Automatic start of a generator

General description

This application note will help you to set your Xtender for an automatic start of a generator as per different parameters such as the output power, the level of battery voltage, or a combination of several conditions.
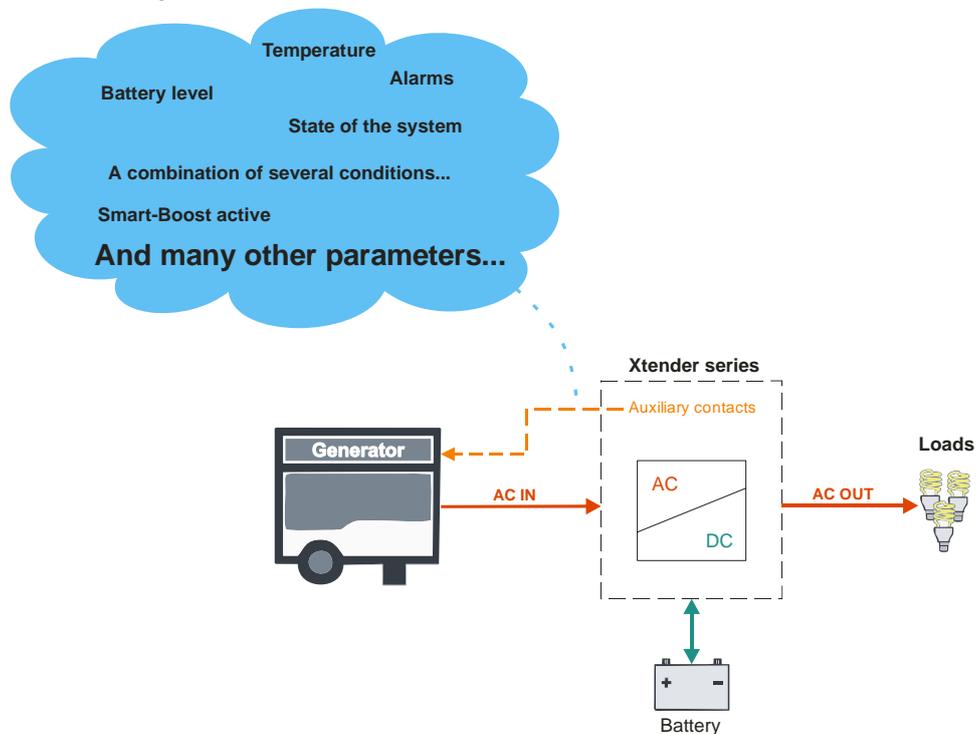
Features

- Activation with set schedules

- Activation according to one or multiple events :
  - External command
  - Voltage level of batteries
  - Over temperature
  - Output power
  - Etc…

- Possibility to combine different conditions.

Minimal configuration

- **Range of inverters**
  - **All Xtender Series**

- **Xtender**
  - *Software vers.   : 1.3.28 and higher*

- **RCC-02/-03**
  - *Software vers.   : 1.3.34 and higher*
  - *RCC User level : EXPERT*

Application schematic

The generator can start with :

Temperature
Alarms
Battery level
State of the system
A combination of several conditions...
Smart-Boost active
And many other parameters...

Xtender series
Auxiliary contacts
Generator
Loads
AC IN
AC
AC OUT
DC
Battery

(Figure 1) Xtender connected with a generator

Detailed description

This description consists of two parts.

The first explains how an Xtender can physically start a generator.

A second shows the programming options for allowing or not this start.

Why the function "Automatic start of a generator" ?

In actual fact, all hybrid systems require an automatic management of the different actors that compose them. It is therefore possible, with an Xtender, automatically to manage a generator and run it only when one or more conditions are met.

The different types of generators

It exists on the market all kinds of generators of different powers, but also different start methods.

There are generators to start manually (via a cord) and generators that start automatically (using a key or a switch).

The "manual start generators" can not be started automatically. Which is however quite possible for generators that start automatically !

For this class of generator, two types are further distinguished :

1. Generator requiring two wire contact
2. Generator requiring three wire contact

⚠ **In general, only diesel generators can start automatically, this for the following reason:**

A diesel generator requires only a preheating before a start, while a gasoline generator needs a choke.

How to drive these generators ?

For a "two wire contact generator", the start requires simply the closure of one auxiliary relay of the Xtender to start or stop the generator.
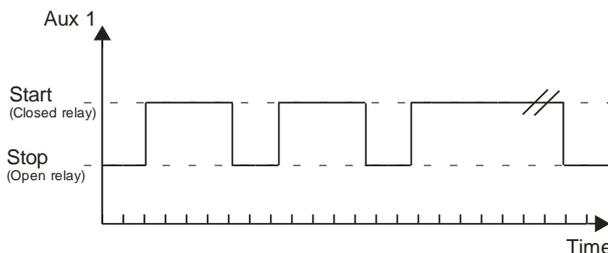
(Figure 2) Aux 1 as start contact

To start a "three wire generator", it is necessary to use two auxiliary relays.

A first, the auxiliary relay 1, as the ON/OFF of the generator and a second, the auxiliary relay 2, as a start button (series of pulses).
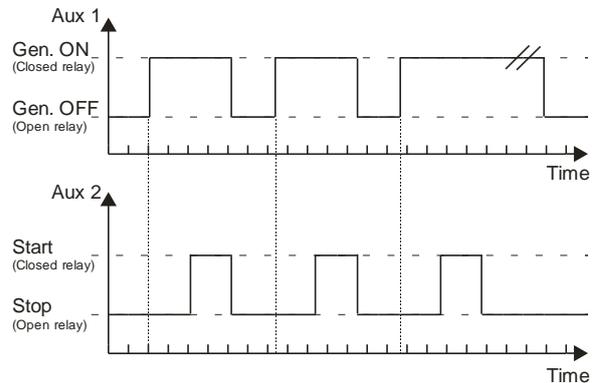
(Figure 3) Aux 1 as the ON/OFF contact and Aux 2 as start contact

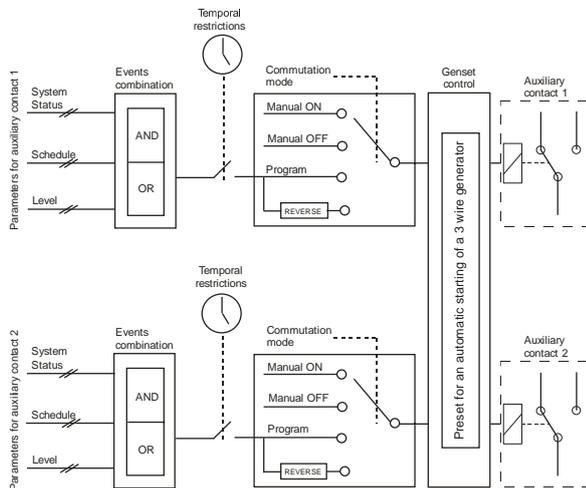# Auxiliary contacts - Description

The Xtender inverter-charger is equipped with two auxiliary contacts (Aux1 / Aux2) each with one free of potential contact (reverser). These two contacts allow multiple functions to be carried out by using adequate cabling as well as simple programming (for more information, refer to the section "Auxiliary contacts" of the RCC-02/-03 user manual).

(Figure 4) Summary of programming possibilities for the auxiliary contacts

Each auxiliary contact may therefore be activated as per the system status, a schedule or a particular level. These events can be combined with an OR / AND function.

The result of this events combination may be subject to a temporal restriction. For example, to avoid having too much noise during the night, a temporal restriction could be applied to prevent the generator to start from 8:00 pm at 8:00 am.

Note that, if necessary, each of the auxiliary contacts can be manually controlled.

Preset for an automatic start of a generator

For an automatic start of a 3 wire generator, the Xtender offers the possibility to activate an enlarged function where the auxiliary contacts 1 and 2 are already pre-programmed for this purpose.

(For more information, refer to the section "Help for the programming" in page 4 of this document)

List of events

The events listed on the right are being assigned two numbers of parameters. The first corresponds to the auxiliary contact 1 (Aux 1) and the second corresponds to the auxiliary contact 2 (Aux 2).

Here is the list of events that can be taken into account in the programming of the auxiliary contacts :

- Set schedules {1269} {1378}
- Xtender OFF {1225} {1333}
- Xtender ON {1518} {1519}
- Remote ON/OFF input active {1543} {1544}
- Battery undervoltage alarm {1226} {1334}
- Battery overvoltage {1227} {1335}
- Inverter or Smart-Boost overload {1228} {1336}
- Overtemperature {1229} {1337}
- No Overtemperature alarm {1520} {1521}
- Active charger {1231} {1339}
- Active inverter {1232} {1340}
- Smart-Boost active {1233} {1341}
- AC In present with fault {1234} {1342}
- AC In present {1235} {1343}
- Transfer relay drawn {1236} {1344}
- Battery charging in bulk charge phase {1238} {1346}
- Battery charging in absorption phase {1239} {1347}
- Battery charging in equalization phase {1240} {1348}
- Battery charging in floating phase {1242} {1350}
- Battery charging in reduced floating phase {1243} {1351}
- Battery charging in periodic absorption phase {1244} {1352}
- Autonomy test in progress {1529} {1530}

(For more information about these events, refer to the section "Contacts activated by an event" of the RCC-02/-03 user manual)

List of levels

Here is the list of particular levels (with delay) that can be taken into account in the programming of the auxiliary contacts :

- Contact active according to the battery voltage {1245} {1353}
- Contact active by inverter power or Smart-Boost {1257} {1366}
- Activation of the contact 1 on battery temperature {1503} {1504}

(For more information about this events, refer to the section "Contacts activated by an event" of the RCC-02/-03 user manual)

Help for the programming

The first element to be defined before any program is the type of generator (see page 2, The different types of generators)

For the cases listed below, we consider that the used generator requires three wire contacts. This is therefore necessary to active in the "Extended functions" the parameter "Genset control" {1491} that set the auxiliary contact AUX 1 as the operational contact and the auxiliary contact AUX 2 as the startup contact (with pulse).

Configurable parameters for the "Genset control"

To be compatible with almost all the generators of the market, four programmable parameters are available (figure 5).

A. Main contact hold/interrupt time {1574}

Some generators require an interruption of the main contact between the cranking attempts (choke pulse). This parameter allows to set this duration.

B. Duration between the starter attempts {1494}

This configuration determines the duration between the start attempts. It also determines the duration between the activation of the operational contact and the first attempt at restarting.

C. Duration of starter pulse {1492}

With this configuration you can adjust the time at which the start contact is activated.

D. Number of startup attempts {1493}

The start contact is activated a limited number of times in order to protect the starter if the generator has a fault. Once the maximum number of start has been reached, the operational contact is also deactivated. For a new attempt to be made the condition that generated the start must disappear and reappear.
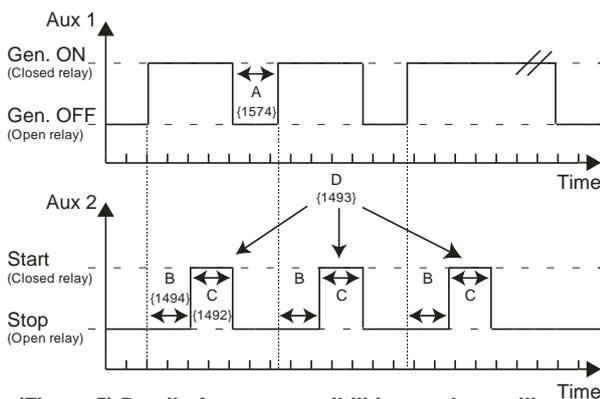
(Figure 5) Detail of preset possibilities on the auxiliary contact

The start is carried out by first activating the operational contact (Aux 1) and then activating the startup contact (Aux 2). The latter engages several times, if necessary, to starting the motor. If a voltage appears at the terminals of AC IN, the startup contact is released.

Additional configurable parameters

Parameters to configure only for the auxiliary contact AUX 1 (the operational contact).

Contact activated with set schedules {1269} {1378}

The auxiliary contact can also be activated like a programmable clock. Three different weekly programs are available. For each program, the time frame may be applied to one or several days of the week. If the finishing time is programmed before the starting time, the time frame is not taken into account.

Contact activated by an event {1455} {1456}

The auxiliary contacts may be activated by the states or events occurring in the installation. Each event may be combined with another to establish complex functions (see List of events in page 3.

Contact activated by levels
- As per the battery voltage {1245} {1353}
- As per the inverter power or Smart-Boost {1257} {1366}
- As per the battery temperature {1503} {1504}

The auxiliary contacts can be activated on levels such as the level of battery voltage or temperature (see List of particular levels with constraint p. 3). At each of these levels is associated an activation delay. As the events, levels may be combined with another to establish complex functions.

Time restrictions {1203} {1312}

These configurations allow the time frame to be defined in which the contact should under no circumstances be activated. Three distinct schedules are accessible in the form of restriction programs (programs 1 to 3). For each program, it is possible to select the day of the week where the restriction is activated. If the day is selected it appears on the screen and if it is not selected it is represented on the screen by two horizontal lines. Once the days are selected, it is necessary to adjust the time frame where the restriction is active using the "starting time" and "finishing time" configurations. If the finishing time is programmed before the starting time, the restriction time frame is not taken into account.

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Security : Limit the time of activation with a parameter of Maximum duration of activation {1514} {1515}

If the maximum duration for the relay activation that you have selected is reached and if the activation conditions are still present (for instance a battery undervoltage), the contact will not be reactivated as long as the conditions are present. Therefore there is a risk that the auxiliary contact remains locked in this deactivated state and you will have to reset manually this alarm by deactivating and then activating this parameter.

Use this function with care and only as a security.

When the conditions are met, either one or two relays are activated permanently. If you wish that the activation duration is limited in time, even if the conditions are met, you can activate this function. Once the relay is activated, a countdown runs according to the duration you have selected. Once this countdown is completed the relay is released, even if the conditions are still there. The relay can not be anymore activated as long as the activation conditions have not disappeared.

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Frequently Asked Questions

Why the function OR / AND?

The parameter "Combination of events mode" {1497} {1498} defines how the various events intended to activate the auxiliary contact are combined. Either a single event suffices to activate the contact (OR function) or it must have all the active events in order for the contact to be activated (AND function).

As an example let us consider two events :

1 Battery undervoltage alarm
2 Overtemperature

If you want to activate the generator directly when one of the events occurs, it is necessary to activate the OR function.

If you want the generator engages only when both events occurs, it is necessary to activate the AND function.

Why programmed levels with time constraints?

Adding time constraint to one or more events can prevent the systems constantly start and stop the generator.

For example, if the generator starts with the event "Battery undervoltage alarm", the batteries will be rapidly charged. Then, the generator stops after a short time and will restart when the battery voltage level is down again. This repeated sequence is inadvisable for the generator and the batteries.

In this case, a temporal restriction would thus start the generator only after exceeding a certain time the low voltage level of the batteries, but also to stop the generator only after spending some time at the high voltage level of batteries.

Thus, the batteries will be fully charged before turning off the generator.

How to automatically start a generator when it is a secondary energy source?

As described in the application note "AN005 Automatic management of two different energy sources" it is possible to have as second energy source a generator (figure 6).
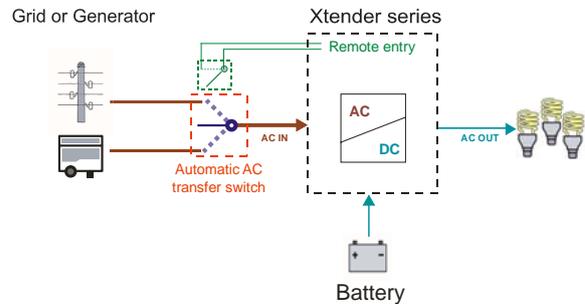
(Figure 6) Automatic management of two different energy sources

It is also possible, requiring some wiring, to automatically manage this generator.

However, there remains a difficulty. It may happen that the generator does note receive the order to stop despite the return of the main source. It is therefore necessary to prohibit the generator once the main source is present.

To detect the presence of the main source and then disconnect the generator, we propose to use a "not wired contact" of the relay K3 of the Automatic AC transfer switch.

Thus, whatever the type of generator (2 or 3 wire), you can ensure that the generator will be turned off once the presence of the main source.

For more information about the wiring, see the figure 7 and 8 on the next page

Notes

Associated application notes :

► AN005 Automatic management of two different energy sources

Schematic wiring between the generator and the Xtender

2 wire generator

AC switch

Public grid
(Main source)

Remote entry

AC

DC

Generator
(Second source)

G

Uout

Command +

K3 *

5   6

AUX 1

AUX 2

Loads
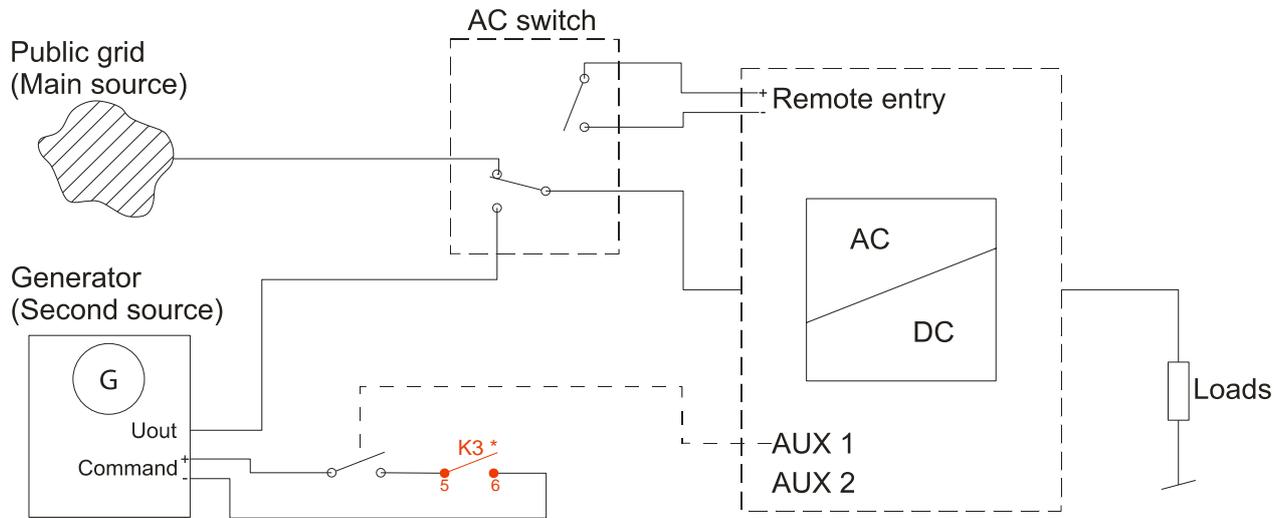
* K3 is a relay of the "Automatic AC transfer switch" where the contact 5-6 is free.

(Figure 7) Automatic management of a 2 wire generator as second energy source

3 wire generator

AC switch

Public grid
(Main source)

Remote entry

AC

DC

Generator
(Second source)

G

Uout

Command +

Pulse +
Pulse

K3 *

5   6

AUX 1

AUX 2

Loads

* K3 is a relay of the "Automatic AC transfer switch" where the contact 5-6 is free.

(Figure 8) Automatic management of a 3 wire generator as second energy source

Auxiliary contacts programming map

This map is a summary containing all adjustable parameters for each auxiliary contact. These parameters are adjustable using the RCC-02/-03.

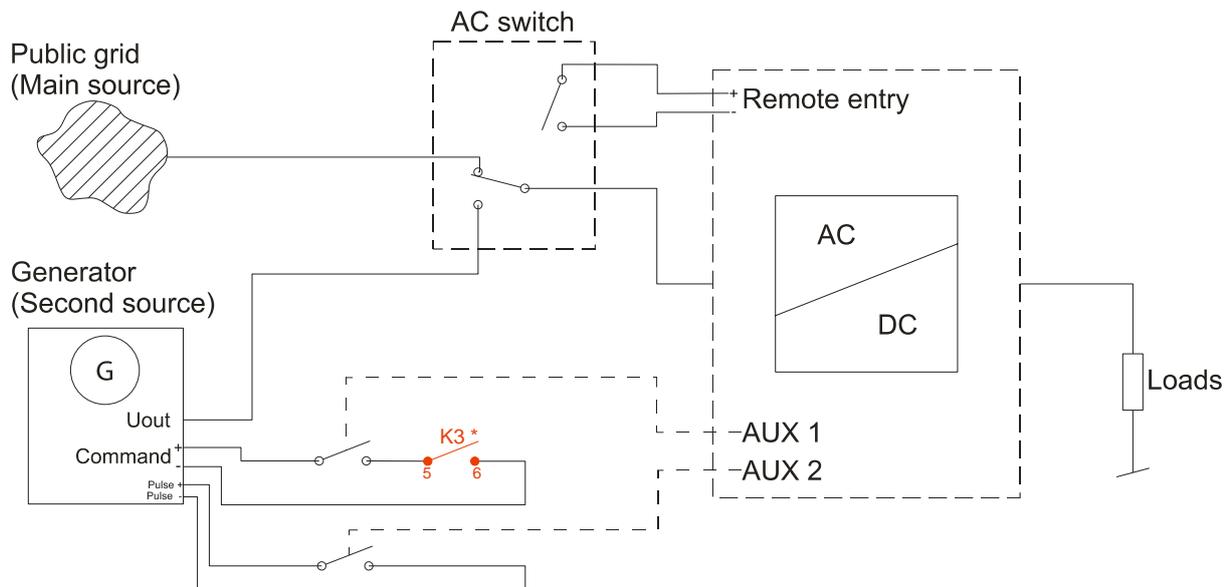| Parameter	Unit	12			24			48		
		Factory	Min	Max	Factory	Min	Max	Factory	Min	Max
AUXILIARY CONTACT 1										
Operating mode (AUX 1 / AUX 2)	Text	Automatic	Automatic	Manual OFF	Automatic	Automatic	Manual OFF	Automatic	Automatic	Manual OFF
Combination of the events for the auxiliary contact (AUX 1 / AUX 2)	Text	Any (Function OR)	Any (Function OR)	All (Function AND)	Any (Function OR)	Any (Function OR)	All (Function AND)	Any (Function OR)	Any (Function OR)	All (Function AND)
Temporal restrictions (AUX 1 / AUX 2)										
Program 1 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Program 2 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Program 3 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Program 4 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Program 5 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Contact active with a fixed time schedule (AUX 1 / AUX 2)										
Program 1 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59

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Parameter	Unit	12			24			48		
		Factory	Min	Max	Factory	Min	Max	Factory	Min	Max
Program 2 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Program 3 (AUX 1 / AUX 2)										
Day of the week (AUX 1 / AUX 2)	days	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU	-- -- -- -- -- -- --	-- -- -- -- -- -- --	MO TU WE TH FR SA SU
Start hour (AUX 1 / AUX 2)	hh:mm	07:00	00:00	23:59	07:00	00:00	23:59	07:00	00:00	23:59
End hour (AUX 1 / AUX 2)	hh:mm	20:00	00:00	23:59	20:00	00:00	23:59	20:00	00:00	23:59
Contact active on event (AUX 1 / AUX 2)										
Xtender OFF (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Xtender ON (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Remote entry (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Battery undervoltage (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Battery overvoltage (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Inverter or Smart- Boost overload (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Overtemperature (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
No overtemperature (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Active charger (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Active inverter (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Active Smart-Boost (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
AC input presence but with fault (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
AC input presence (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Transfer relay ON (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
AC out presence (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Bulk charge phase (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Absorption phase (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Equalization phase (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Floating (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Reduced floating (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Periodic absorption (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Autonomy test running (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Contact active according to battery voltage (AUX 1 / AUX 2)										
Use dynamic compensation of battery level (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Battery voltage 1 activate (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes

Parameter	Unit	12			24			48		
		Factory	Min	Max	Factory	Min	Max	Factory	Min	Max
Battery voltage 1 (AUX 1 / AUX 2)	Vdc	11.7	9	18	23.4	18	36	46.8	36	72
Delay 1 (AUX 1 / AUX 2)	min	1	0	60	1	0	60	1	0	60
Battery voltage 2 activate (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Battery voltage 2 (AUX 1 / AUX 2)	Vdc	11.9	9	18	23.9	18	36	47.8	36	72
Delay 2 (AUX 1 / AUX 2)	min	10	0	60	10	0	60	10	0	60
Battery voltage 3 activate (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Battery voltage 3 (AUX 1 / AUX 2)	Vdc	12.1	9	18	24.2	18	36	48.5	36	72
Delay 3 (AUX 1 / AUX 2)	min	60	0	60	60	0	60	60	0	60
Battery voltage to deactivate (AUX 1 / AUX 2)	Vdc	13.5	9	18	27	18	36	54	36	72
Delay to deactivate (AUX 1 / AUX 2)	min	60	0	480	60	0	480	60	0	480
Deactivate if battery in floating phase (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Contact active with inverter power or Smart-Boost (AUX 1 / AUX 2)										
Inverter power level 1 activate (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Power level 1 (AUX 1 / AUX 2)	% Pnom	120	20	120	120	20	120	120	20	120
Time delay 1 (AUX 1 / AUX 2)	min	1	0	60	1	0	60	1	0	60
Inverter power level 2 activate (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Power level 2 (AUX 1 / AUX 2)	% Pnom	80	20	120	80	20	120	80	20	120
Time delay 2 (AUX 1 / AUX 2)	min	5	0	60	5	0	60	5	0	60
Inverter power level 3 activate (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Power level 3 (AUX 1 / AUX 2)	% Pnom	50	20	120	50	20	120	50	20	120
Time delay 3 (AUX 1 / AUX 2)	min	30	0	60	30	0	60	30	0	60
Inverter power level to deactivate (AUX 1 / AUX 2)	% Pnom	40	20	120	40	20	120	40	20	120
Time delay to deactivate (AUX 1 / AUX 2)	min	5	0	60	5	0	60	5	0	60
Contact active according to battery temperature (AUX 1 / AUX 2) With BSP or BTS										
Contact activated with the temperature of battery (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Contact activated over (AUX 1 / AUX 2)	°C	3	-10	50	3	-10	50	3	-10	50
Contact deactivated below (AUX 1 / AUX 2)	°C	5	-10	50	5	-10	50	5	-10	50
Contact active according to SOC (AUX 1 / AUX 2) Only with BSP										
Contact activated with the SOC 1 of battery (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Contact activated below SOC 1 (AUX 1 / AUX 2)	% SOC	50	0	100	50	0	100	50	0	100
Delay 1 (AUX 1 / AUX 2)	h	12	0	99	12	0	99	12	0	99
Contact activated with the SOC 2 of battery (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Contact activated below SOC 2 (AUX 1 / AUX 2)	%	30	0	100	30	0	100	30	0	100
Delay 2 (AUX 1 / AUX 2)	h	.2	0	99	.2	0	99	.2	0	99

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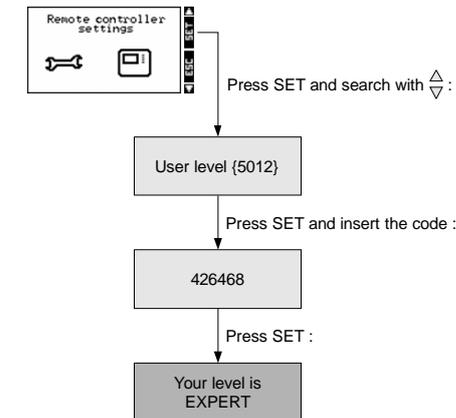| Parameter	Unit	12			24			48		
		Factory	Min	Max	Factory	Min	Max	Factory	Min	Max
Contact activated with the SOC 3 of battery (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Contact activated below SOC 3 (AUX 1 / AUX 2)	%	20	0	100	20	0	100	20	0	100
Delay 3 (AUX 1 / AUX 2)	h	0	0	99	0	0	99	0	0	99
Contact deactivated over SOC (AUX 1 / AUX 2)	% SOC	90	0	100	90	0	100	90	0	100
Delay to deactivate (AUX 1 / AUX 2)	h	.2	0	10	.2	0	10	.2	0	10
Deactivate if battery in floating phase (AUX 1 / AUX 2)	No/Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Security, maximum time of contact (AUX 1 / AUX 2)	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Maximum time of operation of contact (AUX 1 / AUX 2)	min	600	10	1200	600	10	1200	600	10	1200
Reset all settings (AUX 1 / AUX 2)		S	S	S	S	S	S	S	S	S
AUXILIARY CONTACTS 1 AND 2 EXTENDED FUNCTIONS										
Generator control active	No/Yes	No	No	Yes	No	No	Yes	No	No	Yes
Number of starting attempts		5	0	20	5	0	20	5	0	20
Starter pulse duration (with AUX2)	sec	3	1	20	3	1	20	3	1	20
Time before a starter pulse	sec	3	1	20	3	1	20	3	1	20
Main contact hold/interrupt time	sec	0	0	30	0	0	30	0	0	30

RCC-02/-03 Programming guide

This programming guide will illustrate with a concrete example. As shown in figure 9, we have a system consisting of a 3 wire generator connected to the AC-IN of an Xtender powered by a battery. At the AC-OUT of the Xtender are connected some loads.
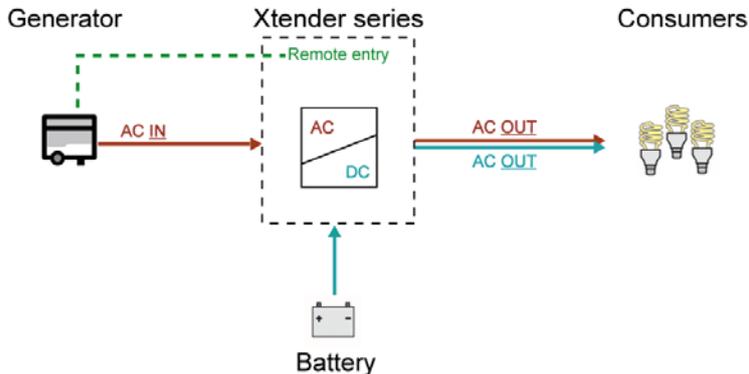
(Figure 9) Automatic management of a 3 wire generator as energy source

To configure the various Xtender settings to start the generator at a low voltage battery or a power outage, both with a certain time, follow the steps below :

Step 1 – User level to Expert

Press SET and search with △▽ :

User level {5012}

Press SET and insert the code :

426468

Press SET :

Your level is EXPERT

¡ The code is available in the user manual RCC -02 / -03

Step 2 – Restore default settings

Press SET and search with △▽ :

BASIC SETTINGS {1100}

Press SET and search with △▽ :

Restore default settings {1395}

Press SET, selection Yes with △▽ and press SET :

Wait a few moment and the system is restored
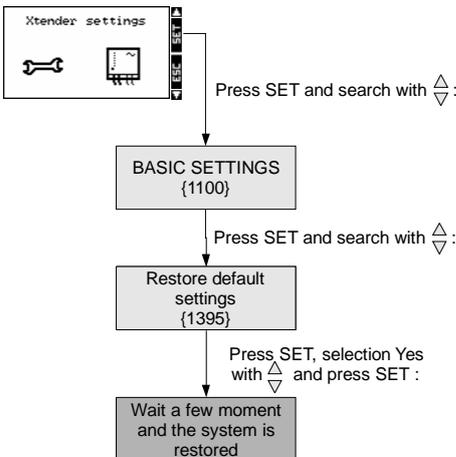
Step 3 – Active the Genset control
(only for a 3 wire generator)

Press SET and search with △▽ :

Auxiliary contacts 1 and 2 extended functions {1489}

Press SET and search with △▽ :

Generator control active {1491}

Press SET, selection YES with △▽ and press SET :

Genset control activated
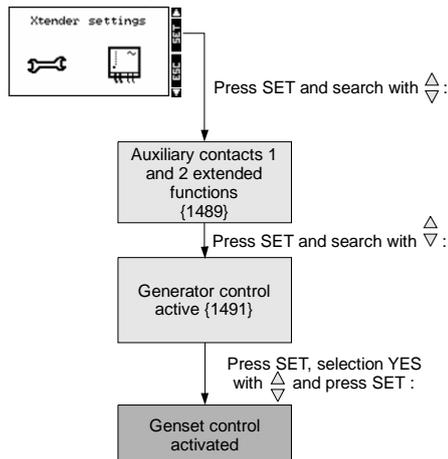
Step 4 – Settings of the start contacts
(for more information, refer to the figure 5 p.4)

Step 4.1 – Number of starting attempts

Press SET and search with △▽ :

Auxiliary contacts 1 and 2 extended functions {1489}

Press SET and search with △▽ :

Number of starting attempts {1493}

Press SET, selection the desired number ¡ with △▽ and press SET :

Number of starting attempts is set
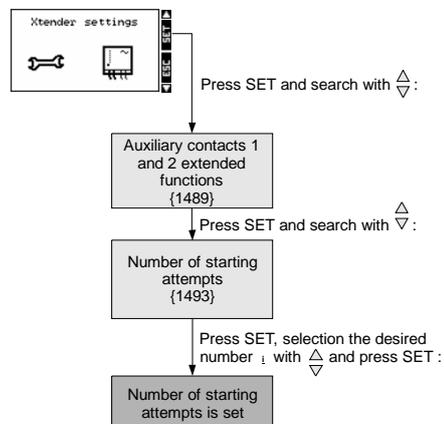
¡ The factory value for this number is « 5 ». This value is suitable for most generators.

Step 4.2 – Starter pulse (with AUX2)

```
Xtender settings
```

Press SET and search with △▽ :

Auxiliary contacts 1 and 2 extended functions {1489}

Press SET and search with △▽ :

Starter pluse duration (with AUX2) {1492}

Press SET, selection the desired number ¡ with △▽ and press SET :

Time of starter pulse is set

¡ The factory value for this number is « 3 seconds ». This value is suitable for most generators.
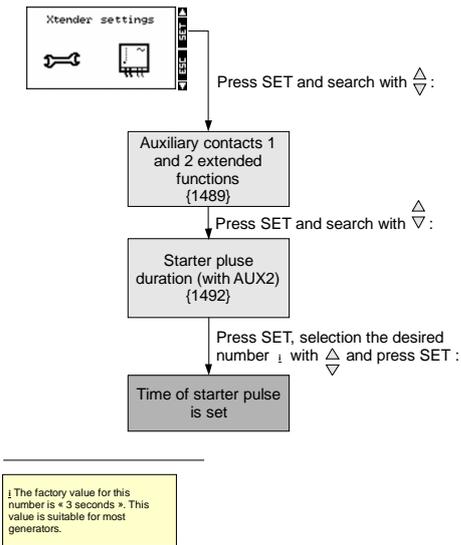
Step 4.3 – Time before a starter pulse

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Xtender settings
```

Press SET and search with △▽ :

Auxiliary contacts 1 and 2 extended functions {1489}

Press SET and search with △▽ :

Time before a starter pulse {1494}

Press SET, selection the desired number ¡ with △▽ and press SET :

Time of starter pulse is set

¡ The factory value for this number is « 3 seconds ». This value is suitable for most generators.

Step 4.4 – Main contact hold/interrupt time

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Xtender settings
```

Press SET and search with △▽ :

Auxiliary contacts 1 and 2 extended functions {1489}

Press SET and search with △▽ :

Main contact hold/interrupt time {1574}
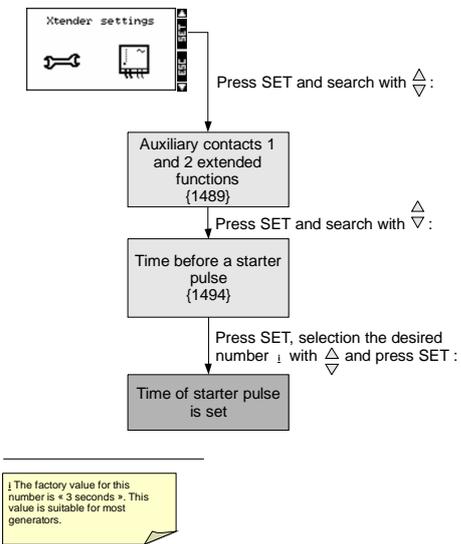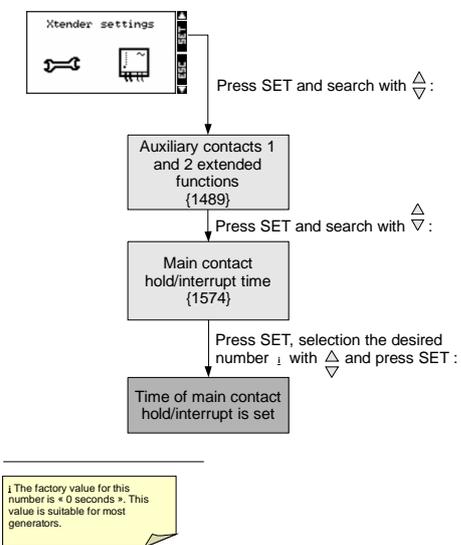
Press SET, selection the desired number ¡ with △▽ and press SET :

Time of main contact hold/interrupt is set

¡ The factory value for this number is « 0 seconds ». This value is suitable for most generators.
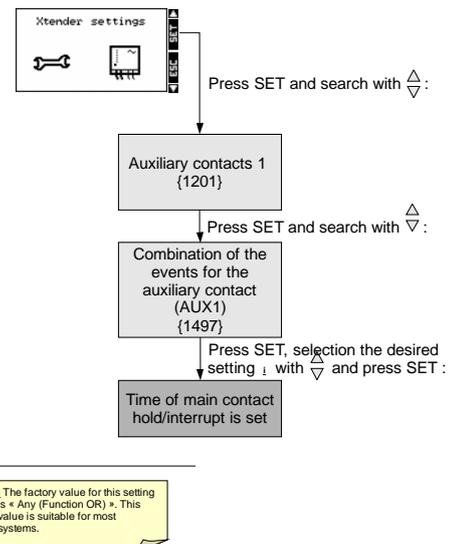
Step 5 – Setting of the auxiliary contact 1

For more information and a better view of all the programming options, refer to the "Auxiliary contacts programming map" on page 8.

Step 5.1 – Operating mode

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Xtender settings
```

Press SET and search with △▽ :

Auxiliary contacts 1 {1201}

Press SET and search with △▽ :

Operating mode (AUX1) {1202}

Press SET, selection the desired setting ¡ with △▽ and press SET :

Time of main contact hold/interrupt is set

¡ The factory value for this setting is « Automatic ». This setting is necessary to drive a generator with an Xtender.
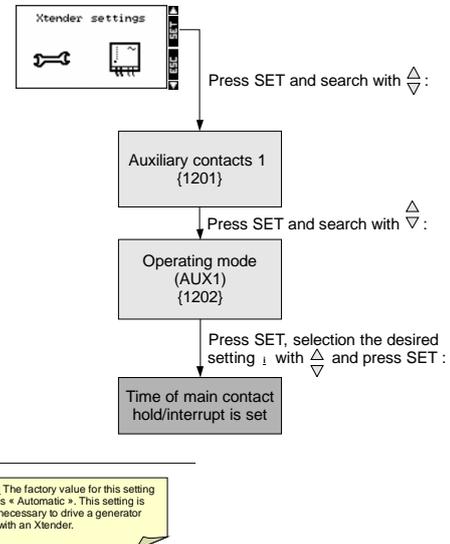
Step 5.2 – Combination of the events for the auxiliary contact

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Xtender settings
```

Press SET and search with △▽ :

Auxiliary contacts 1 {1201}

Press SET and search with △▽ :

Combination of the events for the auxiliary contact (AUX1) {1497}

Press SET, selection the desired setting ¡ with △▽ and press SET :

Time of main contact hold/interrupt is set

¡ The factory value for this setting is « Any (Function OR) ». This value is suitable for most systems.

STUDER

Step 6 – Contact active according to the battery voltage

For this setting, we will help with the "Auxiliary contacts programming map" on page 8. The parameters are adjustable from the following sub-menu :

Xtender settings

Press SET and search with △▽ :

Auxiliary contacts 1
{1201}

Press SET and search with △▽ :

Contact active in function of battery voltage (AUX1)
{1245}

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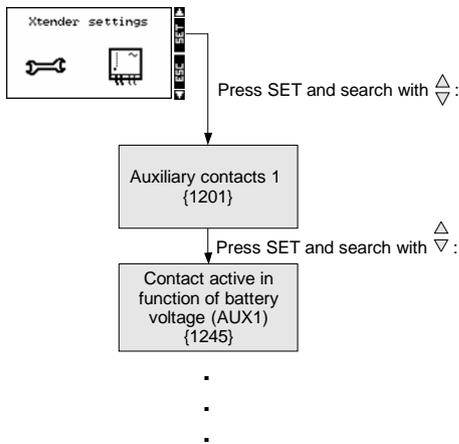
Note that factory values are suitable for most generators.

Step 7 – Contact active with inverter power
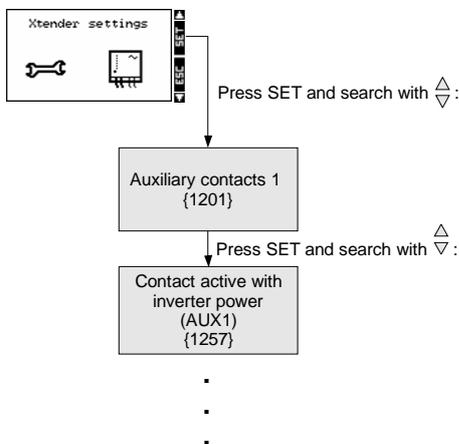
For this setting, we will help with the "Auxiliary contacts programming map" on page 8. The parameters are adjustable from the following sub-menu :

Xtender settings

Press SET and search with △▽ :

Auxiliary contacts 1
{1201}

Press SET and search with △▽ :

Contact active with inverter power (AUX1)
{1257}

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Note that factory values are suitable for most generators.

End of the programming

Notes

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Switzerland

Studer Innotec SA
Rue des Casernes 57
1950 SION / Switzerland
Tel :027 205 60 80 / Fax : 027 205 60 88
Email: info@studer-innotec.com
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