

MV Electrical network management

Easergy Range

FLITE116 – G200

Wireless Communicating indicator

User's manual



NT0008910



Safety information

Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

- Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety information

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As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

FCC Part 15 (G2GF only)

CLASS A EQUIPMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RED Compliance

RED compliance statement of Flite116-SA in 915 MHz version

Hereby, Schneider Electric declares that the radio equipment type wideband transmission system is in compliance with directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

<https://www.schneider-electric.com/en/download/document/PHA7357900/>

Parameter	Value	Unit
Operating frequency range	918.075 – 919.125	MHz
Maximum transmitted power	-2.26	dBm

RED compliance statement of G2SF in 915 MHz version

Hereby, Schneider Electric declares that the radio equipment type wideband transmission system is in compliance with directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

<https://www.schneider-electric.com/en/download/document/PHA7358400/>

Parameter	Value	Unit
Operating frequency range	918.075 – 919.125	MHz
Maximum transmitted power	2	dBm

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FLITE 116-SA wireless sensors are used to provide current measurement and line fault indication to a SCADA system, using a hub called G200 to report the information on a long-range level.

G200 is available as a standalone unit, solar cell powered or as a OEM part to be integrated inside a existing control cabinet fitted with a RTU to which one connects the outputs of the G200 (dry contact output relay and/ or RS232 interface).

This user's manual describes each component (G200 and FLITEs) and how to install and commission them.

G200 is also used for some other applications that are not described here, for it is linked to these applications.

Please note that some features requested by and developed for OEM customers may not appear in this manual, which is intended for the standard product version.

Product references

To order a product with the correct reference, please refer to the commercial brochure or to your sales representative.

In this document, G200 is referred to as:

- G2GF (medium size enclosure)
- G2SF (card version with IP 21 enclosure)

And FLITE 116-SA are referred to as "FLITE".

Note: a separate user's manual (NT00081-0x) is describing more precisely the DNP 3.0 implementation for G200 RTU.

Part 1 - G200



G2SF



G2GF

Introduction

G200 is available in two versions, among which:

- As a standalone unit (**G2GF**), medium size IP54 cabinet, powered by solar cell panel.
- As a card (**G2SF**), fitted inside a small size IP21 cabinet, for integration in a existing remote control cabinet.

Functions

G200 performs the following functions:

- **Dialogue with FLITE fault current indicators** via a bi-directional short range HF radio link.
- **Monitoring**, for remote indication and/or local display of the following information:
 - Fault current path, for both short-circuits and ground (earth) faults
 - Medium voltage loss/ return alarms
 - Average load current
 - Medium voltage availability
 - FLITE low battery alarm
 - FLITE communication interruption alarm.
- **Communication with the remote control supervisor:**
 - Use of protocol DNP 3.0 Serial & TCP/IP or Modbus Serial & TCP/IP or IEC101
 - Management of data communication devices.
- **Recording of time stamped events as they happen** (20 ms accuracy). These events may be downloaded onsite to a laptop PC with a local connection.
- **External power supply**
 - 6/12 VDC (G2GF and G2SF)
 - solar cell panel fitted with 6 VDC - 10 A/h back-up battery (G2GF).

FCC Compliance (G2GF)

NOTICE

HAZARD OF INCORRECT OPERATION FOR FCC COMPLIANCE

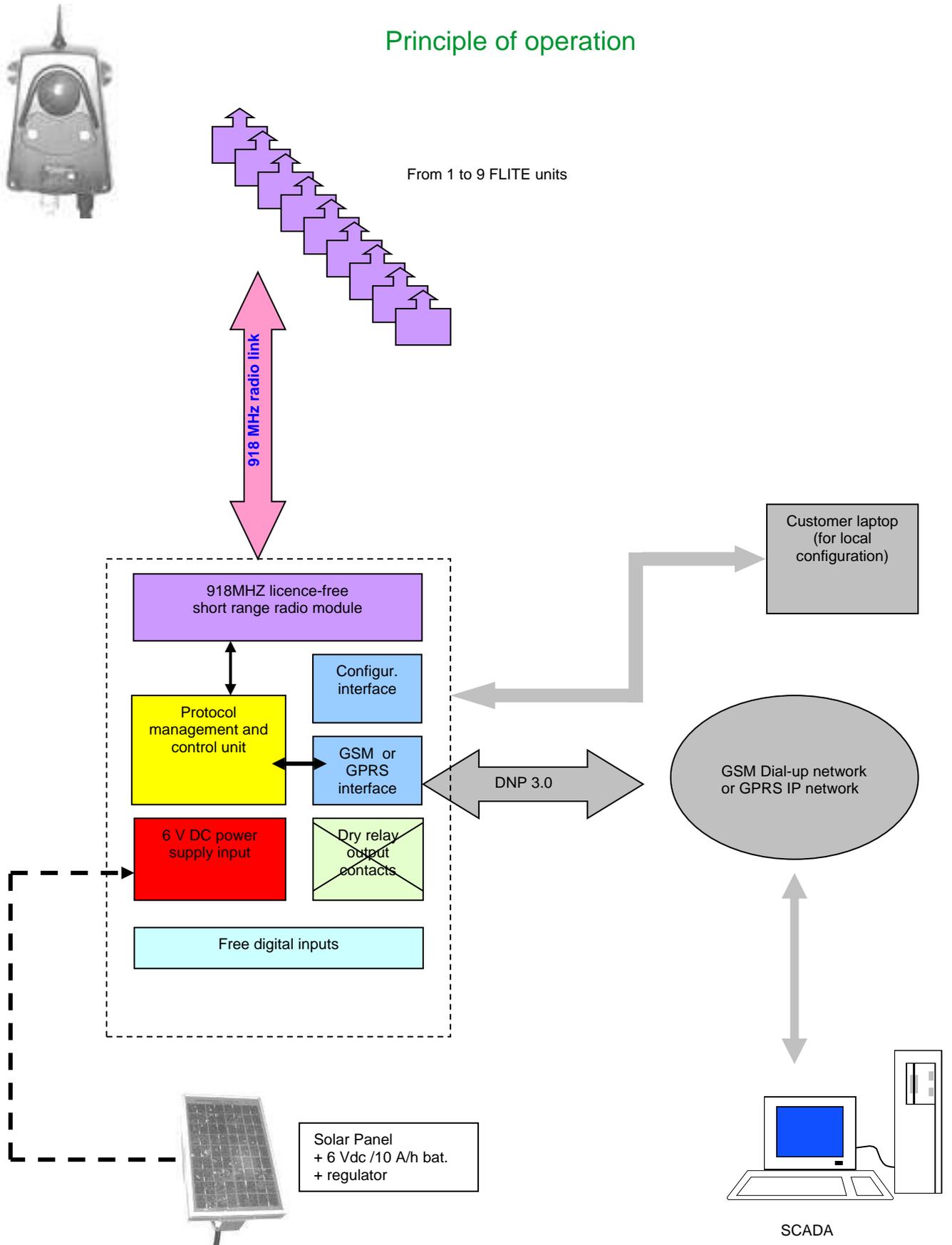
- Changes or modifications not expressly approved by Schneider Electric could void the user's authority to operate the equipment.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - This device may not cause harmful interference, and
 - This device must accept any interference received, including interference that may cause undesired operation.

Failure to follow these instructions can result in equipment damage.

General specifications

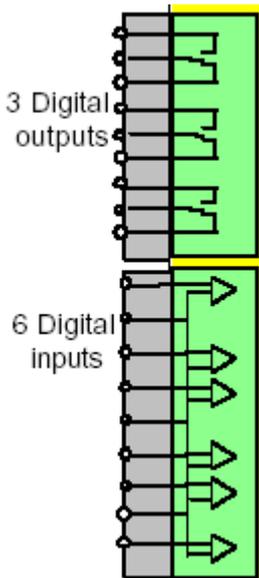
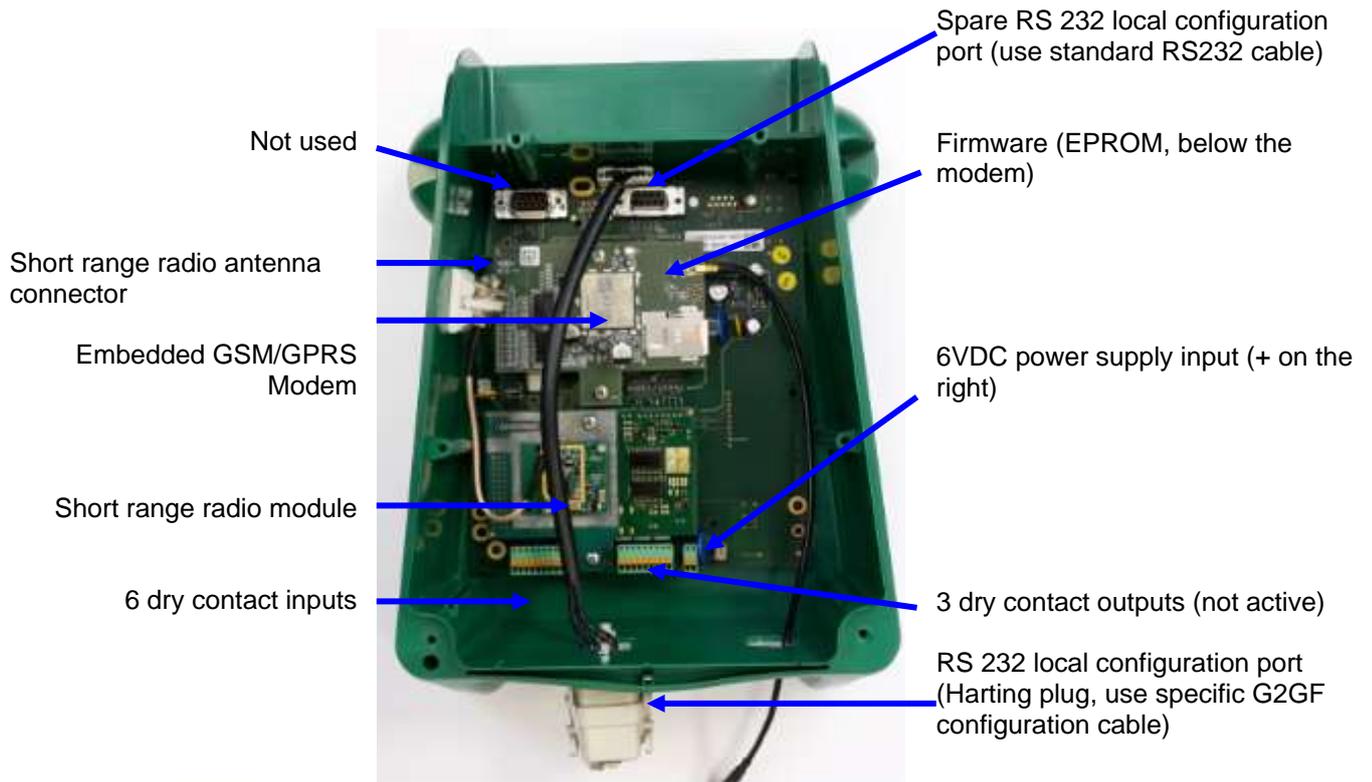
FLITE communication			
Management	Number of FLITE 116 units per G200		▪ From 1 to 9
Short range radio	Frequency used		▪ 918-919.2 MHz or 865.65-866.89 MHz with frequency hopping
	Standard compliance		▪ FCC part 15.249 and AS/NZS 4268:2003
	Maximum distance to G200		▪ 100 m (with clear line of sight)
Electronics			
G200 card power supply	Requested voltage		▪ + 6Vdc
	Requested power supply for RS232 interface		▪ 26 mA
	Requested power supply for GSM/GPRS interface		▪ 40 mA in standby ▪ 0.8 A upon GSM communication ▪ 300 mA upon GPRS communication
Cabinet characteristics			
Electromagnetic compatibility	Electrostatic discharges	IEC 61000-4-2	▪ Level 4 (8 kV on contact)
	Electrical fields	IEC 61000-4-3	▪ 80 MHz – 1 GHz – 10 V/m
	Fast transient bursts	IEC 61000-4-4	▪ +/- 1 kV 5 / 50 Tr / Th ns. Frequency: 5 kHz
	Radio frequency in MC	IEC 61000-4-6	▪ 0.15 MHz to 80 MHz – 3 Vrms
Climatic specifications	Temperature range	°C	▪ 25°C to +70°C (except GSM modem: -25°C to +55°C)
Mechanical specifications	Dimensions and weight	H x W x D	▪ G2GF: 270 x 203 x 110 mm (10.63 x 7.99 x 4.33 in) - 1.5 kg ▪ G2SF: 250 x 150 x 65 mm (9.84 x 5.91 x 2.56 in) – 1 kg
	Protection	IEC 60529	▪ G2GF: IP54 ▪ G2SF: IP21
SCADA communication			
Protocol			▪ DNP 3.0 Serial & TCP/IP, Modbus Serial & TCP/IP, IEC101
Long range communication	Embedded interface	G2SF	▪ RS232
		G2GF	▪ GSM/GPRS

Principle of operation





Product description



I/O wiring
(Digital outputs not active)

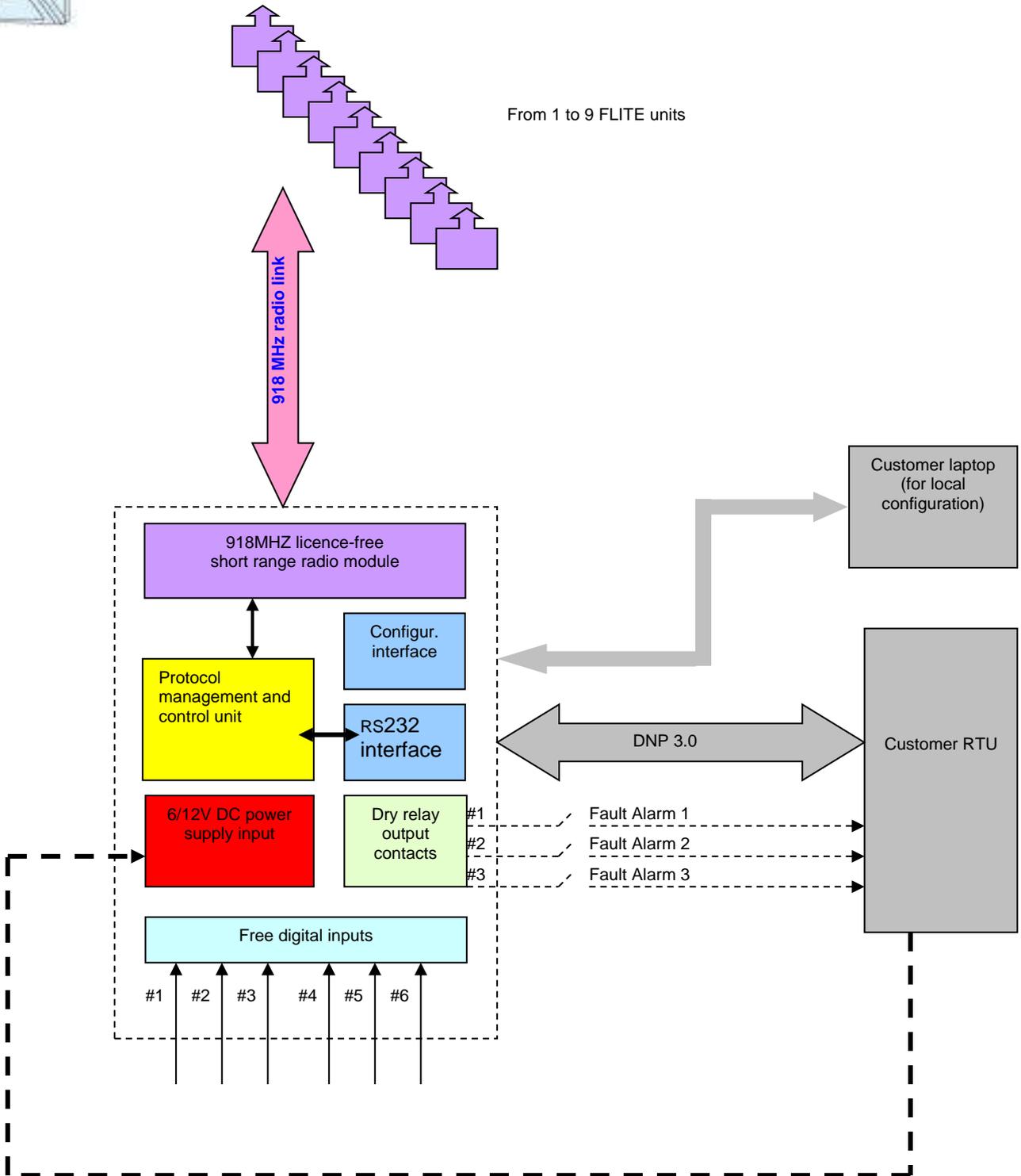
Electrical specification

- G2GF is fed from an external 6 VDC power supply supplied by a solar cell panel fitted with its own back-up battery, such as our optional GS-6-10/GS-6-20
- When its GSM/GPRS interface is in stand-by mode, G2GF uses 40 mA
- When the GSM/GPRS is communicating, consumption climbs to 0.35 A when GSM reception level is correct. Eventually, it may reach 0.8 A when GSM reception level is low

Dimensions

- Height x Width x Depth: 270 x 203 x 110 mm (10.63 x 7.99 x 4.33 in).

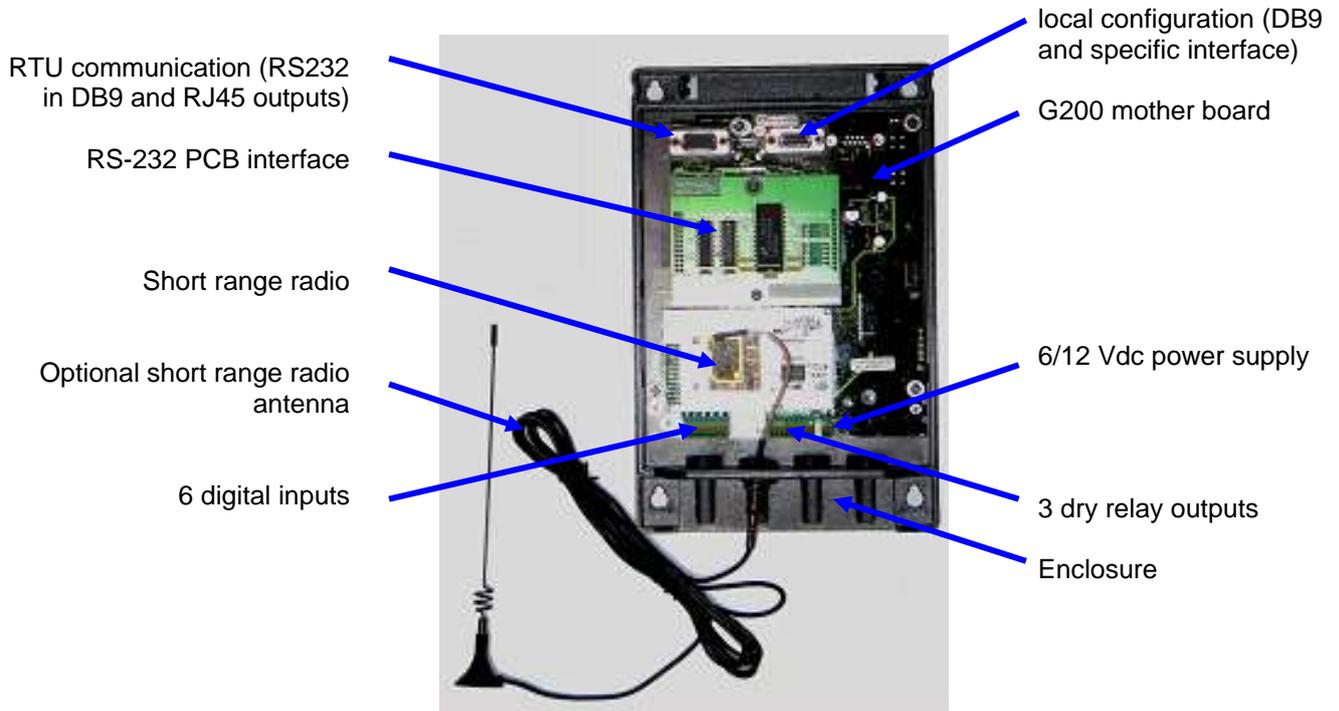
Principle of operation





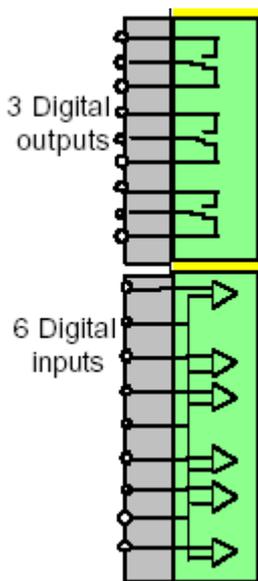
Product description

Distribution networks are sometimes fitted with remote controlled overhead MV load break switches which are not fitted with fault current indication feature and/ or load current measurement. G2SF offers them a possibility to upgrade them with these functions.



Electrical specifications

- G2SF is to be powered from an external 6/12 VDC power supply, provided by the remote control cabinet it is integrated into.
- In its standard version (RS232 communication interface), G2SF only needs 26mA (+ 30 mA by Relay closed)
- This figure includes the short-range radio module standby consumption
- G2SF is not fitted with any battery back-up, which therefore must come from the remote control cabinet.
- G2SF card is fitted with a double protection system, which prevents from causing any damage to:
 - The G2SF card, should the polarity be inverted on its +/- DC power connector,
 - The external DC supply source, should the G2SF card be in short circuit (consumption exceeds 0.9A)



I/O wiring

DO may be set to (depending to the version):

- Either MV fault current line #1, 2 or 3
- Or MV fault current on any line
- Or Flite communication interruption
- Or Flite battery potential issue

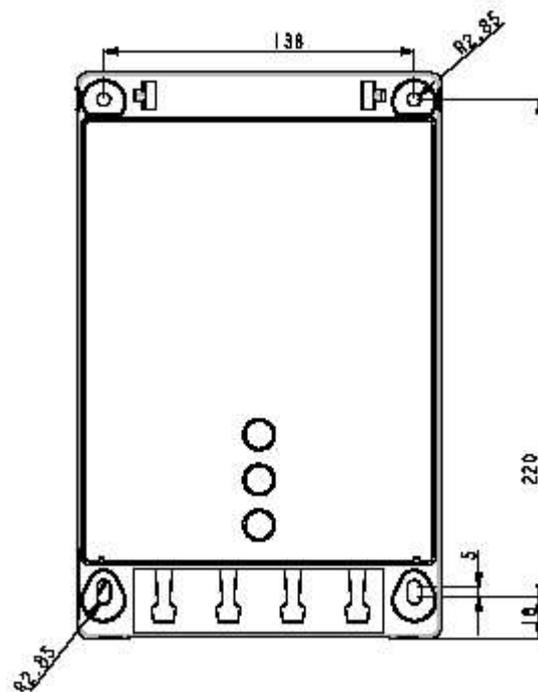
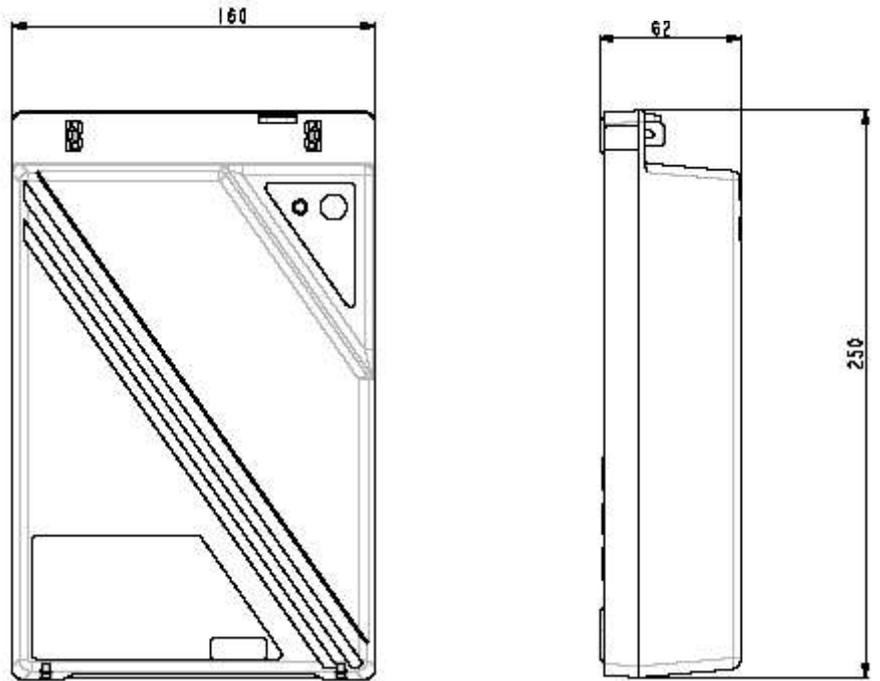
Troubleshooting

- A flashing red LED indicates a detected fault on the equipment:
- Check that the EEPROM is properly inserted on the support. Check the EEPROM pins. Restart the product. The red LED should switch off.
 - If the red LED is still flashing, load the default configuration (factory configuration) and restart the product. The red LED should switch off.

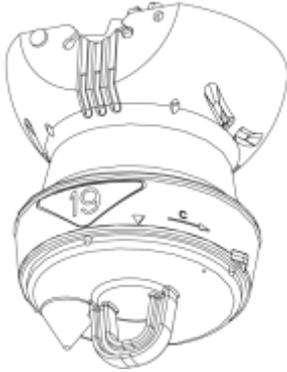


Dimensions

Since G2SF is intended to be fixed inside an existing remote control cabinet, it is useful to know the precise dimension of the 4 holes provisioned for the mounting.



**Part 2
FLITE**



FLITE116-SA

(*) FLITE116-SA standard configuration

DI=60A
 IMAX=800A
 VALIDATION=ON (70s)
 FLASH=2H
 INRUSH=ON(3S)
 RESET=ON(3s)

FLITE may be used to remotely measure current on Distribution lines up to 36 kV and indicate network fault currents & voltage losses/returns

Introduction

FLITEs are wireless, single-phase, fault current passage indicators (also referred to as FCIs or Faulted Circuit Fault indicators) for Medium Voltage Distribution lines and load current measurement devices at the same time

FLITEs are fitted with the following components:

- Two sensors: one for MV voltage detection and one for current measurement.
- A short-range radio module
- An IP56, UV resistant envelope (PC/ABS)
- A transparent screen
- 7 high intensity red LEDs, for local fault current display and test
- Spring grips, to hold on the MV conductor
- A replaceable lithium battery (standard model from the market)

Operations performed

Fault detection

When fitted with a standard configuration (*), FLITE shall operate as described here after:

• **Fault current detection**

Once the MV line is established, FLITE shall detect all sudden load current increases (di/dt) greater than 60A and/or IMAX level, occurring within 60 ms (50 ms +/- 10ms), immediately (i.e. within validation time) followed by a voltage dip lasting more than 300 ms. The voltage dip corresponds to the first opening of the upstream recloser.

Once confirmed, FLITE starts flashing and sends an alarm to G200.

When a recloser starts an open & reclosing sequence, all FLITE units located outside the path of the fault current filter the inrush current occurring during reclosing cycle, to avoid false fault detection.

• **Reset**

If the recloser has cleared the fault current:

- The MV voltage has come back for more than a given time (standard: 3 s), so FLITE resets its flash and sends a "fault cleared" alarm to the G200

If the recloser has not cleared the fault current:

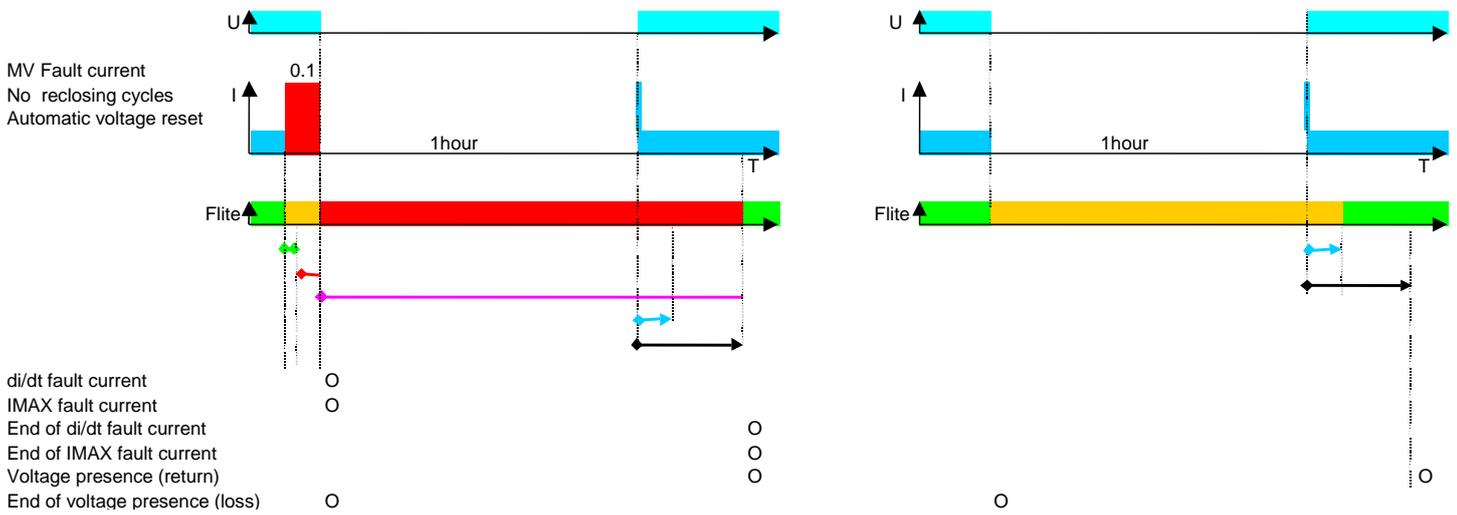
- FLITE flashes for several hours in timer-reset mode (4 hours default setting), except if the fault current is repaired and the line is re-energized before this time has elapsed. It stops flashing and sends a "fault cleared" alarm to G200
- If the fault current is not cleared and that the operator unsuccessfully tries to reclose the recloser, FLITE flash goes on.

Application		FLITE 116-SA
DI/DT		OFF- 6-12-24-30-40-60-80 A
IMAX		100-150-200-250-300-400-500-600- 800 A
INRUSH RESTRAINT		ON (3, 30 or 60 s) or OFF
FAULT CONFIRMATION		ON (70 s) or OFF
AUTOMATIC VOLTAGE RESET		ON (3, 30 or 70 s) or OFF
AUTOMATIC TIMER RESET		2-4-8 or 16 hours
FAULT DELAY TRIP		48 ms (60 hz.) 60 ms (50 hz)

Waiting for a MV fault current
 Waiting for events
 Flash On.

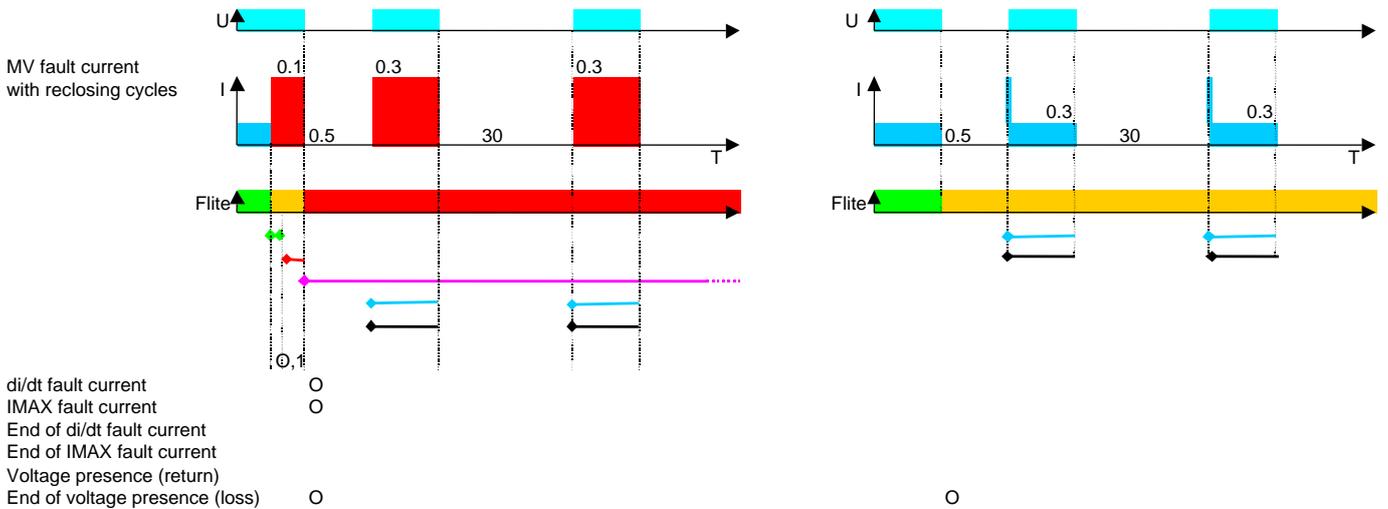
FLITEs located UPSTREAM the fault current

FLITEs located DOWNSTREAM the fault current



FLITEs located UPSTREAM the fault current

FLITEs located DOWNSTREAM the fault current



Line monitoring

In addition to the fault detection function, FLITE performs:

- A load current measurement (3 to 630 A),
- An immediate voltage loss detection,
- A regular check of the MV voltage presence or absence
- A regular check of its lithium battery voltage.

Each FLITE sends to the G200 unit, every end of period (a period = 1 hour), all the data collected during that period:

I_MAX: maximum instantaneous current measured

I_MIN: minimum instantaneous current measured

I_MEAN: average current for the period

FLITE battery status

Upon SCADA request (for instance prior to switch loads), G200 ask all FLITEs to send their instantaneous current measurement (I_INST), so that the network operator can make sure that loads may added to others.

By regularly downloading the I_MAX/I_MIN/ I_MEAN measurements from each FLITE, the SCADA operator has a clear view of the daily/ weekly/ yearly consumption on each phase on each MV line of the network.

Load current measurement

FLITE 116-SA:

The principle remains the same with some improvements:

I_INST is 3 s current measurement value sampled permanently.

I_MAX and I_MIN are re-evaluated every 3s

I_MEAN is the average of all I_INST values.

Lithium battery alarm

Each end of period, each G200 unit knows which FLITE unit is having lithium battery problem. Forwarded to the SCADA or the maintenance centre, the operator knows he must plan a replacement for that FLITE unit.

This prevents to have non-working fault current indicators on the network

Short range communication alarm

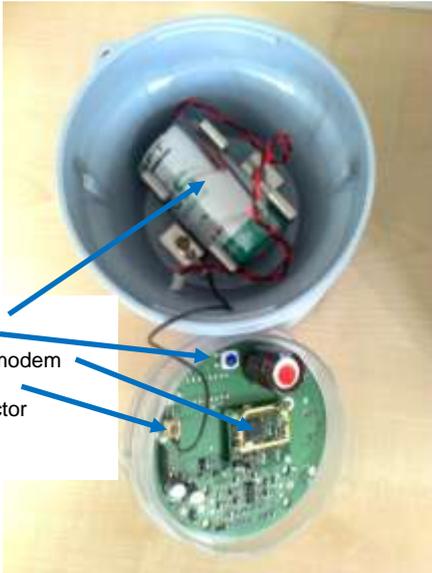
Although the short-range communication G200-FLITES has been duly tested at time of on-site installation, there may be new obstacles obstructing the direct line of sight needed for a good communication (growing trees, parked trucks, new fences, etc.).

This is why G200 is fitted with a special counter, which records all unsuccessful communications to any FLITE: when a user-set limit is overtaken, an alarm is sent to the SCADA or maintenance centre for action.

MV sag or absence

FLITE116-SA is permanently monitoring the medium voltage: as soon as a voltage dip occurs (even on single phase CB, recloser or fuse operation) a radio alarm is sent in real-time to the G200.

Upon voltage return, an end of alarm is also sent to G200 but it is 70 s delayed to avoid multiple radio alarms during reclosing cycles.



Power supply

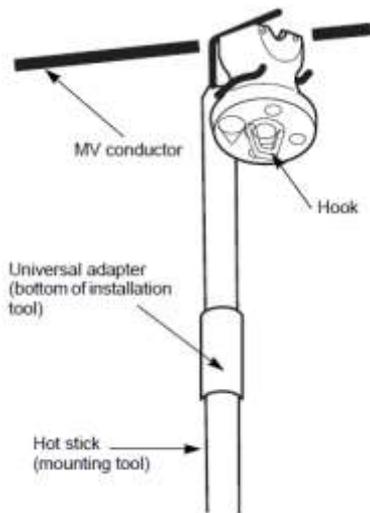
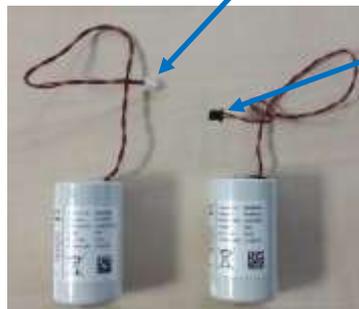
Open FLITE transparent screen and plug in the battery connector.

Maintenance

The lithium battery of the Flite 116 can be replaced:
The reference depends on the Flite 116 reference and the manufacturing date

FLITE 116-SA	Manufacturing Date	Lithium battery reference
EMS58200	Before November 2017	59982
EMS58201	Before February 2017	
EMS58200	After November 2016	EMS58240
EMS58201	After February 2017	

Identification: the ref 59982 has a white connector, the EMS58240 has a black connector



Test/reset feature

Using a magnet on the FLITE shall generate the following actions:

	FLITE 116-SA
FLASH is ON	FLITE immediately resets
FLASH is OFF	FLITE flashes for 20 s and send IMAX + di/dt alarms to G200 in real time (useful for a demonstration)

Installation

⚠️ ⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The installation of FLITE 116-SA must be done using the following means:

- With gloves and an insulated bucket truck, using adapted security procedures for hot line working,
- With specific FLITE11X installation tool (SICAME tool - ref. 59953) mounted on a hot stick fitted with a universal adapter.
- Or with second specific FLITE 11X tool (shotgun tool). The Flite 116-SA is fitted with a hook to have the possibility to use the shotgun tool.

Failure to follow these instructions will result in death or serious injury.

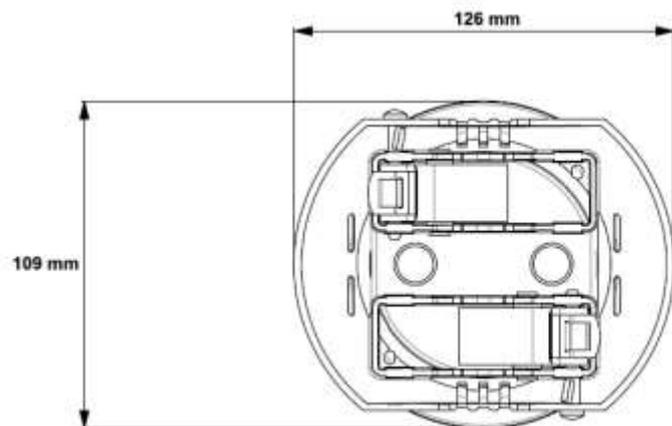
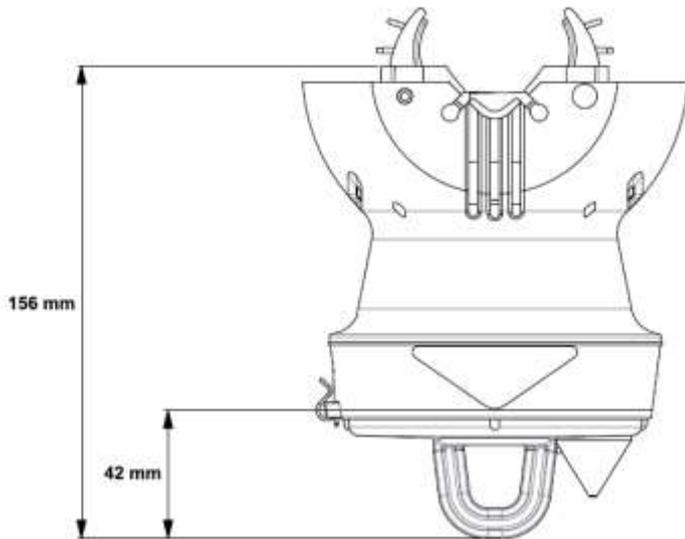
FLITE is a versatile product able to adapt to various conditions of use and environment.

Application		FLITE 116-SA
Distribution lines		7 to 36 kV (min and max)
Conductor diameter		5 to 25mm (0.197 x 0.984 in) prior 2020, 7 to 42mm (0.276 x 1.654 in) since 2020
Power Frequency		50 And 60 Hz
HV/MV neutral arrangement		Solidly grounded, via a resistor or isolated
Fault current detection on invert time protected lines		Yes
Fault current confirmation		ON (70 s) or OFF
Automatic voltage reset		ON (3, 30 or 70 s) or OFF
Automatic timer reset		2-4-8 or 16 hours
Local fault current indication		
Visual signal		Red flash light (8 High luminosity LEDs)
Flash frequency		20 / min
Flash duration per fault current		2-4-8 or 16 hours (user-set)
Total flash duration (with the same battery)		400 hours
Short range radio interface		
Frequency used		918-919.2 MHz or 865.65-866.89 MHz
Sensitivity		-110 dBm
Power supply		
Replaceable lithium battery		3.6 VDC
Battery duration		Up to 5 years ½ with 3 Flites Up to 4 years ½ with 9 Flites (1)
Operation temperature		- 40 °C to + 70 °C (-40°C to +85°C according to ANSI test)
Humidity		< 95%
Wind resistance		Up to 150 km/h
Protection level		IP56-IK07
Electro-magnetic compatibility		IEC 61000-4-2, IEC 61000-4-3, IEC 61000-6-4 and IEC 61000-6-2
Short-circuit withstand		12.5 kA/1s
Maximum load current		800 A
Shock tests		125 kV/50 Hz - 60s (IEC 60694)

(1): this lifetime corresponds to standard situation. The lifetime depends on the temperature, the total duration of flash and the communication frequency between G200 and Flite 116-SA.

FLITE 116-SA is protected by a weather proof envelope made of PC/ABS which dimensions are listed down below.

Mechanical characteristics	
Net weight	0.54 kg
Mounting	spring grips



Part 3 Installation

NOTICE

HAZARD OF RADIO COMMUNICATION DISTURBANCE

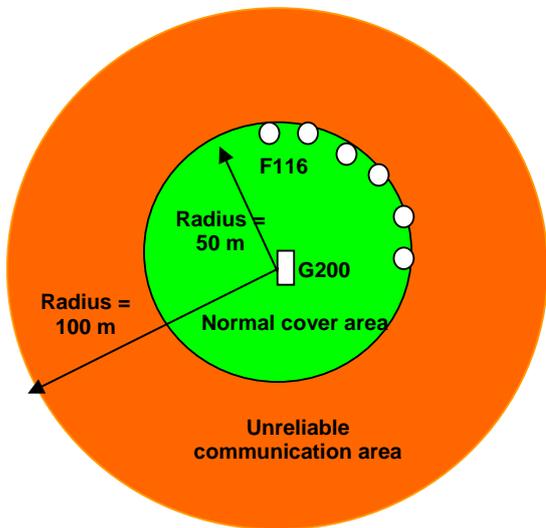
■ When used in urban areas, many “natural” obstacles (vehicles, buildings, etc.) may disturb the radio signal between G200 and its FLITE units.

■ Diffraction, refraction or diffusion phenomena can create areas of “shadows”, interrupting message receptions at points close to the sender while enabling a correct reception at a more distant point.

■ In addition, electromagnetic noises affect communication performance: FLITE installations close to a high-power radio or cellular relay are to be avoided.

Consequently, respect the list of rules described in this chapter “FLITE installation” to ensure a reliable radio communication between G200 and its FLITE units.

Failure to follow these instructions can result in equipment damage.



- ☐ **Distance**
 - ✓ All FLITEs shall be placed within a 50 to 100 meters radius around the G200 (although depending on local conditions. FLITE units may successfully operate with no disturbance or clear line of sight at even greater distances).
 - ✓ The maximum distance between FLITEs shall be 100 meters.

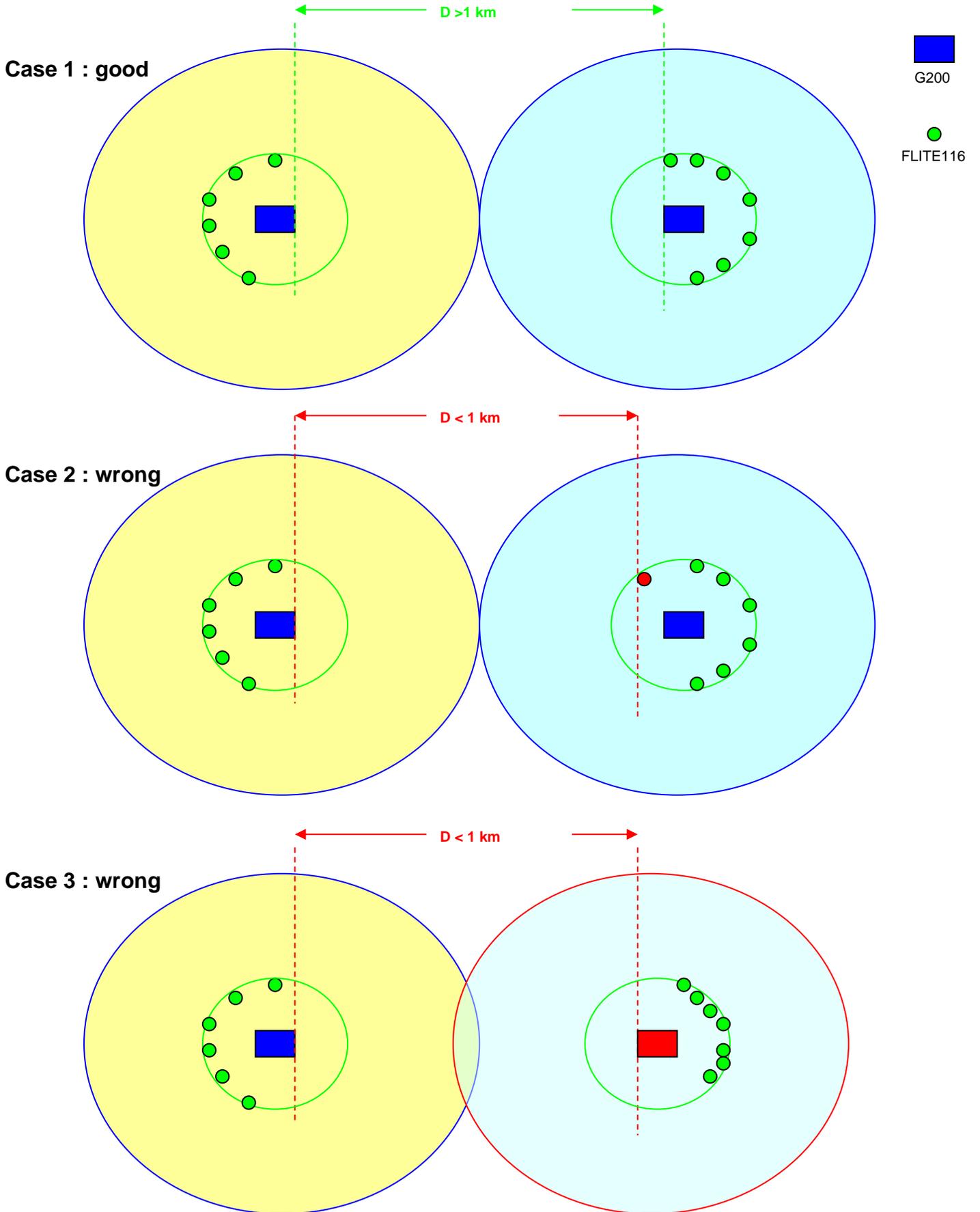
- ☐ **G200 installation**
 - ✓ If pole is located along the road, install G200 antenna above truck height.
 - ✓ Please note that noise is lower than -65 dBm on 902-928 MHz frequency range.

- ☐ **G200 – FLITE orientation and positioning of antennas**
 - ✓ Place FLITEs in the middle of the range rather than close to the pole.
 - ✓ turn the G200 to the side of the FLITEs that are furthest away
 - ✓ take care to distance G200 antenna from metallic objects on the pole.
 - ✓ try to have a direct line of sight between G200 and all FLITEs
 - ✓ place the high power radio antenna (GSM, GPRS, or radio) of the G200 (pole mounted version) or of the RTU (card version) at least two meters from the G200 short range radio antenna.

- Note:** FLITEs are equipped with broad band antenna, so they may be placed at any point around the relay, as long as no metallic obstacle obstructs the link.

- ☐ **Distances between FLITEs linked to two different G200 units (*)**
 - ✓ To avoid collisions, it is recommended to place **two FLITEs linked to two different G200 units** by more than 1 km.
 - ✓ Similarly, **two G200 units** must be separated by more than 1 km.

To check FLITEs positioning use the RSSI command in the “Flite communication parameters” (see description in FLITE COMMUNICATION PARAMETERS).



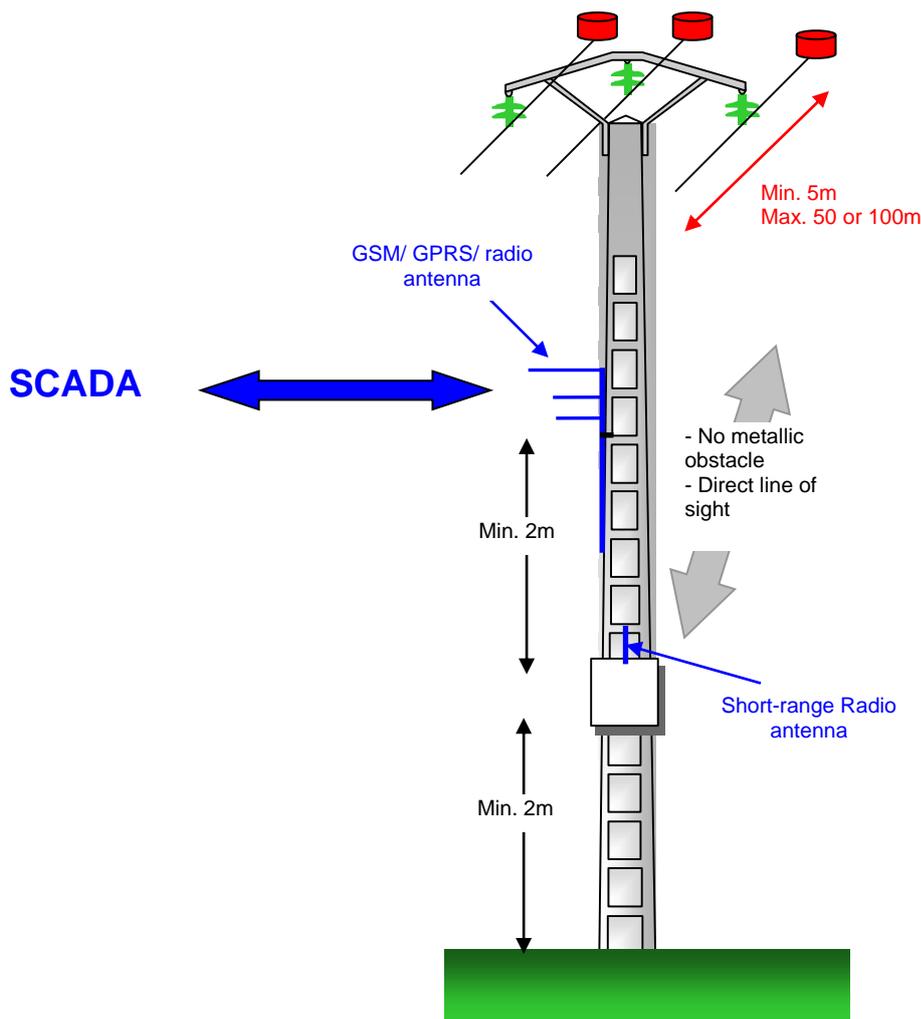
The G200 cabinet (or the RTU to which it is linked per RS232) may be fitted with a long-range radio interface (radio or cellular) to communicate with the SCADA.

NOTICE

HAZARD OF RADIO COMMUNICATION DISTURBANCE

- The long-range radio interface has a stronger radio signal than the short-range radio used between G200 and its attached FLITEs, and may therefore disturb this link. Consequently, the long-range antenna must be placed on the other side of the pole where G200 short range antenna is installed.
- The short-range radio uses 918-919.12 MHZ or 865.65-866.89 MHZ bandwidth, so it is recommended to avoid the same frequencies on the long-range link. If you have to do anyway, please your local support for advice.

Failure to follow these instructions can result in equipment damage.



Introduction to GSM/GPRS networks

G200 units may communicate to the SCADA through various medias, among which GSM (dial-up connections) or GPRS (IP address).

G200 offer includes embedded GSM/GPRS interfaces as well as external GSM/GPRS modem devices. To operate, these interfaces or devices need what is called a SIM card.

This SIM card is provided by your GSM/GPRS network provider and contains the required information to hook the G200 unit onto the GSM/GPRS network.

To insert this card inside G200 embedded GSM/GPRS interfaces or external GSM/GPRS devices, process as explained here.

SIM card /GSM antenna installation

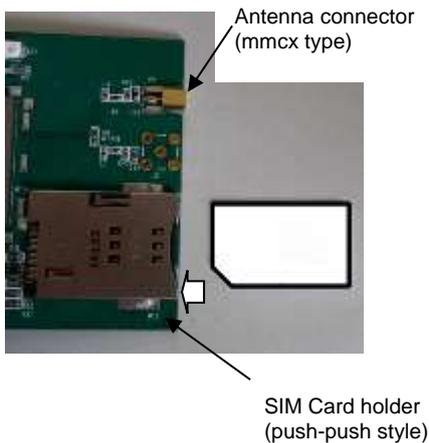
To add a SIM card, proceed as follows :

- Power off the G200
 - Insert the SIM Card in the holder.
- Note:** some versions avec equipped with a modem in a metal box requiring to press a push button to extract the SIM card.
- Connect the antenna to the GSM/GPRS MODEM.
 - Power the G200 unit again.
 - Check with a PC and the G200 configuration software that :
 - the MODEM is identified
 - the GSM/GPRS radio signal is correct
 - the SIM card is identified
 - the telephone numbers are correct.

Note: write down the telephone number of your SIM card (to report it on the SCADA).

Covered frequencies

GSM/GPRS: Quad-Band (850/900/1800/1900 MHz).





G2GF

- G2GF is meant to be mounted on any kind of pole (concrete, steel or wood).
- Since both power supply and battery back-up are located outside the G2PF unit (inside the solar cell panel), there is nothing to do on this unit, except connecting the DC supply to the G200 card and the GSM antenna to the GSM card.

Note: as a standard, solar cell panel ref. GS-6-10/GS-6-20 includes a GSM patch antenna. So, the antenna cable and the DC cable are located inside a single cable protection (linking the G2GF unit to the GS-6-10/GS-6-20 unit).

Optional GS-6-10 (10W) / GS-6-20 (20W)

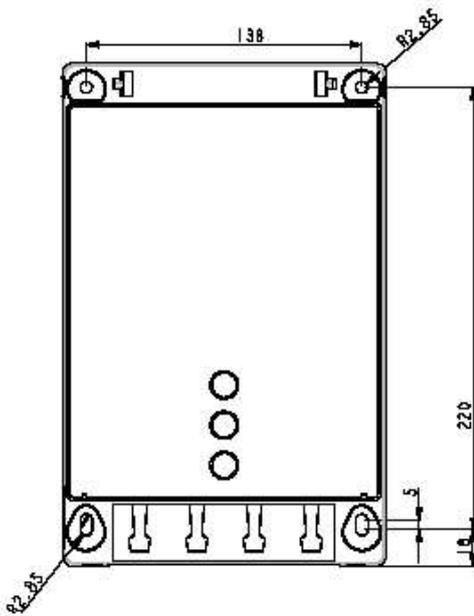
The optional solar cell panel has been designed to fit the power requirement of G2GF units fitted with our embedded GSM (or GPRS) card. It is also possible to use it for the DC version of our G2PF, when the external modem used does not exceed the solar cell panel capacity.

A separate "**GS-6-10/GS-6-20 installation manual**" document explains how to install it.

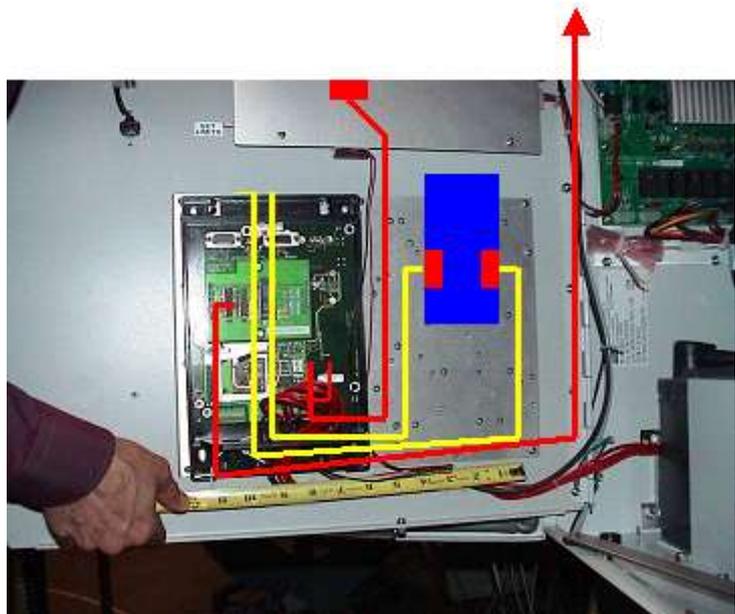
G2SF

G2SF is meant to be mounted inside the cabinet of an existing control cabinet with four screws (see figure here beside)

The unit is fitted with 4 holes enabling to be screwed onto a metallic plate such as the picture here below.



G2SF screw holes



In this example of implementation, G200 is delivered with the following four cables:

- A short-range antenna cable,
- A DC power supply + dry relay outputs,
- A communication cable,
- A configuration cable.

Part 4

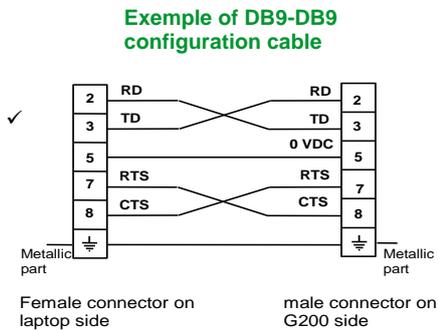
Commissioning

Hardware required

The equipment is configured using a microcomputer operating under Windows and accessories provided:
 "G200 configuration tool" software, included in the "Easergy CD" (will have to be installed on the computer from the CD – see next chapter),
 a RS232 connection cable

The pin and socket connector used is a cross cable.

Note: for PC fitted without RS232 port, a RS232/USB adapter is necessary.



The male-female cable is crossed

Connecting the computer

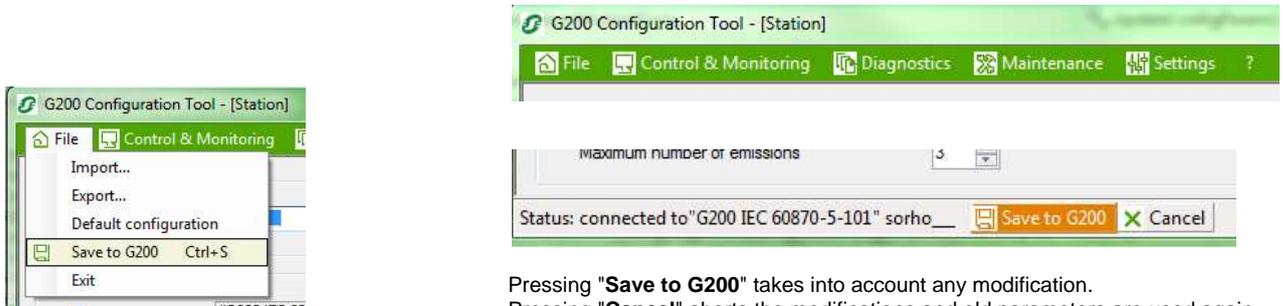
Plug the cord into serial port no. 1 (COM1) of the computer and into the connector on the front of the module at the G200 end.

Note: on G2GF, you may use the Harting connector without needing to open the enclosure.

When the PC is on, insert the Easergy CD ROM into the drive. After a moment, the software will run automatically (auto run function) and a window will appear on screen. In the menu, select "Easergy G200" and then select "Installation". The G200 configuration tool will be installed automatically on the hard disk and shortcuts will be created on the desktop of the computer. Click on the shortcut "G200 configuration tool" to start the Easergy Configurator software. The main menu will appear in a windows application.

Configuring the unit

The configuration tool is using drop down menus



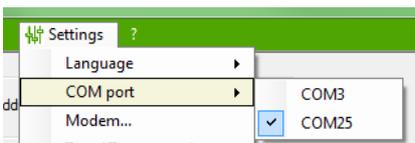
Pressing "Save to G200" takes into account any modification. Pressing "Cancel" aborts the modifications and old parameters are used again.

NOTICE

HAZARD OF LOSS OF CONFIGURATION

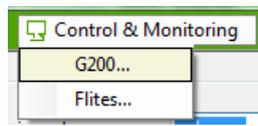
To take into account any change on the G200 configuration, you must press the "Save to G200" option in the menu, or on the button on the status bar, if available (when a change is detected). Until this is done, the equipment runs with the previous data, which are therefore different from the data displayed on the screen.

Failure to follow these instructions can result in equipment damage.



COM port configuration

The user has to define which COM port is used for serial communication with the G200. A list of available COM ports is proposed under Settings\COM port menu. The default value at first start is COM0, the user must select the correct COM port. The selected value is stored as a setting and will be reused at next start of the application. The list of available COM ports is updated when the list is shown. If you use an USB/RS232 adapter, please connect it before launching the configuration tool.



The Control & Monitoring menu is used to display information linked to G200 and FLITES state.

- G200 information's:

Equipment fault:

- G200 encounters a configuration fault.

Alarm processing:

- An alarm is being processed.

GSM MODEM STATES

Modem not identified:

- G200 was unable to communicate with the modem used.

SIM card failure:

- G200 has detected the embedded GSM modem card, but cannot read the SIM card.

Signal strength:

- Indicates the Received Signal Strength Indication of the GSM/GPRS modem.
- Should be above 16.

IP address (only GPRS):

Current G200 IP address.

Modem state:

- Indicates the current state of the modem

Hayes version:

Modem state	comments
Modem hang up	Standby state
Modem calling...	-
Modem answering...	-
Modem connected	-
Modem breaking	The modem is hanging up
Modem Init...	G200 is configuring the modem
Modem sending SMS...	
Code pin error !	Wrong PIN used

File

Import...

Import previously exported configuration file into the configuration tool. The configuration will not be save to G200 until the "Save to G200" is used.

Export...

Export current configuration into a file, for further reuse. Useful to duplicate configurations on many G200, or as backup. The file content G200 settings, modem settings and Flite settings

Default configuration

Restore default configuration.

A confirmation is required.

The configuration will not be save to G200 until the "Save to G200" is used.

Save to G200

Save the configuration into the G200.

Exit

Close the application.

If the configuration in the configuration tool is different from the one in the G200, a message will be shown, and confirmation will be required.

Control & Monitoring

G200...



GPRS version (contd):

Modem state	comments
Modem Init...	G200 is configuring the modem
Entering code pin...	-
Code pin error !	Wrong PIN used
Network registration...	IMSI registration
GPRS registration...	
PDP Init...	Opening a PDP session
PDP Closing...	Closing the PDP session
PDP Status...	Checking the PDP status
PDP Connected !	Stand-by state when listen mode is not activated.
Closing TCP listened	Close the listen port
TCP Closing...	Disconnection from the SCADA
TCP Listening...	Opening the listen port
TCP Listened !	Stand-by state when listen mode is activated.
TCP Connecting...	Connecting to the SCADA
TCP Connected !	Connected to the SCADA
Modem failure !	
GSM registration denied !	IMSI registration is refused by the operator (check your SIM card authorization with your provider)
GPRS registration denied !	GPRS registration or PDP activation is refused by the operator (check your SIM card authorization with your provider)

❑ FLITE information's:

FLITE INSTANT CURRENT VALUES

Displays the latest recorded I_INST values from all FLITEs.
To refresh these values use "Get values" button.

■ **Get values:**

Command to retrieve the latest I_INST current values from all FLITE units.

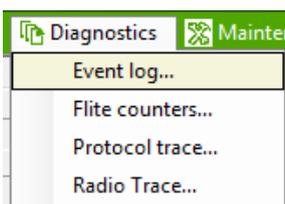
CURRENT

lavg: last received average load
lmin: last received minimum load
lmax: last received average load

FLITES STATES

Fault Pres.: fault current detected on FLITE no. x
MV Presence: last received MV availability.
Com. fault: FLITE no. x currently in communication interruption
Battery fault: battery potential issue on FLITE no. x
Conf fault: FLITE no. x configuration is not complete.
MV (KV/m): Electric field level. This gives an indication used for MV presence. This is not a measurement that would correspond to the Voltage level.
Comm Qual.:
Quality of the radio communication (%) between G200 and the FLITE no. x.
This indicator is regularly refreshed (measurement period) and must be 100 %.

Note: the counter is initially set to 100% at each configuration loading, Then it is reduced gradually when measurements are not updated within each period (plus an additional 2 mn delay to take radio repeats into account).



The "Event Log..." menu is used to review stored time-stamped events locally.

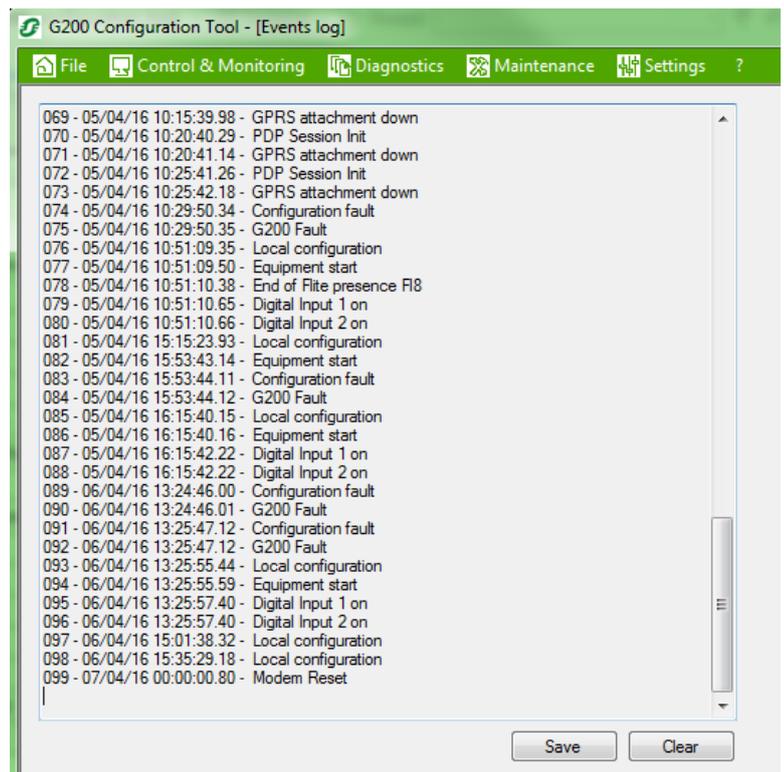
- It is possible to move around the list using the arrow keys.
- 100 time-stamped events may be recorded. When this number is exceeded, the first event in the list is "Events loss".
- Events may be erased by using the "Clear" button. This will permanently erases the time-stamped events.
- Events may be saved in a text file by using the "Save" button

Flites...



Diagnostics

Event log...



Flite counters...

The "Flite counters" menu is used to display the statistics counters from the FLITES. Refresh these values with "Get flite info" button.

Counters are listed here below:

Trs232:

- Acknowledge rate of message sending on the serial port between the radio component and the PIC.
- It should be more than 80%.

Tradio:

- Sending rate of message previously acknowledged.
- It should be 100%.

Tapp:

- Application acknowledge rate.
- It should be more than 80 %.

■ **Get flite info:**

Command to retrieve the latest communication counter values from all FLITE units (data available with "Flite counters").

Note: if the resulting rate is lower than the one expected, it could be due to a hardware problem on the FLITE unit. Replace the FLITE with another one and do the test again.

If the problem is still there, it could be due to a disturbed radio environment or a wrong installation. Please refer to Part 3 – Installation.



Protocol trace...

This menu is used to analyse the data exchange on the long distance connection with the SCADA. Main causes of malfunctioning are:

■ Absence of Supervisor - G200 dialogue

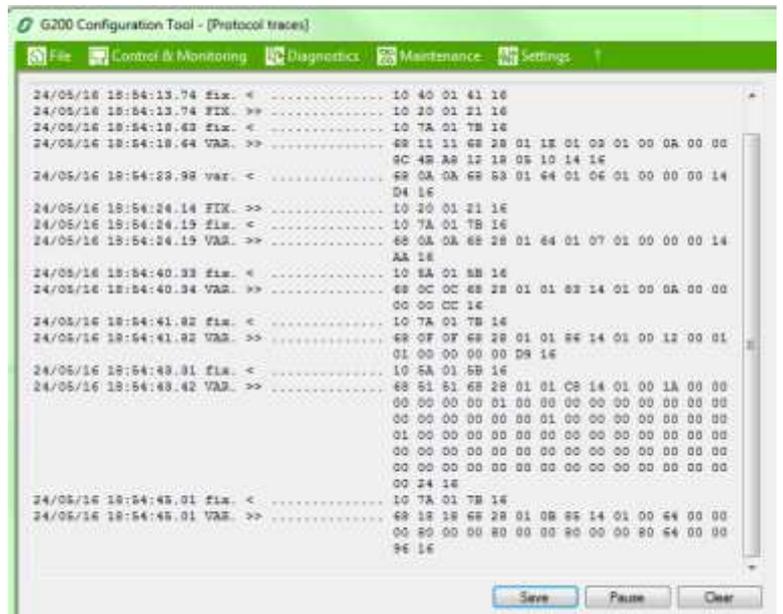
Check:

- Equipment power supply
- State of transmission interface (modem),
- Communication module status.

■ Functional faults statement (remote controls not executed, remote indications not received)

Check:

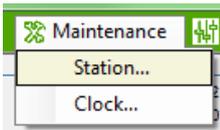
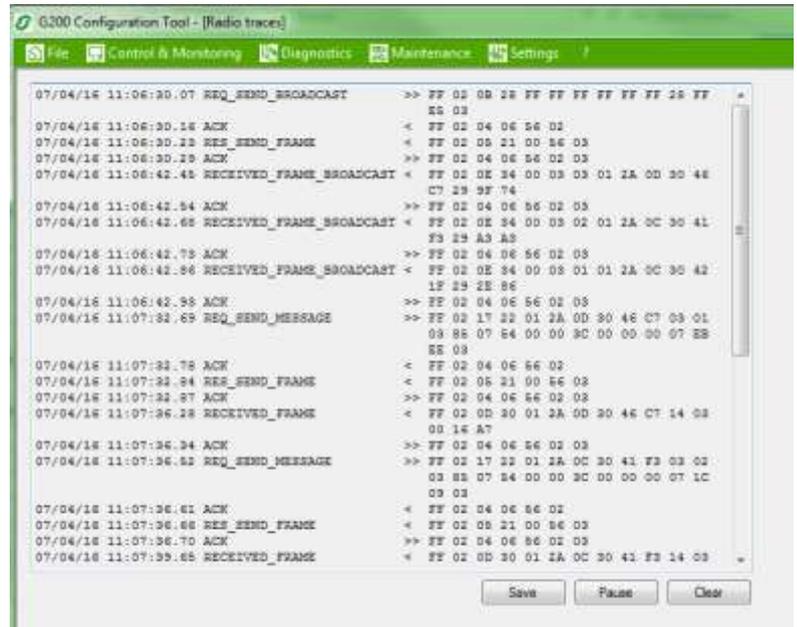
- FLITE power supply,
- FLITE-to-G200 Communication (possible short range radio disturbances).



This menu is used to analyse the data exchange on the short-range radio link to each FLITE unit. Main causes of use are:

- Absence of FLITE - G 200 dialogue:
 - Check:**
 - Equipment power supply.
 - State of transmission interface (aerial, FLITE position, etc.).
 - FLITE power supply (FLITE battery, ...).
 - Start-up procedure.
- Functional faults report (remote controls not executed, remote indications not received):
 - Check:**
 - FLITE power supply.
 - Communication with the FLITE (possible short range radio disturbances).

Radio trace...

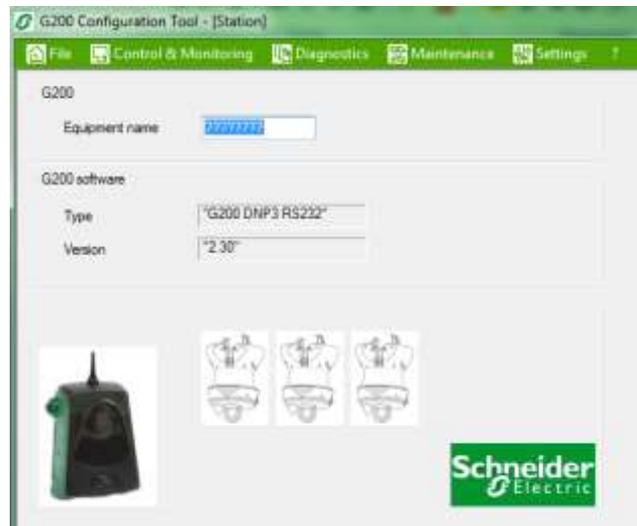


Maintenance

Station...

This window is automatically shown when the G200 is identified, or from the Maintenance\Station menu

- "Equipment Name":**
 - Local name. Can be used to identify the G200.
- "Type":**
 - Read only. G200 identified equipment (protocol, modem).
- "Version":**
 - Read only. G200 software version.

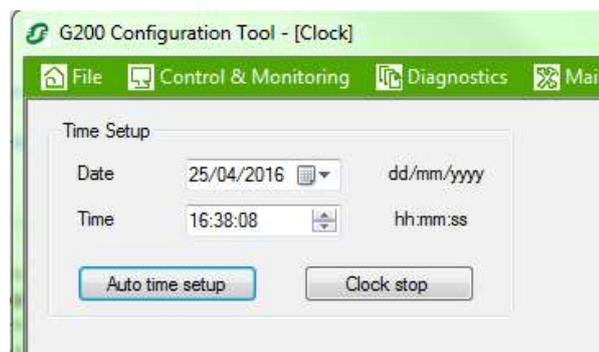


The equipment clock may be set by the configuration computer or automatically from the SCADA using protocol specific commands:

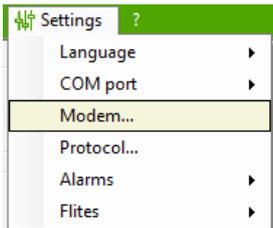
- Auto time setup:**
 - G200 automatically adjusts its date & time to the PC date & time.
- Manual setup time:**
 - G200 clock is manually set by the user.

Clock...

- Clock stop:**
 - When the equipment is stored for a long period of time, it is recommended to stop the clock to increase the service lifetime of the lithium battery associated with the component that manages the clock.



- Notes:**
 - (1) The G200 is delivered with the clock stopped.
 - (2) Date and time are only used for dating time-stamped events and by the protocol analyser.



Settings

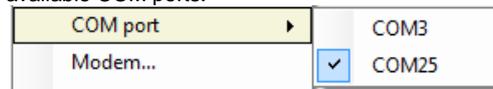
Language

Select desired language used among a list of available languages.



COM port

Select desired COM port for serial communication with the G200 from a list of available COM ports.



The list of available COM ports is not dynamically updated. If you use an USB/RS232 adapter, please connect it before launching the configuration tool.

Note: the setting is not exactly the same for all the different versions of protocol. Some parameters can be not present for certain versions in this menu, or present but disabled.

Modem...

Depending on the G200 software and the modem installed on the G200, different pages are shown.

RS232 PARAMETERS

Baud rate:

- Data-communication speed between SCADA and G200.
- Adjustable from 200 to 9,600 bps.
- Default value: 9,600 bps.

Note: for test purpose, it is better to select a low speed so that it is easier to see exchanged messages between SCADA and G200.

Parity:

- Parity of the characters in send mode. Select "none", "space", "even" or "odd". If possible, choose even parity to ensure secure transmission.

Frame error on idle interval:

- Uncheck if the modem or the transmission can generate an interval of more than one bit between two characters. If checked, the message will be rejected.
- Default value: checked.

Delay before transmission:

- Some modem requires a delay after receiving a message before to be able to transmit another one. If the delay is too short and if needed by the modem, the beginning of the message can be cut and so a frame error can be generated.
- Adjustable from 0 to 500 ms.
- Default value: 00 ms.

Handle DSR:

- Check if you want G200 to detect connection using DSR signal.
- Default value: unchecked.

Handle DCD:

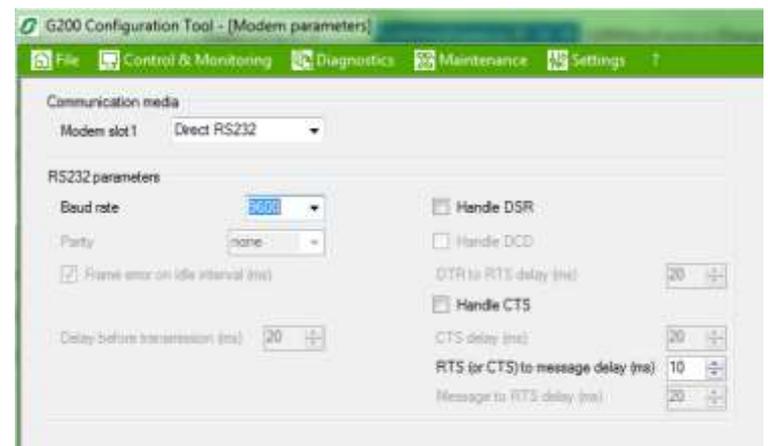
- To make G200 control reception with CD signal, check this option.
- Default value: unchecked.

DTR to RTS delay:

- Delay G200 shall wait after asserting DTR before setting RTS to <1>
- Adjustable from 0 to 500 ms.
- Default value: 20 ms.

COMMUNICATION MEDIA

Modem slot 1: [Direct RS232 \(permanent link\)](#)



Handle CTS:

- To make G200 wait for CTS signal (after asserting RTS signal) before sending message, check this option.
- Default value: unchecked.

CTS delay:

- Delay G200 shall wait for CTS to appear (if handled).
- Adjustable from 0 to 500 ms.
- Default value: 20 ms.

RTS (or CTS) to message delay:

- Delay G200 shall wait after RTS (or CTS if handled) appears before sending the message.
- Adjustable from 0 to 500 ms.
- Default value: 20 ms.

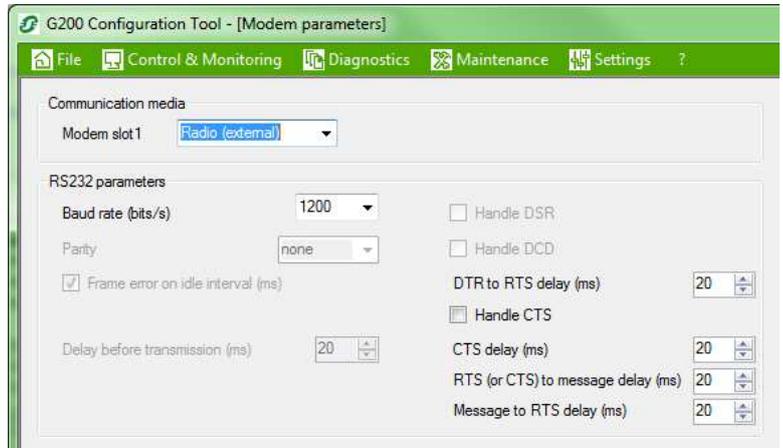
Message to RTS delay:

- Delay G200 shall wait after the end of message before asserting RTS low.
- Adjustable from 0 to 500 ms.
- Default value: 20 ms.

RS232 PARAMETERS

see "Direct RS232" modem.

Modem slot 1: Radio (external modem)



DIALUP PARAMETERS

Host tel number (main):

- SCADA main phone number, used to send the alarms to SCADA.
- 15 digits maximum.

Host tel number (standby):

- SCADA backup phone number, in case of no access using the main phone number.
- 15 digits maximum.

Mode: (DNP3 only)

Three possibilities:

- **SCADA:** G200 only communicates with a SCADA system (the address of the SCADA is configured in the main menu).
- **W500:** Not used
- **SCADA + W500:** Not used

Max transmission time:

- Maximum duration of a call, in Answering mode or Calling mode (alarm).

On time-out expiry, the modem hangs up.

Dial up delay time:

- Time-out delay used for alarms configured with "delayed" option:
- **First try:** adjustable from **0 to 1min. per steps of 1s**. Setting it to "0" selects a random value between 0 and 1 min (this is mandatory to prevent all equipment calling the SCADA at the same time).
- **Second try:** configurable from **0 to 5min. per steps of 60s**. Setting it to "0" selects a random value between 0 and 5 min.
- **Third try:** configurable from **0 to 10 min, in steps of 60s**. Setting it to "0" selects a random time between 0 and 10 min.

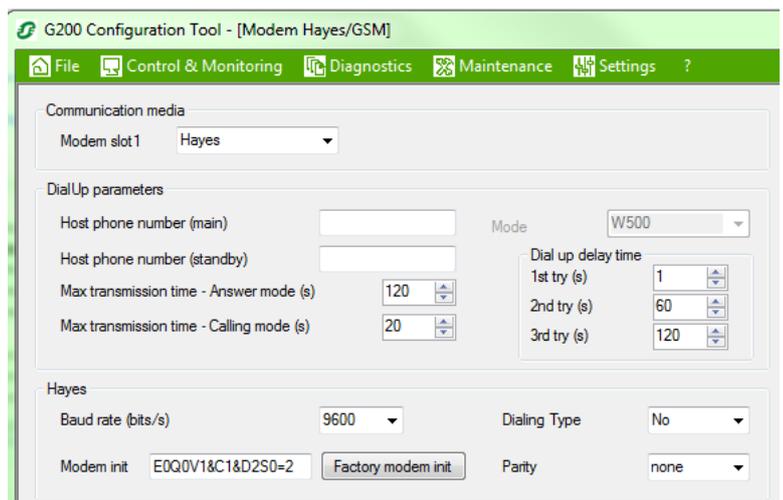
Note: 2nd and 3rd tries are only used if the preceding one (1st or 2nd one) did not manage to send the frame.

HAYES

Baud rate:

- Data-communication speed between SCADA and G200.
- Adjustable to **200/ 300/ 600/ 1,200/ 2,400/ 4,800/ 9,600 or 19,200bps**.
- Default value: 9600 bps (recommended).

Modem slot 1: Hayes (external Hayes modem)



Dialling type:

- Dialling Type of modem. Configurable to No/ Tone or Pulse. Some PSTN modems require a Pulse dialling mode.
- The default value is "No".

Modem init:

- Initialization string sent to the modem equipment power-up. Selecting **Factory modem init** function resets this string to its default value.
- The Modem initialization sequence must do the modem operate as following:
 - No echo
 - Turn on Carrier Detect Signal when remote carrier signal is present
 - Hang up when DTR is low
 - Return basic* result codes as Word
 - Auto-answer.

The default init. string configures these settings for standard Hayes modem.

*: **OK, CONNECT, RING, NO CARRIER, ERROR, BUSY, NO ANSWER.**

Parity:

- Parity of the characters in send mode. Select "none", "space", "even" or "odd". If possible, choose even parity to ensure secure transmission.

DIALUP PARAMETERS

see "Hayes" modem.

SIM CARD PARAMETERS

PIN code:

- Setting of the PIN into the SIM card (default value is 000).
- In case a wrong PIN is entered, "**GSM SIM card failure**" appears in the screen "**G200 equipment states**".

Note: after 3 unsuccessful PIN operations, the SIM card is locked. To unlock it, a mobile phone set is needed (G200 cannot do it). Please also refer to the SIM card user's guide to unlock it.

SHORT MESSAGE SYSTEM: SMS

Short message system enabled :

- To get a SMS (short message) sent to a specific GSM cell phone (the lineman's one, for instance) upon alarm detection, check this option.

Note: it is possible to have both an alarm sent to the SCADA and a SMS to a cell phone. The short message is sent first.

SMS service centre phone number:

- Phone number of the SMS server
- Please refer the SIM card user's guide in which this phone number is given.

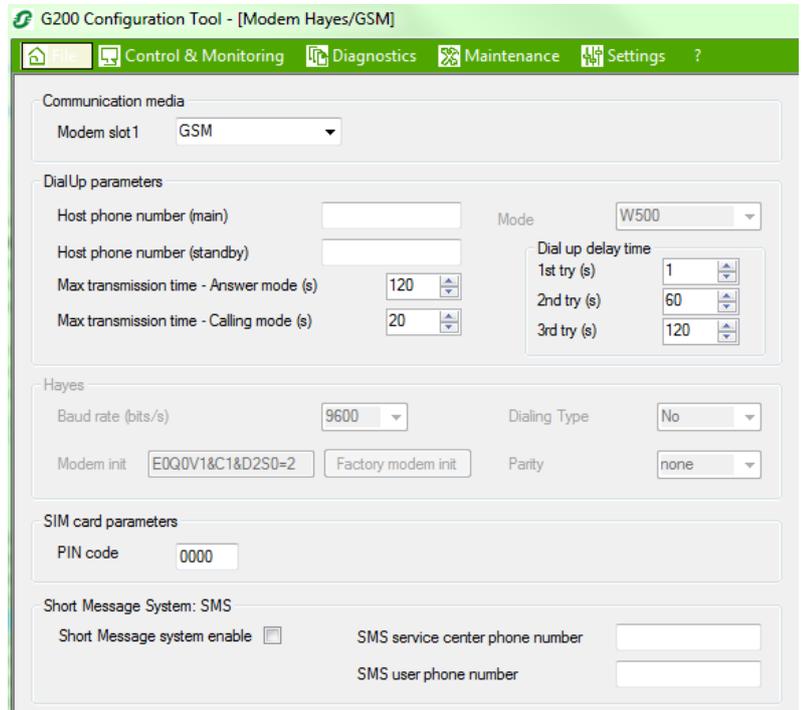
Note: you may set the phone number in international format (for example "+336...." for a French phone cell phone number).

SMS user phone number:

- GSM cell phone number of the person (lineman) to whom the SMS shall be sent.

Note: you may set the phone number in international format (for example "+336...." for a French phone cell phone number).

Modem slot 1: GSM (internal modem)



SIM CARD PARAMETERS

PIN Code:

- Setting of the PIN into the SIM card (default value is 000).
- In case a wrong PIN is entered, "**GSM SIM card failure**" appears in the screen "**G200 equipment states**".

Note: after 3 unsuccessful PIN operations, the SIM card is locked. To unlock it, a mobile phone set is needed (G200 cannot do it). Please also refer to the SIM card user's guide to unlock it.

GPRS COMMUNICATION PARAMETERS

APN Server:

- Enter the APN(Access Point Name) given by your GPRS network provider.

APN Login and Password:

- Enter the login and the password provided with your GPRS account.

Note: in most cases, login and password are not required for GPRS access.

Time between connection attempt :

- Period between two connection attempt, in case the connection is lost.

Daily modem reset hour (only for Modbus protocol):

- In case the connection is lost, this function permits to recover the connection to the GPRS operator, after a modem reset operation. If an hour is defined, the reset is performed every day at the same hour (periodic operation).
- **Note:** If "0h0" is defined, the daily modem reset is not activated.

G200 PARAMETERS

Mode: (only for DNP3 protocol)

Three possibilities:

- **SCADA:** G200 only communicates with a SCADA system (the DNP 3.0 address of the SCADA is configured in the main menu).
- **W500:** Not used
- **SCADA + W500:** Not used.

Listen Mode: (only for DNP3 protocol)

- To make G200 stay in standby to
- Check this option, if you want G200 to be in listen mode between connections due to alarms.

Slave ID: (only for Modbus protocol)

- In Modbus protocol, slave identification must be defined to be able to send an alarm to the L500 in case the IP address has been changed from the operator (for dynamic address only).
Note: this address is only managed in case of L500 Scada type. The same IP address must also be defined on L500 in the G200 setting.

Local Port:

- Enter the port number you want G200 is listening to incoming connection. Value is from 1 to 65535.

Modem slot 1: GPRS (internal modem)

Max transmission time :

- Maximum duration of a TCP/IP connection, in Answering mode and Calling mode (alarm).
- On time-out expiry, the TCP/IP connection is closed.
- Each time the G200 is receiving a request, the timer is re-armed.

TCP connect. delay:

Time to send an alarm configured with "delayed" option:

- **First try** adjustable from **0 to 1min. per steps of 1s**. Setting it to "0" selects a random time between 0 and 1 min (this is mandatory to prevent all equipment calling the SCADA at the same time).
- **Second try:** configurable from **0 to 5min. per steps of 1min**. Setting it to "0" selects a random time between 0 and 5 min.
- **Third try:** configurable from **0 to 10 min, in steps of 1 min**. Setting it to "0" selects a random time between 0 and 10 min.

Note: The 2nd and 3rd emissions are only used by the equipment if the preceding one did not manage to send the frame.

SCADA PARAMETERS:

IP address

You may enter the destination IP address of the SCADA system.

Remote port

Port number of the remote SCADA system, on which it (the SCADA system) is listening to incoming connection from G200 units.

DNP3 SETUP

"RTU Address":

- Source address used by the remote SCADA to identify this G200 through the DNP3 protocol.
- Adjustable from 0 to 65534.

"SCADA Address":

- Destination address used by the G200 to identify the remote SCADA through the DNP 3.0 protocol.
- Adjustable from 0 to 65534.

"W500 Address": not used.

LINK LAYER

Idle line delay:

- Minimum line idle interval between two consecutive frames.
- Adjustable from 10 to 100 ms.

Requires Data Link Confirm:

- To make the Link Layer send User Data using a "SEND-CONFIRM EXPECTED" frame type, check this option.
- To make the Link Layer send User Data using a "SEND-NO REPLY EXPECTED" frame type, uncheck this option.

Note: in case "SEND – NO REPLY expected" frame type is used, G200 will never send "RESET of remote link" frames. It shall strictly operate as a slave.

Maximum Data Link re-tries:

- Number of times the Link Layer shall try to send again its User Data, when the RTU doesn't receive any "CONFIRM" frame (ACK or NACK) to a message using "SEND – CONFIRM EXPECTED" frame types.
- When the Maximum Data Link re-tries is reached without confirmation, Link Layer will perform "RESET OF REMOTE LINK" to re-initialize the link.

Timeout:

- This is the delay that Link Layer will wait for a "CONFIRM" frame after sending a "SEND – CONFIRM expected" frame.
- Adjustable from 1 to 10 s.

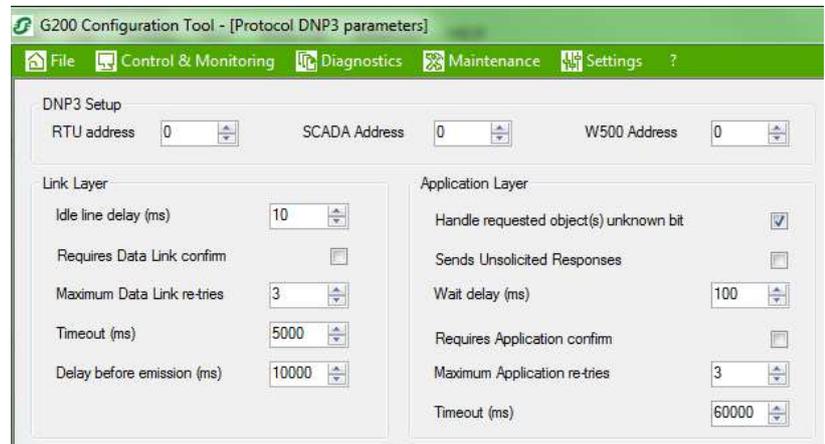
Delay before emission:

- Timeout delay before the first emission.
- Sometimes the connection time can be longer on the SCADA than on the RTU.
- This time-out delay must expire before the first emission is made (Unsolicited response mode).

Protocol...

This menu is used to configure protocol specific parameters

DNP3



APPLICATION LAYER

Handle requested object(s) unknown bit:

- If checked, the G200 will use a specific bit to indicate to the SCADA that the object required is unknown. If the Scada doesn't support this function, uncheck this option.

Sends Unsolicited Responses:

- Unsolicited Responses are enabled if this option is checked.

Wait Delay:

- To limit the number of frames for Unsolicited Responses, it is possible to declare a time-out delay so that, when an event occurs, G200 waits for this time-out after this event before sending a Unsolicited Response.
- This enables G200 to see whether other events happen during the delay, and, if so, to send all events in the same Unsolicited Response.
- This delay is adjustable from 0 ms to 5 s.
- Select "0 ms" if you do not want to use this feature.

Requires Application Confirm:

- To use "Application Confirm", check this option.
- Normally, when Sends Unsolicited Responses is enabled, you have to check this option, unless otherwise required.

Maximum Application re-tries:

- Defines the number of re-tries by the Application Layer, when the RTU doesn't receive any "Confirm" frame (Application Level) to a frame asking for an application confirmation.
- When the Maximum Application re-tries is reached without confirmation, G200 will stop sending the frame.

Timeout:

- Timeout delay for which the Application Layer will wait for a "Confirm" frame (Application Level) after sending a frame asking for an application confirmation.
- Adjustable from 1 to 5 min.

LINK LAYER**Link address:**

Permit to the SCADA to identify the G200 among all the far-end equipment.

Depending on the length of the link address field (1 or 2 octets), it can adopt all values between 0 and 254 or 0 and 65534.

Common address of ASDU:

This address is generally not used by the G200, but the latter controls it.

In general, it is set to 0 (although the standard defines this value as "not used"), to 1 or to the same value as the *link address*.

TRANSMISSION LAYER**Link transmission procedure:**

- Balanced correspond to Master-master transmission or Unbalanced to master-slave.
- The default setting is "Unbalanced".

Single character I used as - ACK:

- Check this option to use the single character I (E5) as an ACK, otherwise a fixed-length frame is used. In radio mode, unchecking this option is recommended, as the character I (E5) is easily generated by noise.
- The default setting is: checked

Single character I used as - NACK (requested data not available):

- Check this option to use the single character I (E5) as a NACK (requested data not available), otherwise a fixed-length frame is used. In radio mode, unchecking this option is recommended, as the character I (E5) is easily generated by noise.
- The default setting is: unchecked.

Field length - Link address:

- Defines the length of the link address field (1 or 2 octets).
- The default value is 1.

Field length - Common address of ASDU:

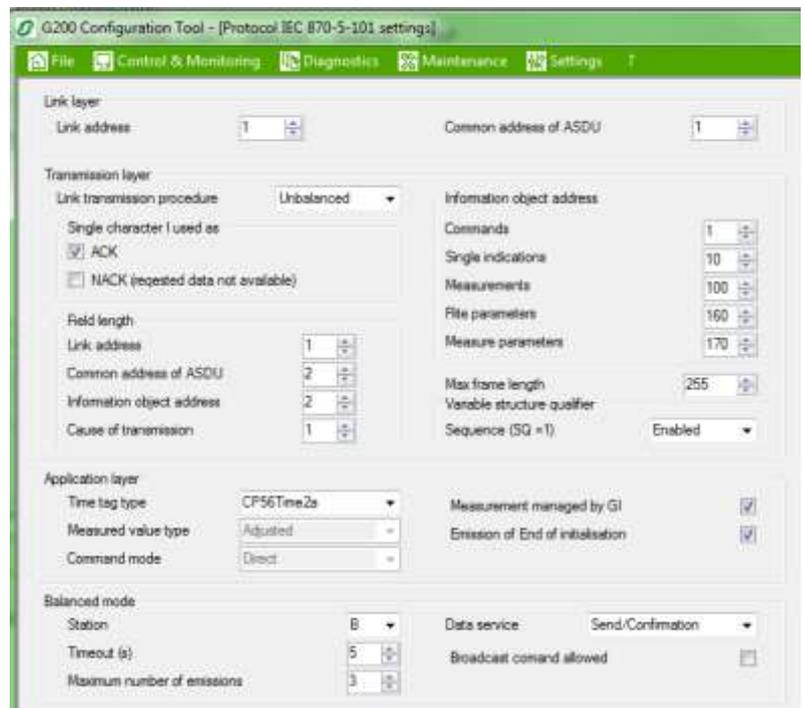
- Defines the length of the ASDU common address field (1 or 2 octets).
- The default value is 2.

Field length - Information object address:

- Defines the length of the object information address field (1, 2 or 3 octets).
- The default value is 2.

Field length - Cause of transmission:

- Defines the length of the cause of transmission field (1 or 2 octets).
- The default value is 1.

IEC 60870-5-101**INFORMATION OBJECT ADDRESS**

The value of the information object addresses is the object type base address + relative address. The relative addresses are given in the tables of G200 IEC101 protocol user guide, in the "Information object addresses" section. The base addresses can be defined by configuration. Follow the following rules:

- An object cannot have a null address.
- The addresses obtained must be less than the maximum possible value (255 for a 1-octet field, 65535 for a 2-octet field, 16777215 for a 3-octet field).
- The addresses must be unique (no overlap between the address areas of different types - except in the case of commands).

Commands:

- The values can range from 0 to 255. The default value is 1.

Single indications:

- The values can range from 0 to 255. The default value is 10.

Measurements:

- The values can range from 0 to 255. The default value is 100.

Flite parameters:

- The values can range from 0 to 255. The default value is 160.

Measure parameters:

- The values can range from 0 to 255. The default value is 170.

Max frame length:

- As specified in IEC 870-5-101. The values range from 11 to 255. Select a value less than 255 if shorter frames are required.
- The default value is 255 octets.

Variable structure qualifier: Sequence (SQ = 1):

- When "enabled" is selected, the G200 tries to shorten the frames when the same types of objects are to be sent in a message. Detailed explanation: when SQ = 1 is enabled, the ASDUs, with the same TID and COT are coded, when possible, as a sequence of information elements in an information object (SQ = 1), or as a sequence of information objects (SQ = 0) (for further details, see the M_SP_NA_1 coding in IEC 870-5-101, sub clause 7.3.1.1). As some PCs do not understand messages in which SQ = 1, this option can be disabled.
- The default option is "enabled".

APPLICATION LAYER

Time tag type:

- This option is used to send spontaneous status changes without a time tag or with a time tag using binary time on 3 or 7 octets (CP24Time2a or CP56Time2a).
For example, a single point change can be transmitted in the format ASDU M_SP_NA_1, M_SP_TA_1 or M_SP_TB_1, according to the option selected.
- Note:** binary time on 2 octets is not used.
- The default option is "7-octet binary time". Binary time on 3 octets consists only of minutes and milliseconds, whereas 7-octet binary time gives the year, month, day (of month), hours, minutes and milliseconds.

Measured value type:

- Normally, IEC 101 proposes "Normalized" or "Adjusted".
- With G200, the only possibility is "Adjusted".

Command mode:

- Normally, IEC101 propose two options: "Direct" and "Select and execute".
- With G200, the only possibility is "Direct".

Measurements managed by GI:

- Define if the General Interrogation from the SCADA includes the request of measurements.
- The default setting is: checked.

Emission of End of initialization:

- Unchecked this option if you do not want the G200 to send an "End of initialisation" (M_EL_NA_1) message after start-up (when the SCADA does not support this information).
- The default setting is: checked.

MODBUS SERIAL

Modbus Address:

- Source address used by the remote SCADA to identify this G200 through the protocol.
- Adjustable from 1 to 255 in GSM and RS232 version.
- 1 is the default Modbus address value in GSM and RS232 version. In GPRS version, the value is fixed to 255.

MODBUS TCP

Slave ID:

The Slave ID is used when the G200 is working in **non-permanent mode** with **dynamic IP**. This mode is implemented in the L500 SCADA to identify the G200 on incoming TCP connection.

The Slave ID is read by the SCADA using the Identification frame (see below).

- The Slave ID must be different for every G200 equipment and must be set in the L500 system as well
- Value is from 0 to 65534

BALANCED MODE

Station:

- As specified in IEC 870-5-101. RTUs are usually type B stations, but it may be necessary to declare them as type A.
- The default setting is B.

Timeout:

- As specified in IEC 870-5-101. It can vary between 1 and 60 s.
- The default value is 5 s.

Maximum number of emissions:

- As specified in IEC 870-5-101. It includes the first transmission and the repetitions. It can vary between 1 and 10.
- The default value is 3.

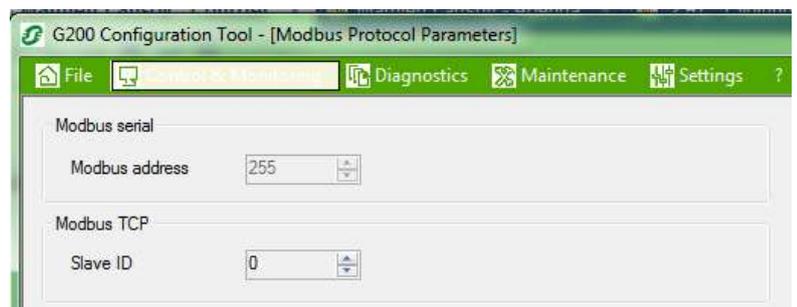
Data service:

- As specified in IEC 870-5-101. Send/Confirm or Send/No Reply.
- The default setting is "Send/Confirmation".

Broadcast command allowed:

- Normally, the broadcast command cannot be used in balanced mode. However, when the collision avoidance algorithm is enabled, the broadcast command can be used to reduce the number of messages exchanged. Check this option to use this additional possibility.
- The default setting is: unchecked.

MODBUS



This menu is used to configure the alarm parameters for the long range communication (to the SCADA system) and storage parameters.

Alarms: Overall...

- Gives access to general G200 alarm menu.

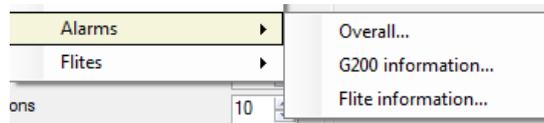
Alarms: G200 information...

- Gives access to G200 alarms and events storage menu.

Alarms: Flite information...

- Gives access to FLITE alarms and events storage menu.

Alarms



This menu is used to configure automatic calls to the supervisor (SCADA).

ALARMS

Alarm message enabled:

- **Checked:** If a change of state of alarms and/ or switch position occurs, a call is made to the SCADA.
- **Unchecked:** G200 does not send any alarm message to the SCADA.

Test alarm:

- To test long range communication, check the option.
- At the next configuration backup, G200 shall issue a call to the SCADA.

AUTOMATIC CALL

Automatic call:

- To issue a cyclic call to the SCADA, check the option "Enabled".
- Select the Start Time (next time after backup), and the Period (in hours).

RELAY PARAMETERS

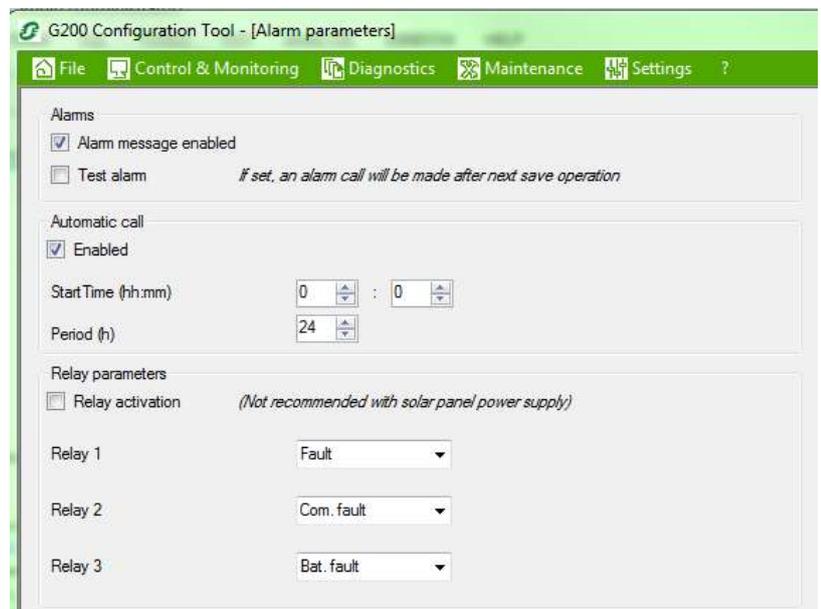
Relay activation:

- Permit to activate the use of relays if this option is checked. It is not recommended to use relays with solar panel power supply.

Each digital output relay (1 to 3) may be assigned to one of the following actions:

- **Fault:** when a line fault current occurs on any FLITE, the DO closes. When all line fault currents are cleared, the DO opens.
- **Com fault:** when a short-range communication interruption occurs on any FLITE, the DO closes. When all communication interruptions are cleared, the DO opens.
- **Bat Fault:** when a battery potential issue occurs on any FLITE, the DO closes. When all battery potential issues are cleared, the DO opens.
- **Fault x:** if a line fault current occurred on FLITE number x (x=1,2 or 3), the DO closes. When the fault current is cleared, the DO opens.

Overall...



This menu is used to configure the alarm parameters and storage information for G200 events.

Note: for each parameter, the choice "Info in stack" is not available with Modbus protocol.

For each item, you can decide with the choice "Alarming" whether the corresponding event is:

- Alarmed, Alarmed on bit set only, Alarmed on bit clear only, or Not alarmed.
- Stored in the CLASS1 stack (for DNP3 or IEC101 only), or not stored.

G200 INFORMATION

Equipment Start:

- Alarm and storage of all G200 starts/ restarts.

Conf:

- Alarm and storage of all local/remote configuration
- It is set to "0" for a local configuration and to "1" for a remote one.

G200 IP address change: (Modbus TCP/IP only)

- Alarm and storage of IP address change occurrence (for dynamic IP address only).

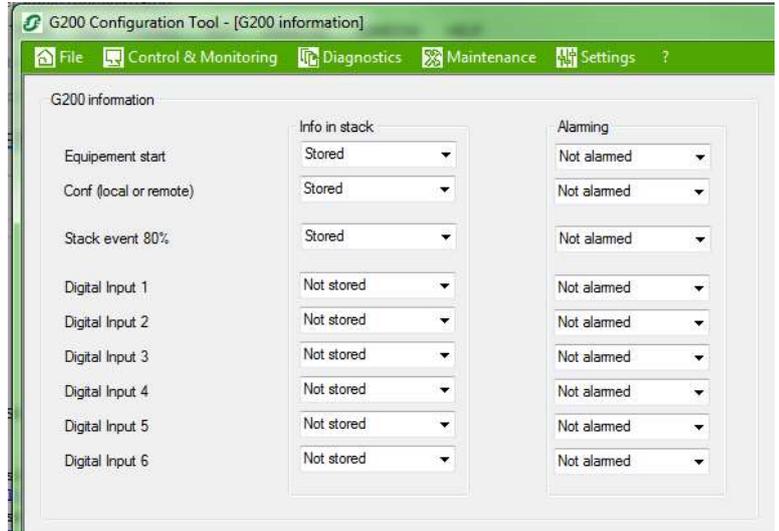
Stack event 80%:

- Alarm and storage of protocol stack 80% overflow occurrences.
- When the protocol stack has reached 80% of its capacity, it may send an alarm to the SCADA so that it downloads the stack before event loss occurs.

Digital Input x:

Alarm and storage of all digital input status changes.

G200 information...



This menu is used to configure the alarm parameters and storage information for FLITE events.

Note: for each parameter, the choice "Info in stack" is not available with Modbus protocol.

For each item, you can decide with the choice "Alarming" whether the corresponding event is:

- Alarmed, alarmed on bit set only, alarmed on bit clear only, or not alarmed.
- Stored in the CLASS1 stack (for DNP3 or IEC101 only), or not stored.

FLITE INFORMATION

di/dt:

- Alarm and storage of all di/dt fault currents detected by any FLITE unit.

Imax:

- Alarm and storage of all IMAX fault currents detected by any FLITE unit.

Flite battery check:

- Alarm and storage of low battery alarm from any FLITE unit.

Voltage presence: (not for Modbus):

- Alarm and storage of MV trespassing according to selected Voltage threshold.

Communication fault:

- Alarm and storage on FLITE-G200 short range communication interruptions.
- An alarm is set when the preset number of successive FLITE communication interruptions is greater than the selected threshold (hereafter).

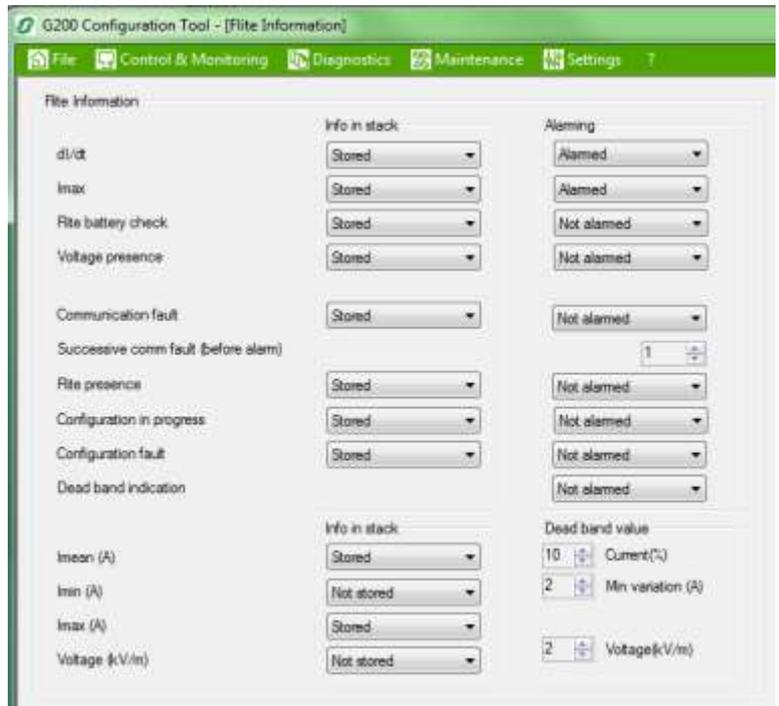
Successive comm fault (before alarm):

- Number of successive interruptions before the alarm (above) is set.
- Adjustable from 1 to 4.

Flite presence: (not for Modbus):

- Alarm and storage of FLITE presence (a logical address is affected to the FLITE) or absence (the logical address is set to zero) events.

Flite information



Configuration in progress: Alarm and storage activation when a FLITE configuration is in progress.

Configuration fault: Alarm and storage activation when a FLITE configuration potential issue occurs.

Dead band indication: (not for Modbus): Alarm activation when the dead band threshold has been reached (I_MAX, I_MIN, I_MEAN or Voltage).

Imean (A): Storage of average current measured by any FLITE unit.

Imin (A): Storage of minimum current measured by any FLITE unit.

Imax (A): Storage of maximum current measured by any FLITE unit.

Voltage (kV/m): Storage of voltage availability measured by any FLITE unit.

DEAD BAND VALUE

Current measurement:

- **Current (%):** relative current variation required for storage.
- **Min variation (A):** minimum absolute variation that is required for storage.

Note: to be stored, a current must increase or decrease in percentage above what is set in "Current(%)" **AND** increase in absolute value above what is set in "Min variation (A)".

Voltage availability:

- **Voltage (kV/m):** dead band value for voltage availability. It is the minimum variation (between the last measurement sent to the SCADA and the new measurement) that is taken into account.

Note: this voltage availability is calculated from an electrical field measurement (in kV/m).

This menu is used to configure the short range radio communication between G200 and FLITEs.

FLITE IDENTIFICATION

NOTICE

HAZARD OF BAD FUNCTIONALITY

During the first installation, it is mandatory to activate a FLITE identification with the Identification process.

Failure to follow these instructions can result in equipment damage.

Identify flites: by clicking this button, G200 searches for all nearby FLITE units and records their unique physical address. The process takes 90 seconds, and can be stopped when all desired Flites are detected.

FLITE COMMUNICATION PARAMETERS

Logical address:

- Logical address that is used by the G200 to address FLITEs.
- Adjustable from 0 to 9.
- A FLITE is considered as not present if its logical address is 0.

NOTICE

HAZARD OF BAD CONFIGURATION

All FLITE units must have a different logical address from 1 to 9. For example, say that 3 FLITEs have been detected:

- FLITE on phase A => select "1" as its logical address.
- FLITE on phase B => select "2" as its logical address.
- FLITE on phase C => select "3" as its logical address.

Failure to follow these instructions can result in equipment damage.

Physical address:

- Physical address (in hexadecimals, on 6 bytes) of the FLITE units identified by the G200.
- This list is updated by the "FLITE identification" command in this page.
- This field cannot be modified by the operator.

Note: a FFFFFFFF value means that there is no corresponding FLITE unit.

RSSI Level:

- RSSI means "Received Signal Strength Indication"
- Used to get information on the signal level received by FLITE. This signal level is indicated in "Status" field.
- In correct conditions, it should be **greater than 30 %**.

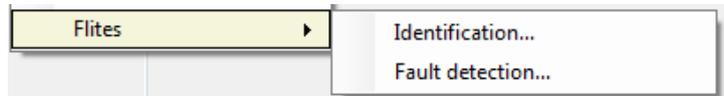
Status:

- Used to indicate the result of RSSI command or Flash command.

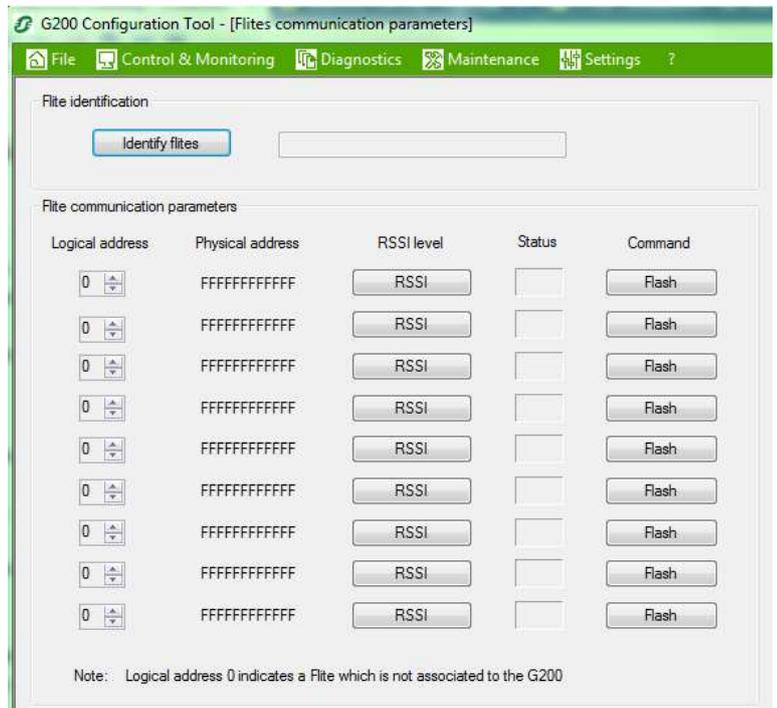
Command:

- Command (signal) used to FLASH a FLITE unit.

Flites



Identification...



This menu is used to configure FLITE fault detection parameters.

For each FLITE unit, following parameters are adjustable:

FAULT DETECTION

dl/dT level:

- Minimum phase current variation threshold above which a fault current is detected.
- Adjustable from 6 to 80A, or disabled.
- dT is automatically set to 60ms (50Hz) or 48ms (60HZ).

Note: the selected threshold may be set at any value, whatever the load current is. This is why using a dl/dT algorithm is preferred to a I_{max} algorithm, for one may apply the same value for the whole feeder since the feeding substation.

I_{max} level:

- Minimum absolute phase current threshold above which a fault current is detected.
- Adjustable from 100 to 800A.

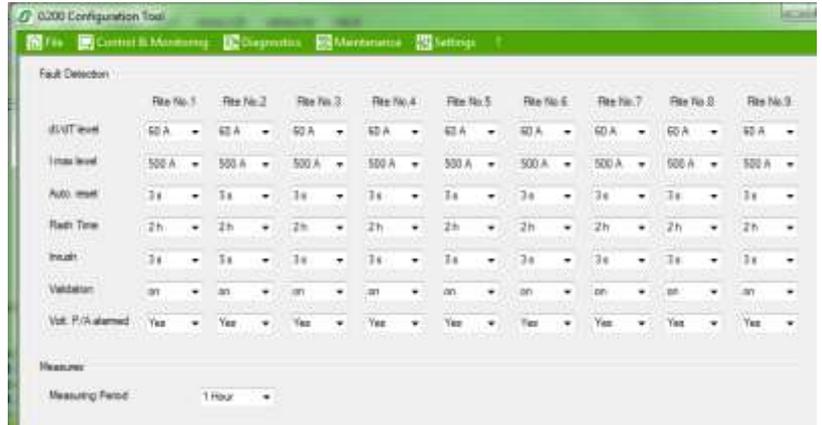
Note: the selected threshold must be greater than the maximum load current in use on the conductor at the location where it is installed.

Auto. reset:

- Time-out for which FLITE waits after MV has return before resetting the flash.
- Adjustable to 2/ 30/ 70s for automatic voltage reset or to OFF ("0").
- For transient fault detection.

Note: FLITE may be set to find all types of fault currents (permanent, transient and "self-extinguishable") depending on its parameter settings.

Fault detection



Flash time:

- Time-out after which flash is reset.
- Adjustable from 2 to 16 hours.

Inrush:

- Used to filter inrush currents due to MV/LV transformers magnetizing currents upon line energizing.
- Adjustable to 3/ 30/ 60s or to OFF ("without").
- Setting it to OFF means to de-activate the inrush filter (not recommended).

Validation:

- When set to "on", FLITE must see a voltage dip within 70 s-after the fault current occurrence to confirm it.
- Setting it to OFF ("without") may be useful for some specific applications.

Volt. P/A alarmed:

- This is the field used to configure Voltage Presence / Absence alarms parameter.
- Adjustable to "Yes" or "No":
 - Yes: Voltage Presence / Absence is alarmed.
 - No: Voltage Presence / Absence is not alarmed. Information is updated each hour after a request message.
- Default value: "No".

MEASURES

Measuring Period:

- Period used by FLITE for current measurement
- Adjustable to 2 min (for test purpose only) or to 1 hour (standard operation).

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