 200 does not detect the current from the HVU:

- *LV cable or connection fault*

4.3.21. Trigger ON Fault

Two cases:

If the trigger is closed on startup of the GNM 200, the "**Trigger ON Fault**" fault is displayed.

For safety reasons, the GNM inhibits this operating mode

If the GNM is in internal trigger mode (P5 =0) without external resetting (P9 =0) and it receives a signal on the input of the external trigger, the message "**Trigger ON Fault**" is generated: trigger conflict.

- Check for trigger configuration errors ([see § 4.2.2.5 page 14](#))
- Check to ensure that the process activates the gate AFTER the power is switched on; otherwise, you must modify the process.

- *In the case of interference, check the LV cable shielding (see the HVU operating manual).*

4.3.22. Analogue Setpoint

The GNM 200 displays "**Analog Value Fit**" when there is an external setpoint on the analogue input despite the setpoint being set to internal (P6=0).

- *Bad configuration or incorrect action.*

4.3.23. Configuration Mode

This message indicates that the trigger is closed during the configuration phase.

Note: the high voltage is inhibited in calibration mode.

- *Incorrect action.*

4.3.24. Soft Di/Dt Fault - Hard Di/Dt Fault

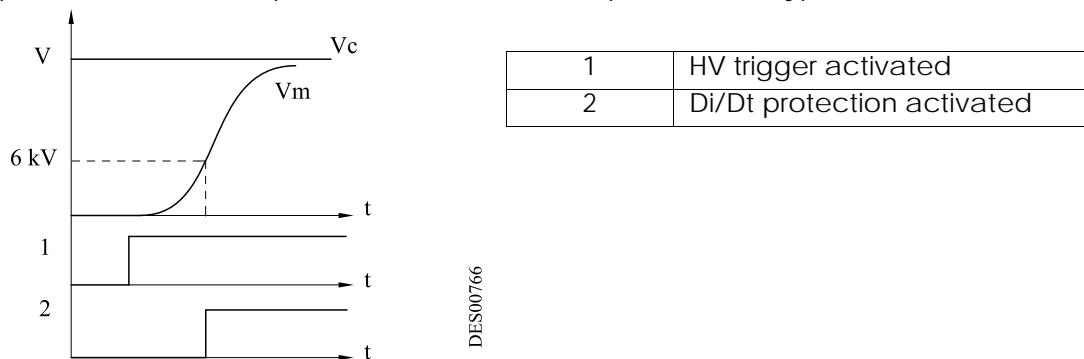
The Di/Dt detects excessive current variations. The GNM 200 is designed with two Di/Dt check systems - [see § 4.3.28 page 23](#).

The first Di/Dt check is controlled by an external analogue circuit. When the value exceeds 50mA/s, the GNM 200 displays "**Hard Di/Dt Fault**".

The second Di/Dt check is controlled by the software. When the value exceeds a programmed threshold, the GNM 200 displays "**Soft Di/Dt Fault**".

A factory-configured minimum voltage threshold (e.g. 6 kV) has to be repositioned before the internal Di/Dt protection device can operate.

The application of this Di/Dt protection device can depend on the type of HVU.



4.3.25. Current Overflow

The GNM 200 checks that the HVU current measurement is less than the programmed threshold.

If it is not, the GNM 200 displays "**I Overflow Fault**". [see § 4.3.28 page 23](#).

4.3.26. Low Voltage Fault

If, in current limitation, the voltage drops below a given threshold, a fault is generated.

This fault can appear in two cases:

- The system is designed to work in current limitation (never in internal charge).
- The setpoint is lower to the threshold, when the current reaches I_o, the fault can be either "Overflow current", either "Low voltage".

- *LV cable fault or [see § 4.3.28 page 23](#).*

4.3.27. Fault collision

The application of this protection depends on the type of HVU, that corresponds to the detection of

Di/Dt higher than a current threshold (60mA).

- *Proximity between the atomizer and the ground (piece,...).*

4.3.28. Current consumption-related faults

- Di/Dt Int. - Di/Dt Ext. fault - Fault collision.
- Overcurrent or undervoltage

The various UHT have maximum characteristics of tension and current which belong to them. The factory parameters limitation and disjunctions of current are regulated with this nominal value of current.

The current consumption depends on a certain number of specific factors to each installation. It is recommended to adjust the threshold of release of the current to a value slightly higher than maximum consumption under normal operation, so as to very detect over-current which could be prejudicial with safety.

Disjunction:



WARNING : The effectiveness of the overcurrent protection (di/dt) must be checked every day. This check must be performed in a non-explosive atmosphere. It consists in moving a metal part close to the air spray gun electrode while it is under power. The operator must be connected to ground. The control module must indicate a fault.



WARNING : Any reduction in the sensitivity of the parameters of safety harms safety.



WARNING : If tripping occurs due to a power consumption problem, it is essential to locate the cause of the problem and take corrective action to prevent re-occurrence.

The causes can come from various reasons of which:

- Proximity of the part of the atomizer (random positioning or swinging of the part to be painted, trajectory of the robot...).
- Power consumption of the different paint circuits (either check the paints and solvents resistivity or change the settings).
Nota: The voltage potential of the paint lines upstream the air spray guns is distributed in proportion to the distance between ground point (0 kV) and the air atomizer HV supply.

When using flammable products, it is necessary to inhibit the HV supply from reaching the power, feed and dump systems, in order to confine the HV supply to within the machines. For this purpose, it is essential to ground the product pipes as near as possible to the air spray guns and in the paint booths. The recommended linear clearance is 2 m. For products with lower resistivity requiring a clearance of more than 2 m, please contact SAMES KREMLIN.

- Cleanliness of the atomizers (in particular when using conducting paints).
- The condition and cleanliness of the dumps.

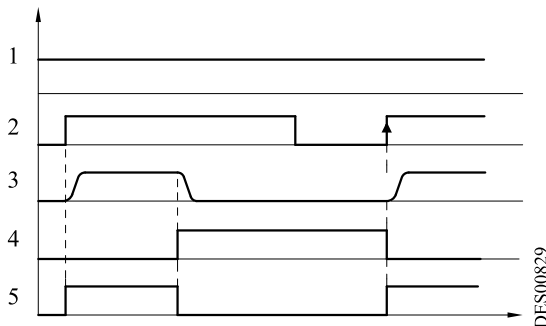
- The HV strength of the conducting particles in metallic paints (the use of a coil will improve the HV strength).
- Insulation fault in insulating materials (hoses – paints or solvents and the ground connection; insulation between HV cable core and semi-conductor).
- Incorrect grounding of the HV cable semi-conductor, or metal parts that have not been grounded, causing near-field ESD and ESC.
- Bad high voltage contact (ex too short length of the high voltage cable in the well of the HVU...).
- Non respect of the procedures of preventive maintenance (dielectric grease recommended by SAMES KREMLIN, in particular on HV connections, well of the HVU...).
- Of water condensation (On the cover of the atomizer or in the hoses of air...).
- Not-cleanliness of the quick disconnect plate of the atomizers.
- ...

4.3.29. Fault Management: HV performance after a type B fault

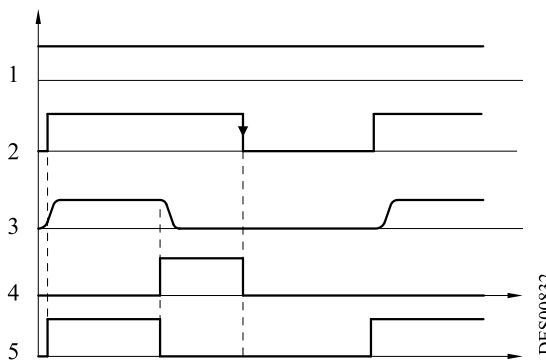
4.3.29.1. External Trigger (P5 = 1)

1	Voltage setpoint adjustment
2	External trigger
3	POWER OFF
4	Fault
5	Trigger image

If P4 = 1



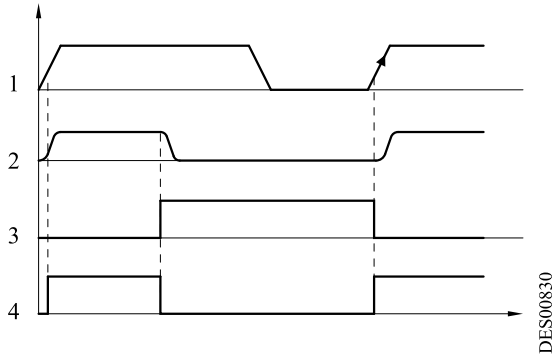
If P4 = 0



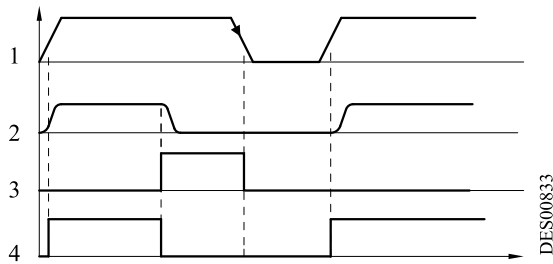
4.3.29.2. Internal Trigger (P5 = 0)

1	Voltage setpoint adjustment
2	POWER OFF (= internal trigger)
3	Fault
4	Trigger image

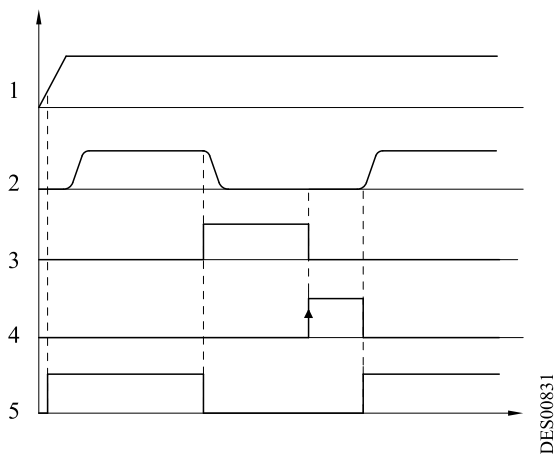
If P4 = 1 and P9 = 0



If P4 = 0 and P9 = 0



If P9 = 1 (P4 = 0 or 1)



1	Voltage setpoint adjustment
2	OFF (= internal trigger)
3	Fault
4	External acknowledgement
5	Trigger image

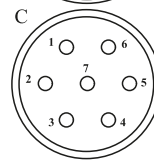
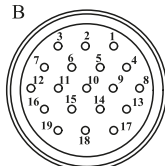
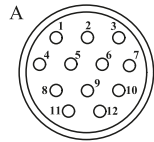
5. Low Voltage Connections

5.1. Power Supply

The GNM 200 can be connected to a power supply of 230 V or 110V, 50 Hz or 60 Hz.

Note: The voltage value is shown on the GNM 200.

5.2. GNM 200 Module

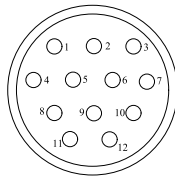


DES01601

A	12-pin plug (HVU)
B	19-pin plug (PLC)
C	7-pin plug (atomizer)

5.3. 12-pin connector (A)

Connection to the HVU

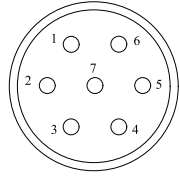


DES00595

Pin no.°	Signal
1	Ground
2	Input + photocoupler
3	+ 15 V, 50 mA protected power supply
4	0 V power supply
5	Input - photocoupler
6	HVU recognition (0 V)
7	HVU recognition (signal)
8	Shield
9	HVU transformer
10	HVU transformer
11	HVU current return
12	HVU voltage return

5.4. 7-Pin Plug (C)

Indicates the gate status (HV On).



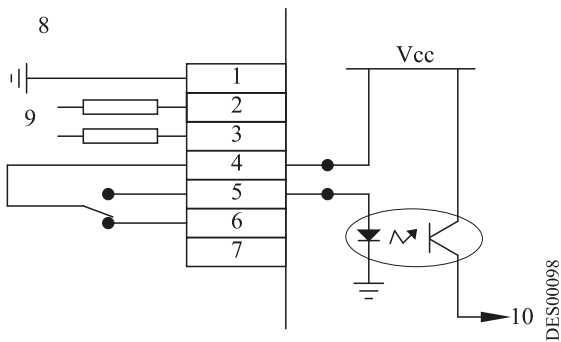
DES00597

Pin number	Signal
1	Ground
2	Phase 1, protected output
3	Phase 2, protected output
4	Common pin for trigger image relay
5	Normally open contact for trigger image relay
6	Normally closed contact for trigger image relay
7	Not connected
	Interrupting rating of the relay: 30 V DC/ 250 VAC - 5A



WARNING : If relays are used under 110 or 220 V, the coating of low-level contacts will be destroyed. It will be impossible to use them with a PLC in this condition.

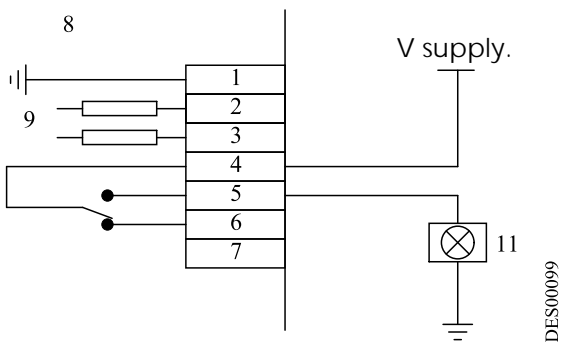
PLC wiring example:



DES00098

1 to 7	GNM 200 terminal block
8	Inside GNM 200
9	Primary power supply output protected by fuses
10	PLC input

Wiring of an "HV ON" indicator lamp,

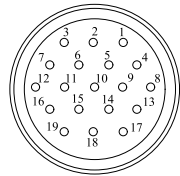


DES00099

1 to 7	GNM 200 terminal block
8	Inside GNM 200
9	Primary power supply output protected by fuses
11	HV ON

5.5. 19-pin plug (B) : I/O (Inputs /Outputs)

Connection to a PLC:



DES00596

Pin Number	Signal
1	Ground
2	Not connected
3	Not connected
4	4 / 20 mA or 0 / 20 mA analog input
5	0 V analogue input
6	0 / 10 V analogue input
7	Measured voltage analogue output (100 kV = ~ 3.5 V)
8	0 V analogue output
9	Measured current analogue output (100 µA = ~ 1.7 V) (500 µA = ~ 4.5 V for the HVU 208)
10	Input + photocoupler
11	+ 15 V, 50 mA max. protected power supply
12	0 V power supply
13	Input - photocoupler
14	Normally open contact, PCB OK relay
15	Normally closed contact, PCB OK relay
16	Common, PCB OK relay
17	0 V, RS232 serial link
18	RxD, RS232 serial link
19	TxD, RS232 serial link
	Interrupting rating of the relay: 30 V DC/ 250 VAC - 5A

The ground connection and 0 V are made via the PCB.

5.5.1. Analog input

The external setpoint can be wired using a current signal (4-20 mA), or a voltage signal (0-10 V).

5.5.1.1. 4-20 mA Setpoint

Scaling is carried out inside the GNM 200.

20 mA corresponds to 100 kV. For an HVU with a maximum voltage of less than 100 kV, the setpoint is automatically clipped to its maximum value.

5.5.1.2. 0-10 V Setpoint

Scaling is carried out inside the GNM 200.

10 mA corresponds to 100 kV. For an HVU with a maximum voltage of less than 100 kV, the setpoint is automatically clipped to its maximum value.

5.5.2. Measured Voltage and Current Outputs
 These outputs are not calibrated inside the GNM 200.

5.5.2.1. Measured Voltage Output

The scale of the measured voltage is 3.5 V for 100 kV. The minimum impedance of the measuring equipment must be 50 kΩ.

5.5.2.2. Measured Current Output

The scale of the measured current is 1.7 V for 100 μA, 4.5 V for 500 μA for one UHT 208. The minimum impedance of the measuring equipment must be 50 kΩ.

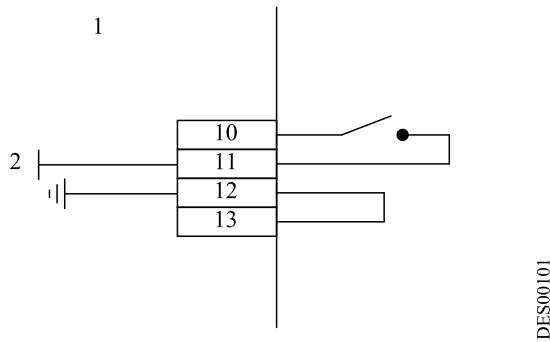
5.5.3. External Trigger Wiring

The external trigger command can be generated in two ways:

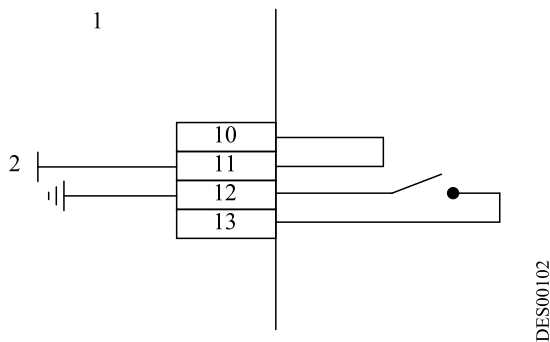
- By dry contact (recommended wiring layout),
- Using the external voltage between 12 and 24 VDC ([see § 5.5.3.2 page 30](#)).

5.5.3.1. Dry Contact. Two possible cases:

1	Inside the GNM 200
2	+ 15 VDC, 50 mA max
10 to 13	GNM 200 terminal block

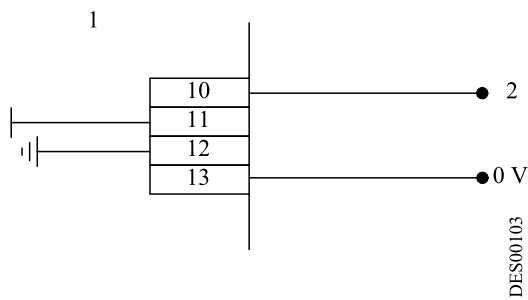


or:



5.5.3.2. Using the External Voltage

The external voltage must be between 12 and 24 VDC.
The impedance of this input is approximately 1 k Ω .



0 V	12 to 24 V power supply return
1	Inside the GNM 200
2	+ 12 to 24 VDC
10 to 13	GNM 200 terminal block



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

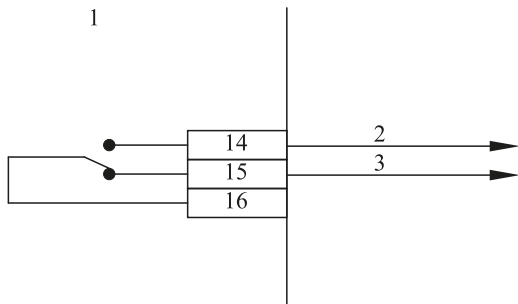
Check that the 0 V of the 12 to 24 VDC power supply is at a potential close to the ground potential.

5.5.4. Using Fault Data

The dry contact of the PCB OK relay indicates that the PCB is energised and that there are no faults.



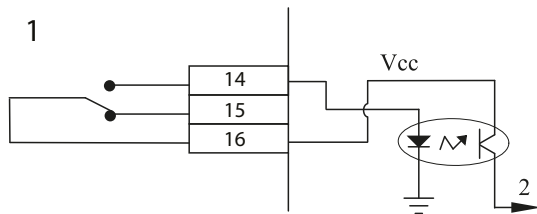
WARNING : If relays are used under 110 or 220 V, the coating of contacts for low-level use will be destroyed. It will be impossible to use them with a PLC in this condition.



1	Inside the GNM 200
2	PCB OK
3	PCB not OK
14 to 16	GNM 200 terminal block

DES00105

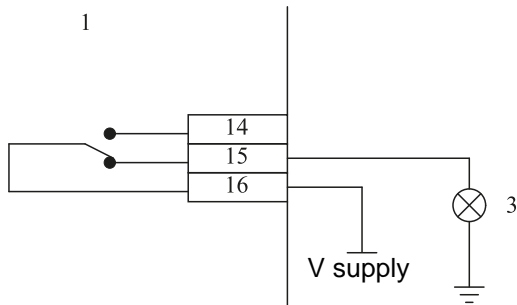
PLC link wiring:



1	Inside the GNM 200
2	PLC input (PCB OK)
14 to 16	GNM 200 terminal block

DES00106

Wiring of an "HV Fault" indicator lamp,

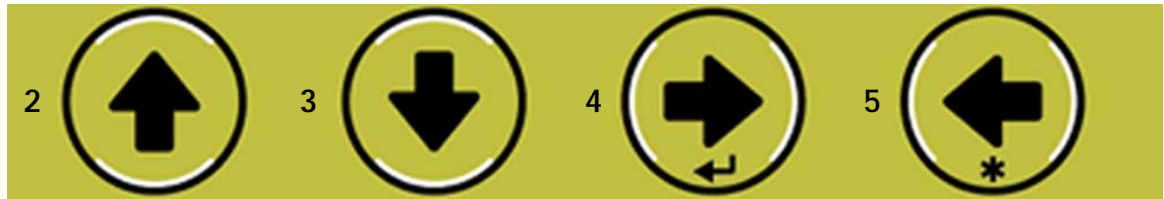


1	Inside the GNM 200
3	Fault (PCB not OK)
14 to 16	GNM 200 terminal block
	Interrupting rating of the relay: 30 V DC/ 250 VAC - 5A

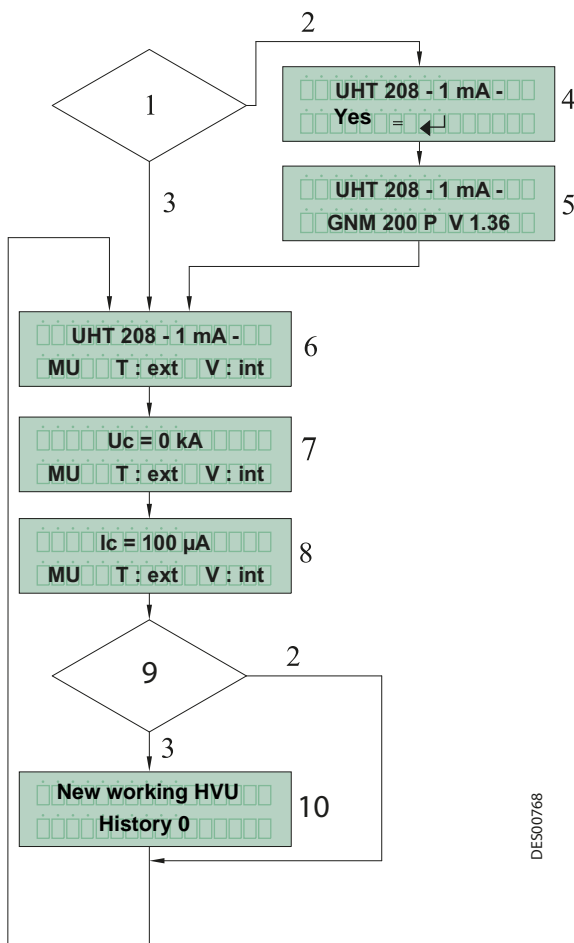
DES00107

6. User Menu Diagram





(the diagrams appearing in this chapter are for information only).



Increasing the parameter values (2)	Decreasing the parameter values (3)	Next screen or validation of a value (4)	Previous screen / special function (5)
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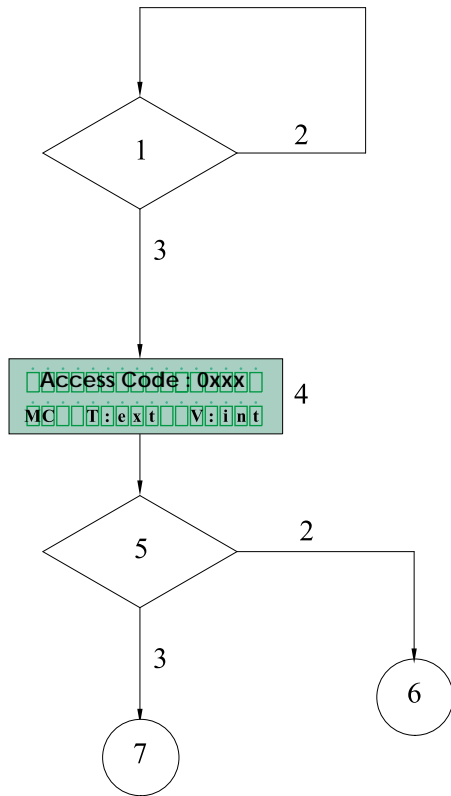


GNM 200 User Menu

1	Same HVU family as the last startup ? (Yes/No).
2	No.
3	Yes.
4	The user must confirm the type of new HVU. After validating with key 4  see § 3.1 page 7, the parameters of this new HVU are automatically selected and all the old settings are lost.
5	During initialisation of the GNM 200, the software release is automatically displayed.
6	User Menu The definition of the HVU is displayed.
7	Voltage setpoint adjustment (kV).
8	Current I_c (μA) setpoint adjustment.
9	Is there a memory fault ?
10	Fault display, scroll using keys 2  and 3  , delete using key 5  see § 3.1 page 7.

DES00768

7. Request Configuration Menu Diagram



1	Configuration Menu Request.
2	No.
3	Yes.
4	Enter configuration code.

5	Check configuration code.
6	Code fault: return to the User Menu

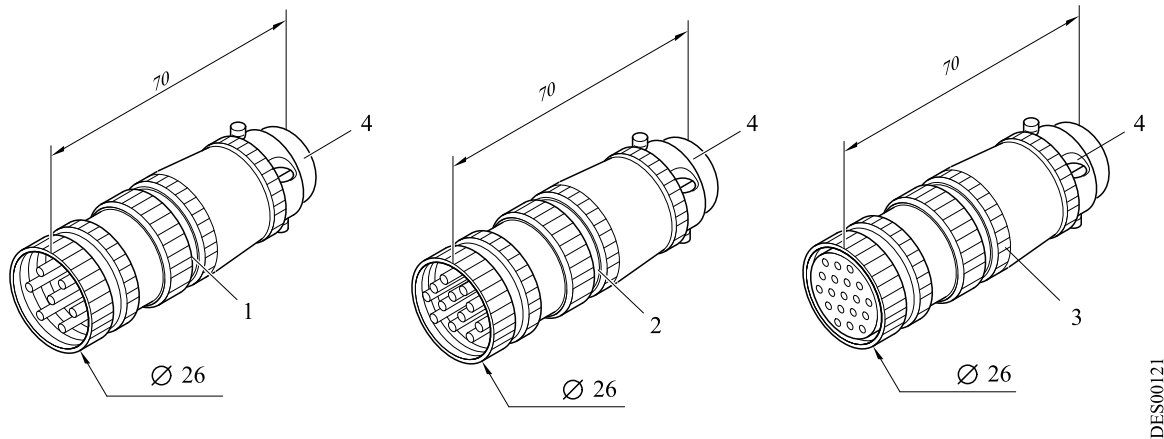
7	Code correct: shows the first parameter of the Configuration Menu.
---	--

DES00839

8. GNM 200 References

Item	Reference	Description	Qty	Unit of sale
	1524481	GNM 200 A in metal case - 110V with memory chip	1	1
-	1517069	GNM 200 A in metal case - 110V with resistor	1	1
-	1517071	GNM 200 A in metal case -220V with memory chip	1	1
-	1517070	GNM 200 A in metal case -220V with resistor	1	1

9. Connectors



Item	Reference	Description	Qty	Unit of sale
1	E4PTFS316	7-contact male connector	1	1
2	E4PTFS343	12-contact male connector	1	1
3	E4PTFS406	19-contact female connector	1	1
4	E4PTFA323	Cable clamp	1	1