

Controller

ATSC20

Operating instructions



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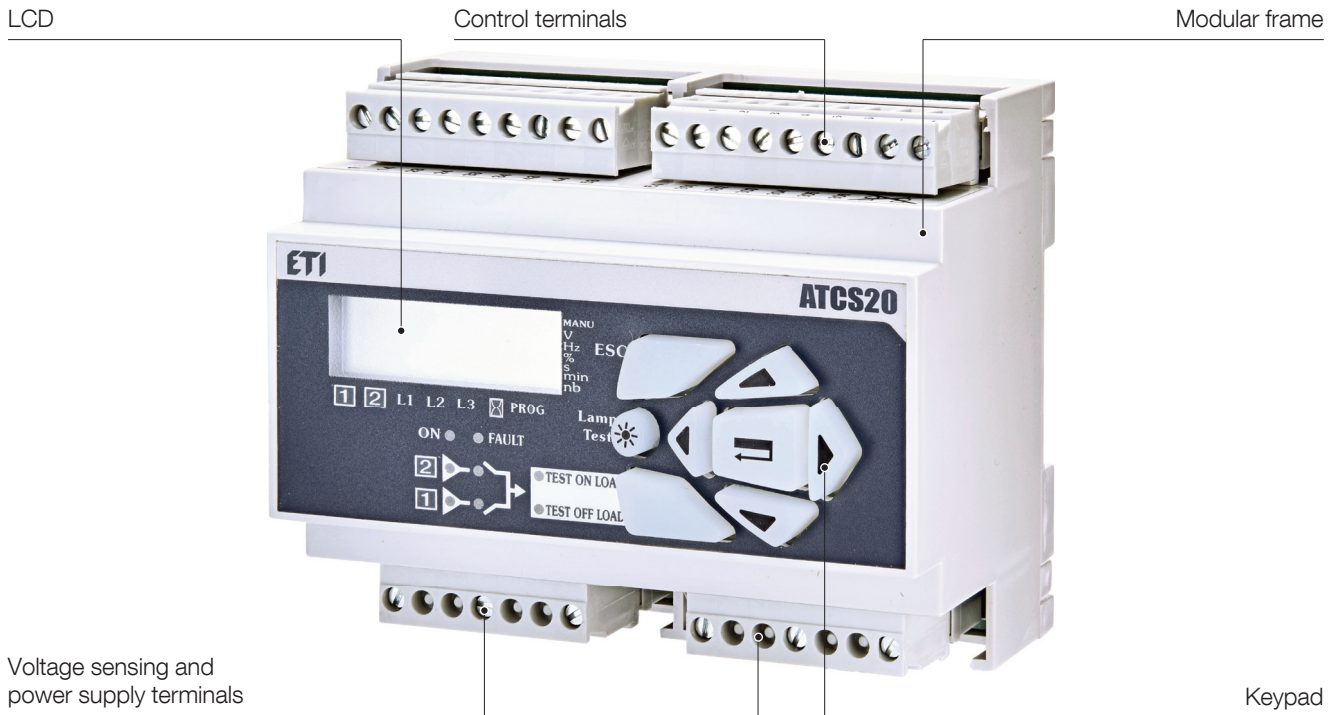


For personnel and product safety, please read the contents of these operating instructions carefully before connecting.

1. GENERAL PRESENTATION

1.1. Product introduction

1.1.1. ATSC20



ATSC20 is modular controller used in automatic transfer switch systems (1-0-2). It monitors 2 separate power sources and electrically controls various kind of transfer switches for autonomous switching between available sources. Impulse or contactor output logic enables to control: contactors, circuit breakers or other motorised switches.

2. INSTALLATION

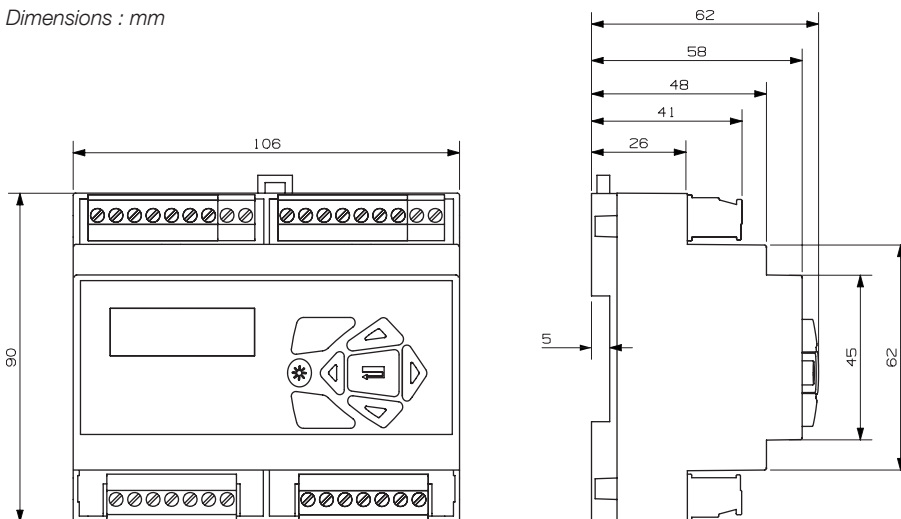
2.1. Mounting

2.1.1. DIN rail mounting



2.2. Dimensions

Dimensions : mm



2.3. Characteristics

2.3.1. IP

IP2 and class II on front face.

2.3.2. Operation

- Temperature : -20 °C to +60 °C.
- Humidity : 80 % at 55 °C - 95 % at 40 °C.

2.3.3. Consumption

7.5 VA max.

2.3.4. Measurement category

Cat III.

2.3.5. Storage conditions

Maximum storage is one year.

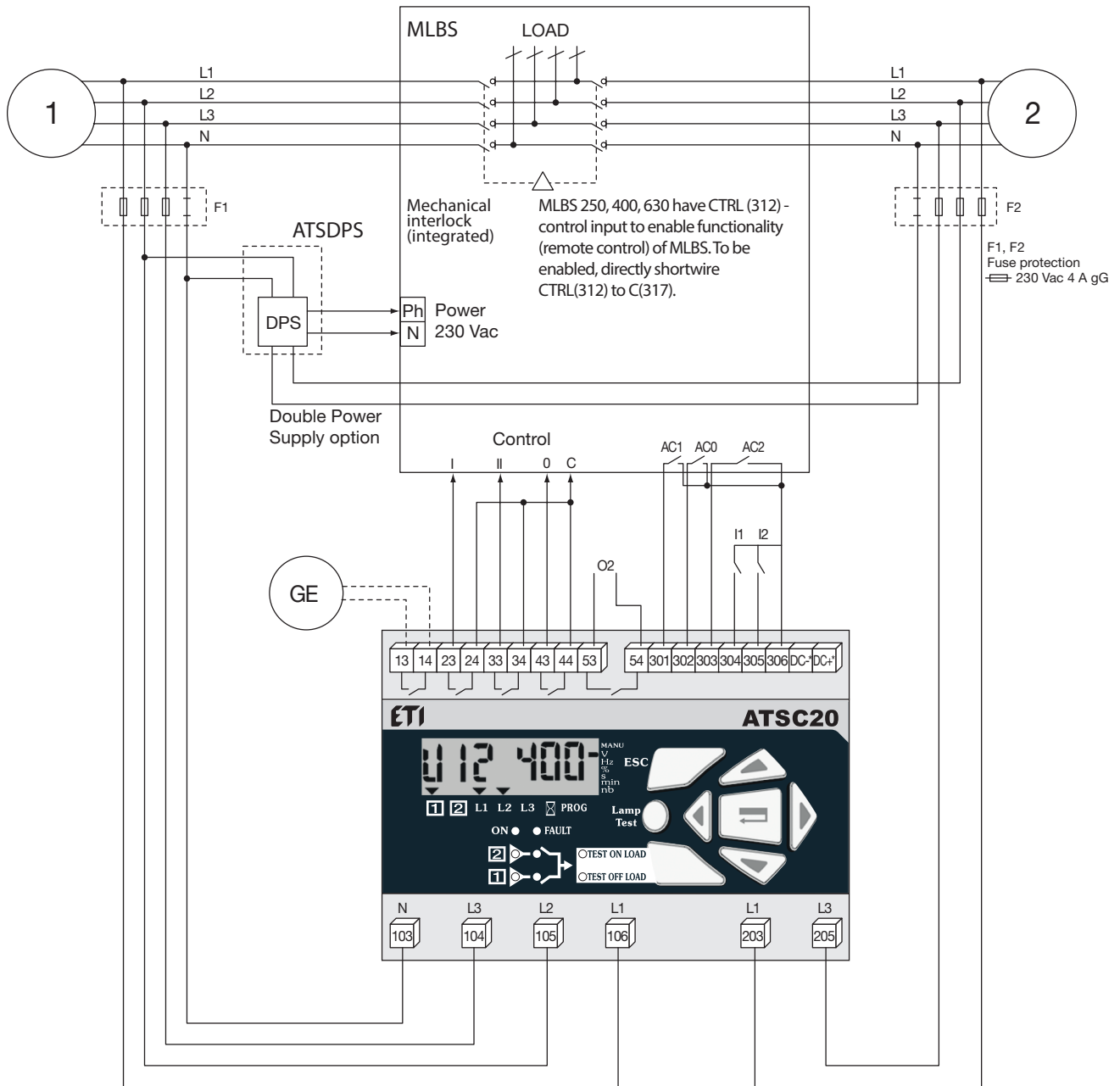
- Maximum storage temperature: 55 °C
- 95 % humidity non condensing at 40 °C.

3. CONNECTIONS

3.1. Control circuits

3.1.1. 400 Vac (P-P) application with neutral conductor switching type technology

- Configure the type of control logic in impulse mode (see Programming chapter).
- Automatic Power supply 203-205 or 104-106 (see Power supply chapter).



* Only on DC versions.

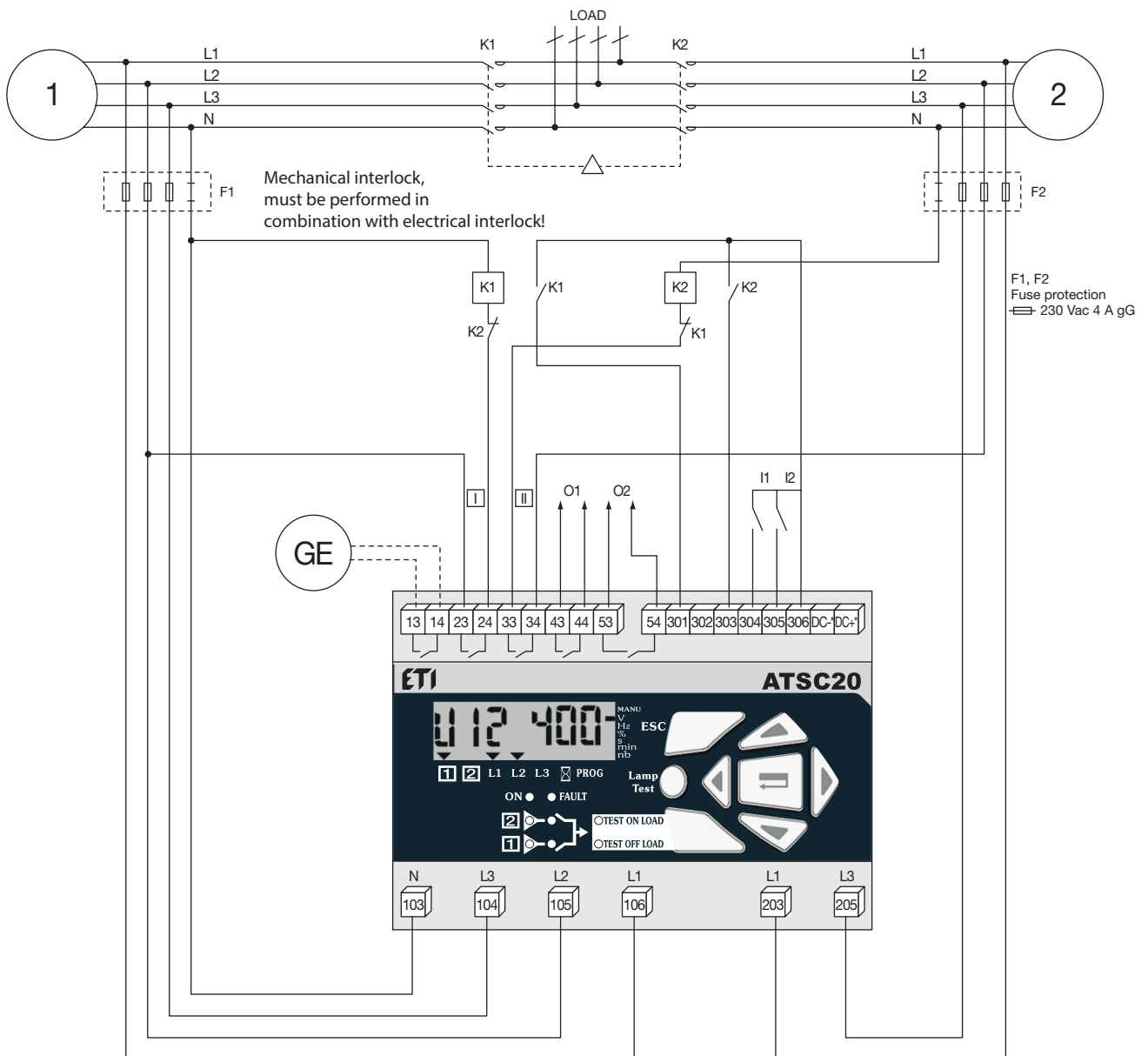


Maximum control cables leng = 10 m. In case of longer distance, insert control relays.

3.1. Control circuits (cont.)

3.1.2. 400 Vac (P-P) application with neutral conductor contactor type technology

- Configure the type of control logic in contactor (see Programming chapter).
- Automatic Power supply 203-205 or 104-106 (see Power supply chapter).



* Only on DC versions.

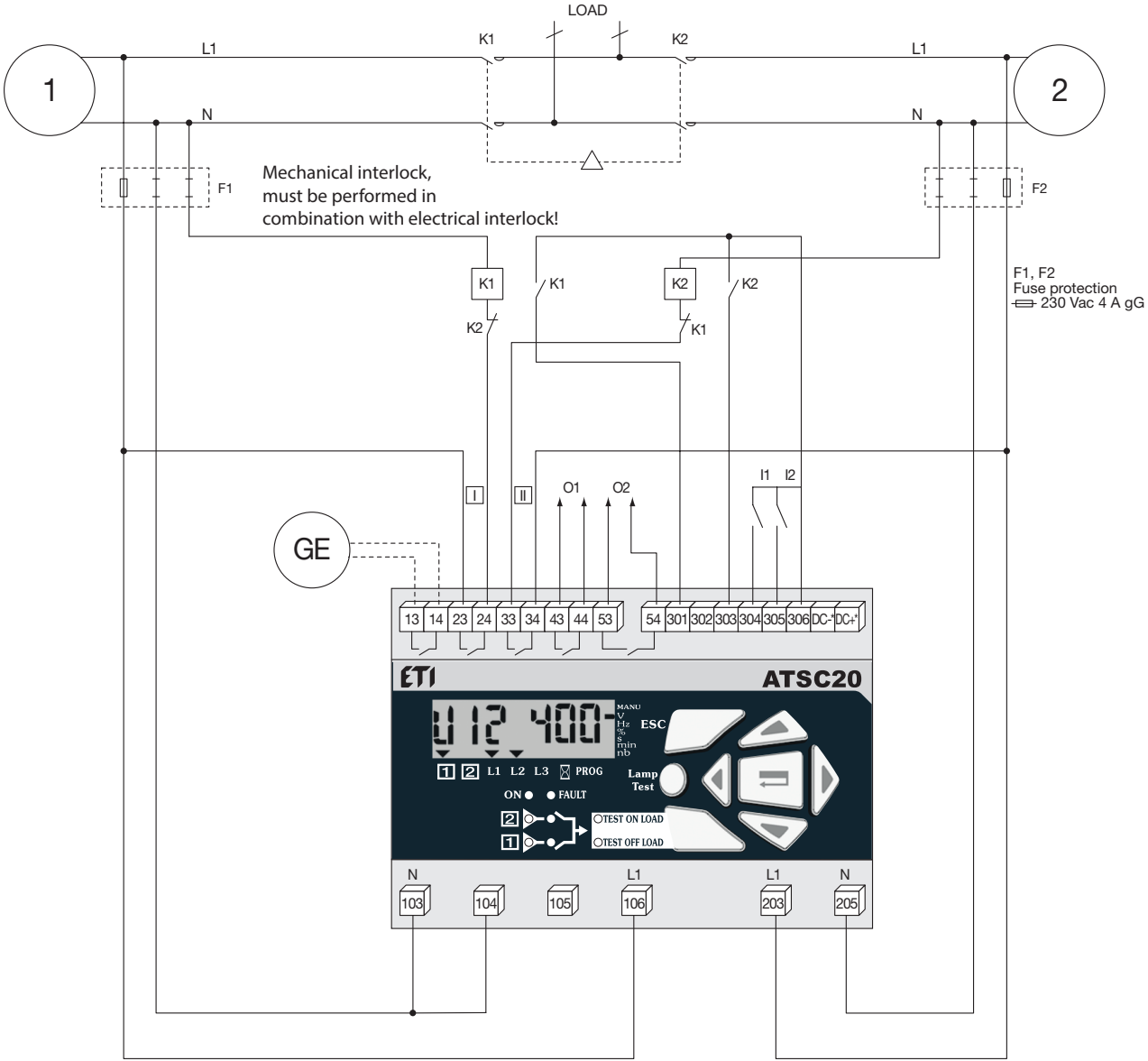


Maximum control cables leng = 10 m. In case of longer distance, insert control relays.

3.1. Control circuits (cont.)

3.1.2. 230 Vac (line - neutral)
contactor type technology

- Configure the type of control logic in contactor (see Programming chapter).
- Automatic Power supply 203-205 or 104-106 (see Power supply chapter).



* Only on DC versions.



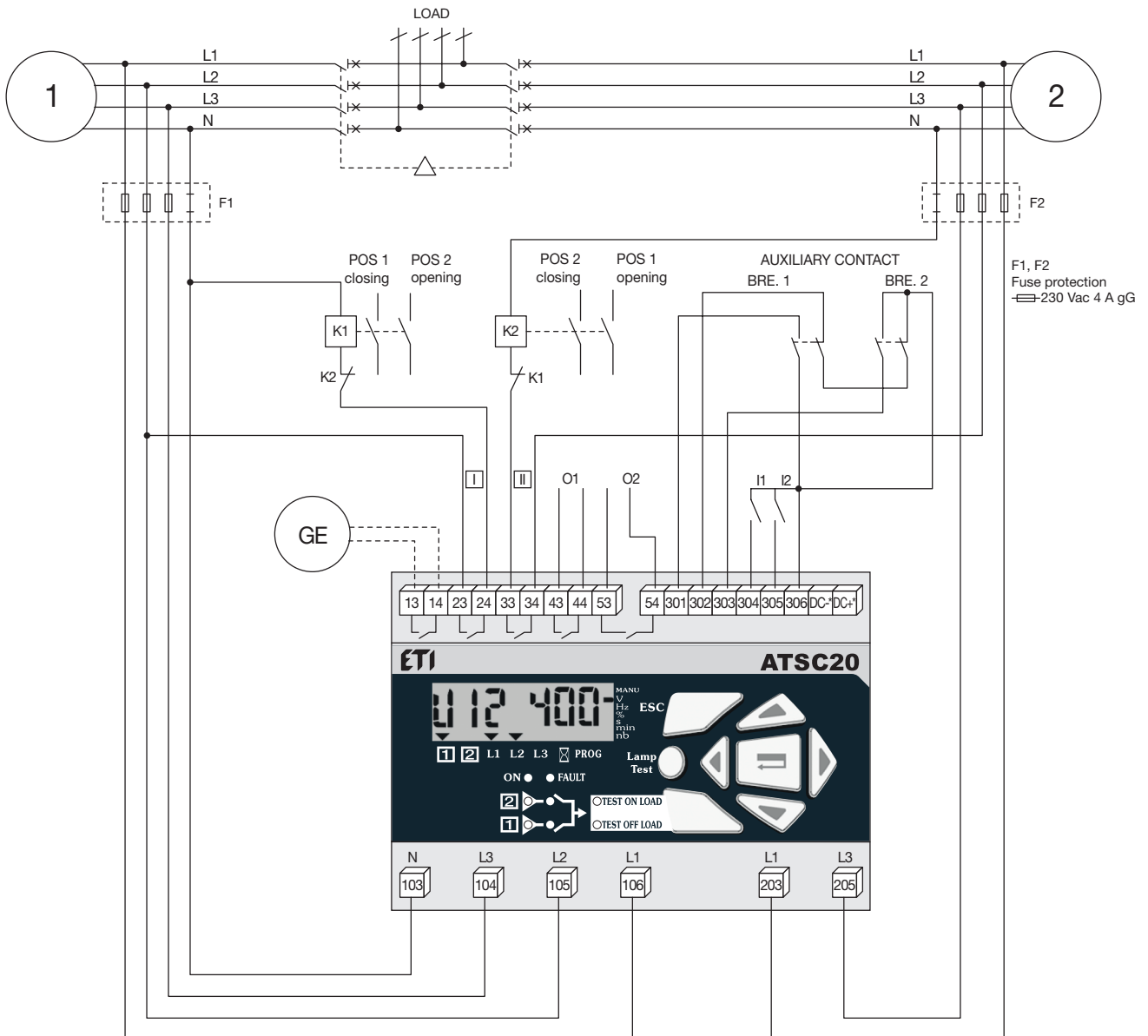
Maximum control cables leng = 10 m. In case of longer distance, insert control relays.

3.1. Control circuits (cont.)

3.1.3. 400 vac (P-P) application with neutral conductor circuit breaker type technology

Electrical interlocking via external control relays

- Configure the type of control logic in contactor (see Programming chapter).
- Automatic Power supply 203-205 or 104-106 (see Power supply chapter).



* Only on DC versions.



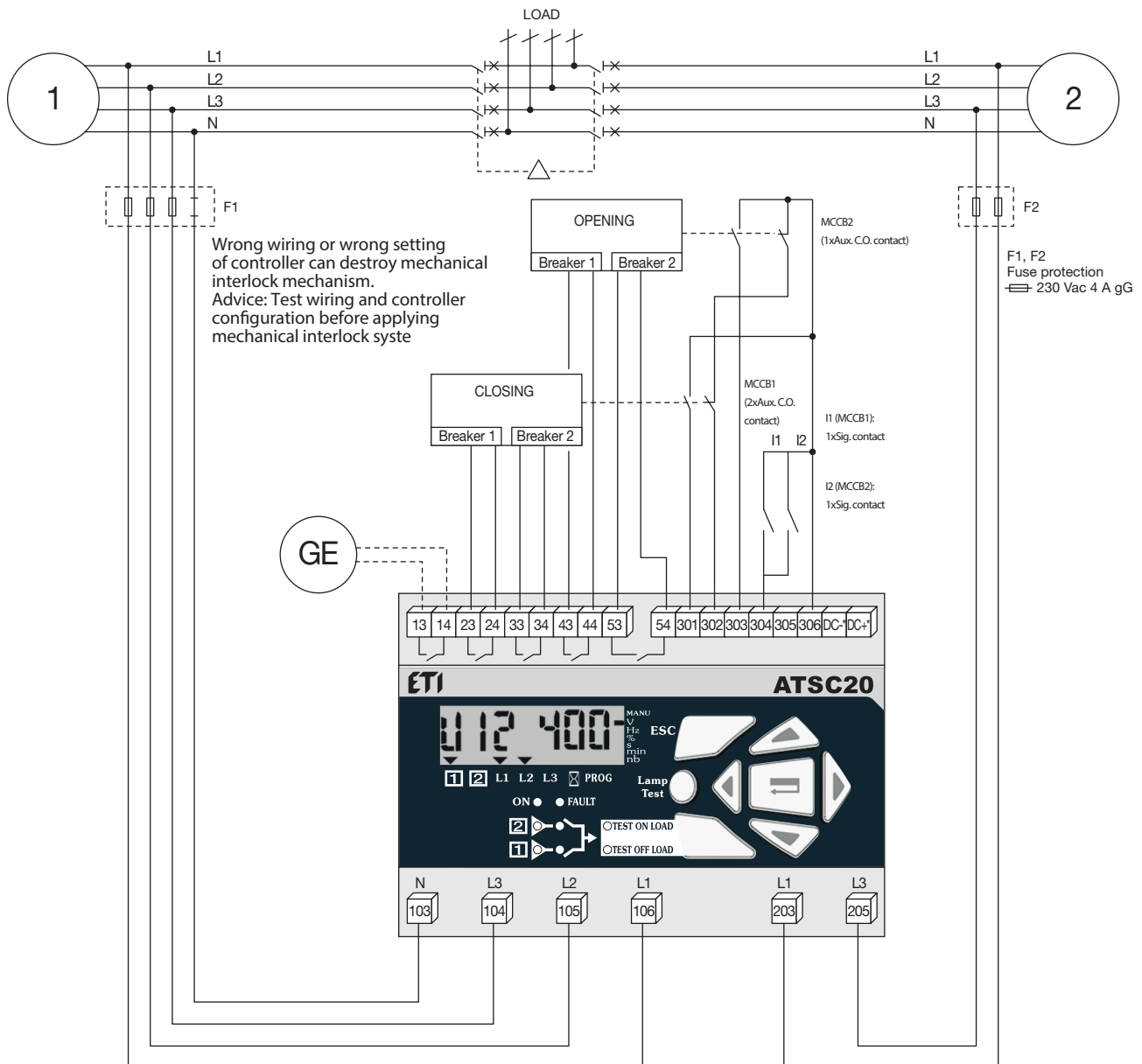
Maximum control cables leng = 10 m. In case of longer distance, insert control relays.

3.1. Control circuits (cont.)

3.1.4. 400 vac (P-P) application with neutral conductor circuit breaker type technology

Electrical interlocking not integrated

- Configure the type of control logic in breaker (see Programming chapter)
- Important to configure controller before applying connections to MCCBs motor operators.
- Automatic Power supply 203-205 or 104-106 (see Power supply chapter).



* Only on DC versions.



Maximum control cables leng = 10 m. In case of longer distance, insert control relays.

This drawing is not including the electrical interlock.

It might be necessary for some breakers not to set up 1DT and 2DT timers to 0. (Recommended 1DT, 2DT value: 2s.)

Set Input1 to Man

3.1. Control circuits (cont.)

Denomination	Terminals	Description	Characteristics	Recommended section
Power supply Source [1]	N (103)	Neutral	440 V ac (phase-phase) maximum, 50 / 60 Hz 254 V ac (phase-neutral) maximum, 50 / 60 Hz	1.5 mm ²
	L3 (104)	Phase 3		
	L2 (105)	Phase 2		
	L1 (106)	Phase 1		
Power supply Source [2]	L1 (203)	Phase 1	440 V ac (phase-phase) maximum	1.5 mm ²
	L3 (205)	Phase 3		
Power supply DC ⁽¹⁾ 12 V dc, 24 V dc	DC-	Power supply 0 V	From 9 V dc to 30 V dc	1.5 mm ²
	DC+	Power supply +V dc		
Genset ⁽²⁾ start signal	13	Genset start / stop relay - 2 stable positions	Dry contact 5A AC1/250 V	1.5 mm ²
	14	Programmable state - factory setting = NO, close to start		
Control (impulse, contactor and breaker mode to programm)	23	Impulse mode: order to close source [1] Contactor mode: order to close contactor source [1] Breaker mode: order to close breaker source [1]	5 A AC1/250 V	1.5 mm ²
	24			
	33	Impulse mode: order to close source [2] Contactor mode: order to close contactor source [2] Breaker mode: order to close breaker source [2]		
	34			
	43	Impulse mode: order to reach position 0 Contactor mode: programmable relay O1 Breaker mode: order to open breaker source [1]		
	44			
	53	Impulse mode: programmable relay O2 Contactor mode: programmable relay O2 Breaker mode: order to open breaker source [2]		
	54			
Information auxiliary contacts	301	Auxiliary contact information position I AC1	Do not connect to any power supply!	1.5 mm ²
	302	Auxiliary contact information position 0 AC0		
	303	Auxiliary contact information position II AC2		
Programmable Inputs	304	Programmable input In1	Do not connect to any power supply!	1.5 mm ²
	305	Programmable input In2		
Common input	306	Specific voltage supply Common terminals 301 to 305	Do not connect to any power supply!	1.5 mm ²

(1) Only on DC version

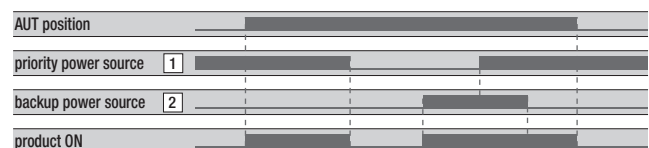
(2) Refer to programming, Setup, to modify relay state.

3.2. Electrical operation

3.2.1. Power supply

ATSC20 integrates 2 power inputs (104-106, 203-205), and consider the available source to keep the product operational. Product supplied when voltage on terminals ≥ 100 V ac.

For the DC version, these is only one power supply input (DC-, DC+).



[1] : terminals 104-106

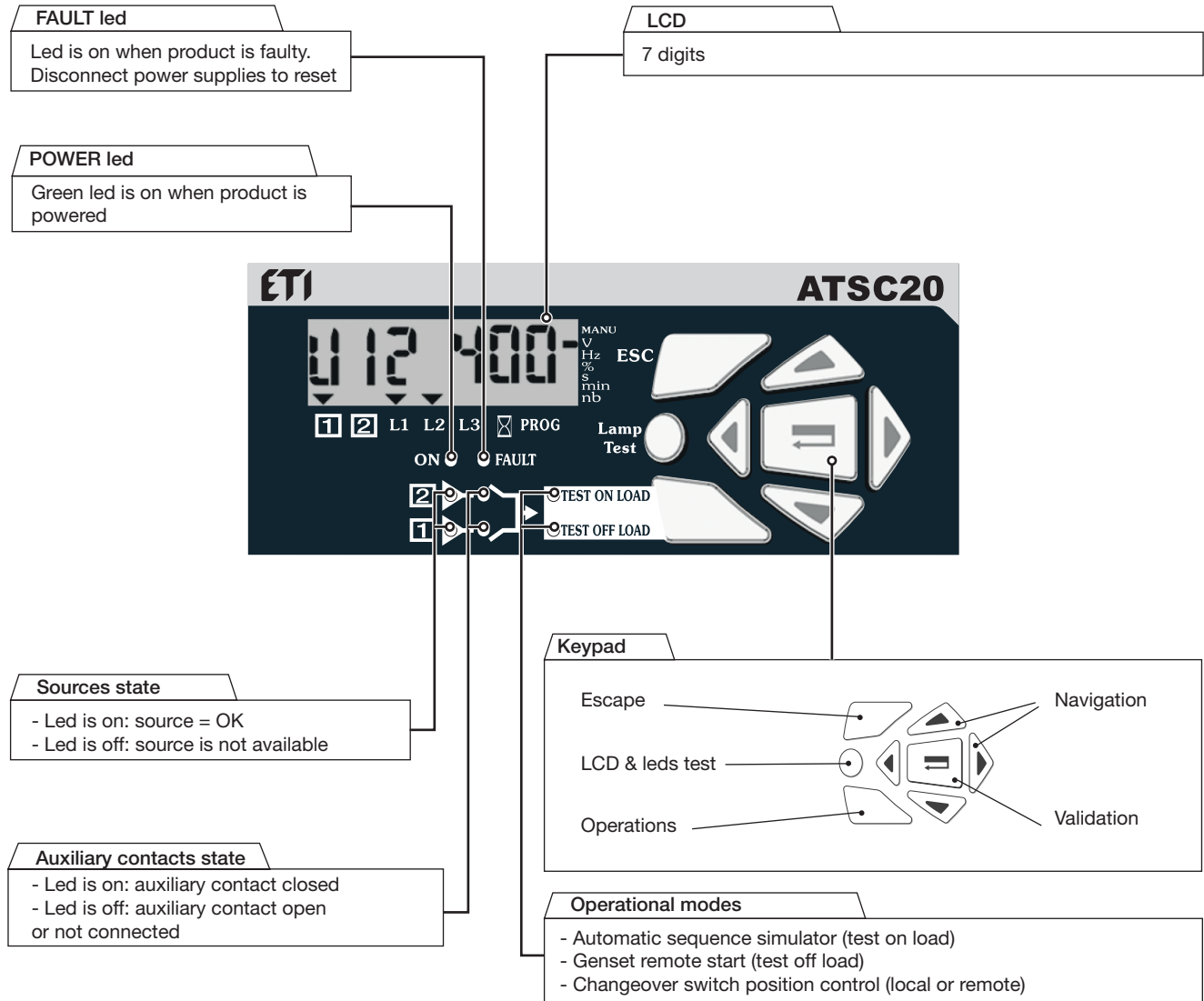
[2] : terminals 203-205

4. OPERATION

4.1. Presentation

The product allows:

- sources control,
- automatic transfer control in AUT mode,
- parameters configuration,
- voltage and frequency metering,
- system state display,
- alarm or fault indication,




4.1.1. Software version



Displayed after reset. (3 minutes power off action to allow reset).

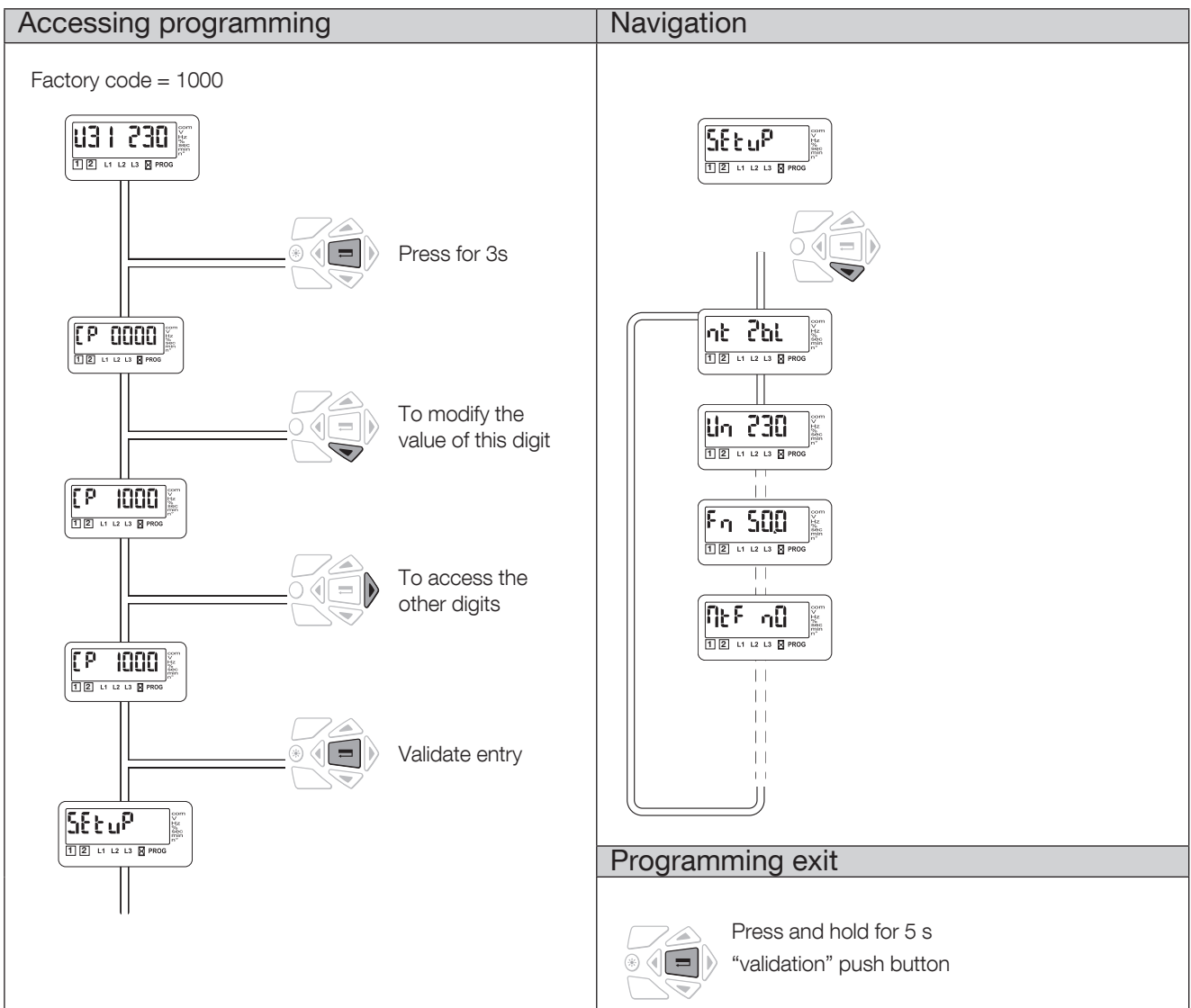
4.2. Programming

- This mode allows product parameters configuration.
- Always accessible in  mode (when programmed on an input).
- Always accessible in AUT mode, changeover switch on priority source, priority source being available
- Not accessible when “test off load”, “test on load” functions are active or during automatic sequence.





Parameters requiring programming before use:

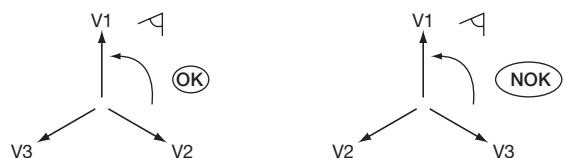
- type of network
- nominal voltage
- nominal frequency
- control logic
- number of auxiliary contacts.



4.2.1. Phases rotation control

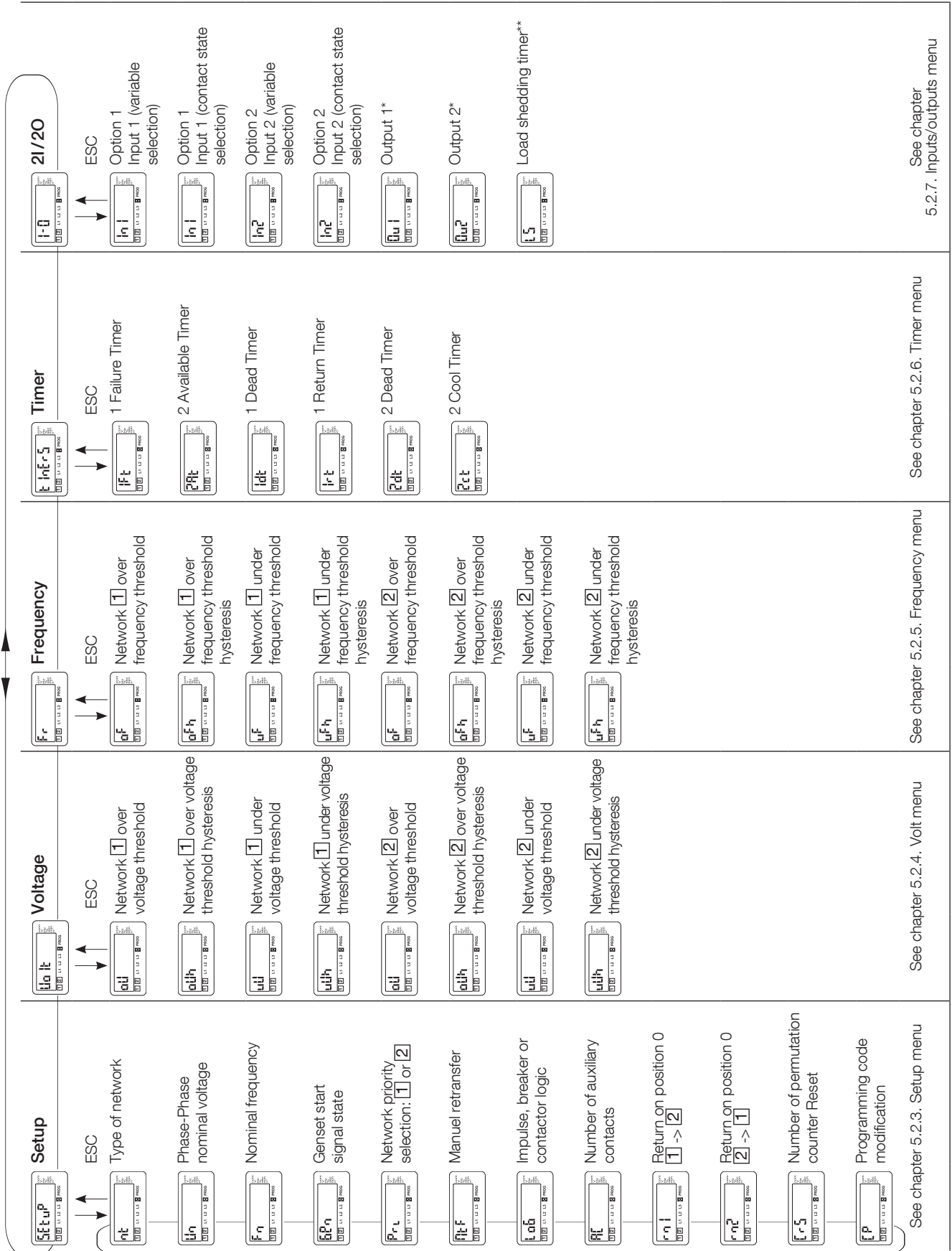
Function available only on source  in case of 3NBL, 4NBL and 41NBL network.

If a fault is detected, the source  is not indicated as available and the following message is displayed  .



4.2. Programming (cont.)

4.2.2. Programming Menu architecture



* Availability of output functions depending on control logic selection (impulse, breaker or contactor logic). ** Displayed if LS output variable has been selected.

4.2. Programming (cont.)

4.2.3. Menu Setup



LCD	Denomination	Definition	Setting range	Default values
	Type of network*	Number of active conductors of controlled network.	1BL, 2BL, 2NBL, 3NBL, 4NBL, 41 NBL	4NBL
	Network nominal voltage	Phase-Neutral voltage for 1BL & 41NBL. Phase-Phase voltage for others.	From 100 Vac to 400 Vac	400 Vac
	Network nominal frequency	Network nominal frequency.	50 Hz or 60 Hz	50 Hz
	Genset start signal state	Normally opened or closed.	NO or NC	NO
	Network priority selection	Keypad selection (1 or 2). Also possible via external contact using option.	1 or 2	1
	Manual Retransfer	Activation of the feature.	Yes or No	No
	Type of control logic selection	Impulse, contactor or breaker. It might be necessary for some breakers not to set up 1DT and 2DT timers to 0 (2 sec. for example).	Imp, Con, brE	Imp
	Number of auxiliary contacts	Depending on the switching mean (switch, contactor, breaker).	0, 2, 3	2
	Parameter 1, return in position 0	Allows to go to position 0 in case of source 1 voltage or frequency outage (out if the defined U, f range).	Yes or No	No
	Parameter 2, return in position 0	Allows to go to position 0 in case of source 2 voltage or frequency outage (out if the defined U, f range).	Yes or No	No
	Number of permutation counter Reset	Allows source 1 -> source 2 automatic sequences counter reset.	Yes or No	No
	Programming code modification	Possible to change the programming code.	from 0000 to 9999	1000

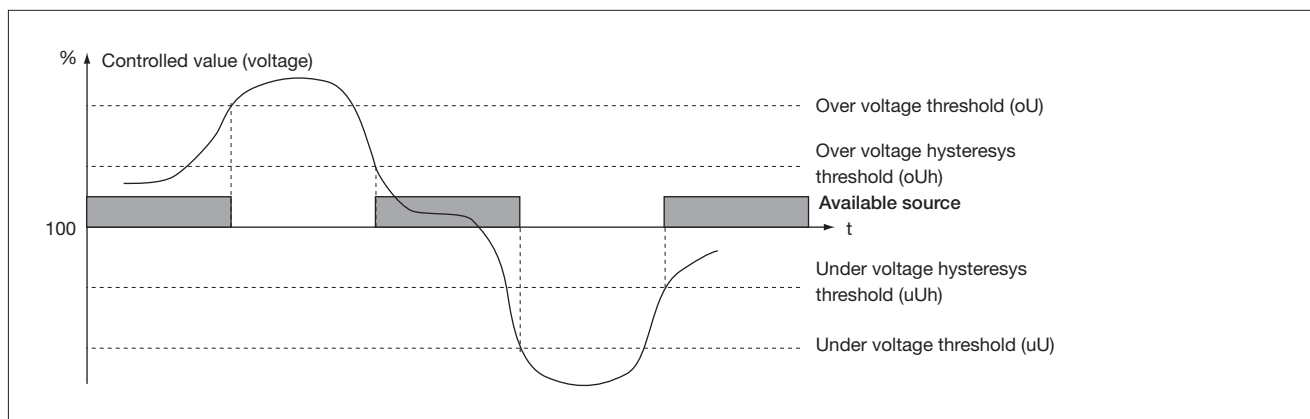
* Refer to annexes.

4.2. Programming (cont.)

4.2.4. Volt Menu



Threshold detection starts from the loss of source or source return sequence.



LCD	Denomination/definition	Setting range	Default values
	Network 1 over voltage threshold.	From 102 to 120%	115%
	Network 1 over voltage threshold hysteresis.	From 101 to 119% (< oU)	110%
	Network 1 under voltage threshold.	From 80 to 98%	85%
	Network 1 under voltage threshold hysteresis.	From 81 to 99% (> uU)	95%
	Network 2 over voltage threshold.	From 102 to 120%	115%
	Network 2 over voltage threshold hysteresis.	From 101 to 119% (< oU)	110%
	Network 2 under voltage threshold.	From 80 to 98%	85%
	Network 2 under voltage threshold hysteresis.	From 81 to 99% (> uU)	95%



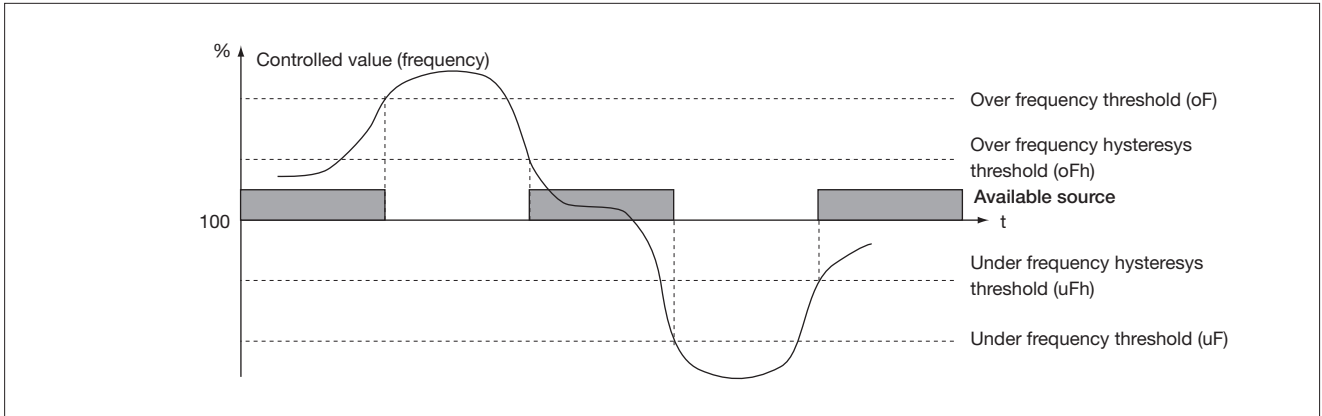
Values definition: % of nominal values.
Hysteresis values range is limited by thresholds values.

4.2. Programming (cont.)

4.2.5. Frequency Menu



Threshold detection starts from the loss of source or source return sequence.



LCD	Denomination / definition	Setting range	Default values
	Network <input checked="" type="checkbox"/> over frequency threshold.	From 101 to 120 %	105 %
	Network <input type="checkbox"/> over frequency threshold hysteresis.	From 100,5 to 119,5 % (< oF)	103 %
	Network <input checked="" type="checkbox"/> under frequency threshold.	From 80 to 99 %	95 %
	Network <input checked="" type="checkbox"/> under frequency threshold hysteresis.	From 80,5 to 99,5 % (> uF)	97 %
	Network <input type="checkbox"/> over frequency threshold.	From 101 to 120 %	105 %
	Network <input type="checkbox"/> over frequency threshold hysteresis.	From 100,5 to 119,5 % (< oF)	103 %
	Network <input type="checkbox"/> under frequency threshold.	From 80 to 99 %	95 %
	Network <input type="checkbox"/> under frequency threshold hysteresis.	From 80,5 to 99,5 % (> uF)	97 %



Values definition: % of nominal values.
Hysteresis values range is limited by thresholds values.

4.2. Programming (cont.)

4.2.6. Menu Timer



LCD	Denomination	Definition	Setting range	Default values
	1 Failure Timer	Delays priority network failure detection.	From 0 to 60 s	5 s
	2 Available Timer	Standby network stability validation before transfer.	From 0 to 60 s	5 s
	1 Dead Timer	Rest in O position when transferring from main network to secondary network.	From 0 to 20 s	0 s
	1 Return Timer	Main network stability validation before re-transfer.	From 0 to 60 min	2 min
	2 Dead Timer	Rest in O position when re-transferring from standby network to main network.	From 0 to 20 s	0 s
	2 Cool Timer	Allows generator cooling down period after load's retransfer from standby source (generator) to main source.	From 0 to 10 min	4 min

4.2. Programming (cont.)

4.2.7. Inputs / Outputs Menu



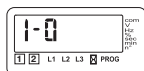
Input state can be configured: NC or NO.

LCD	Denomination / Definition	Setting range	Default values
	Input 1	tfl, tol, Cts, Ft1, Ft2, Ft3, Ft4, Pri, Mtf, S2A, Man, EJP	/
	Input 1 state	NO, NC	NO
	Input 2	tfl, tol, Cts, Ft1, Ft2, Ft3, Ft4, Pri, Mtf, S2A, Man, EJP	/
	Input 2 state	NO, NC	NO
	Output 1	S1A, S2A, LS	/
	Output 2	S1A, S2A, LS	/



Output relays are NO type (construction) and can not be configured as NC.

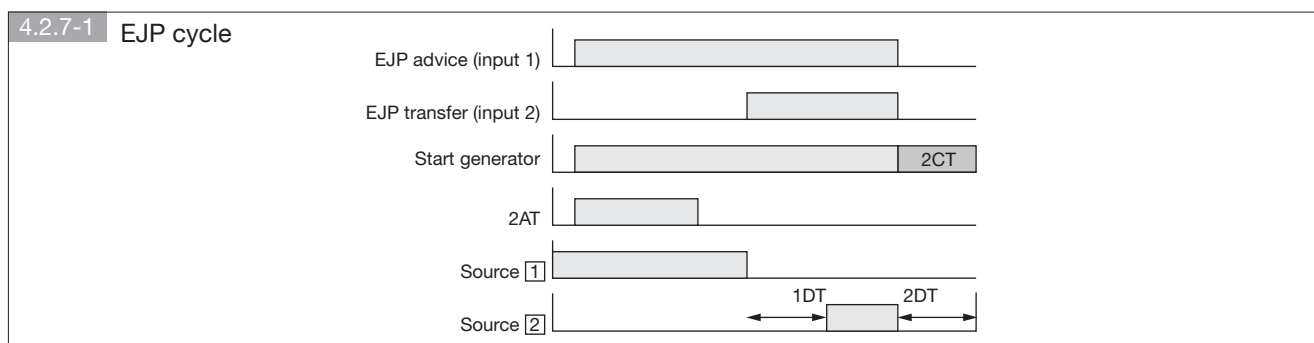
4.2.7. Inputs/Outputs Menu (cont.)



Input variable	Description
Ft1	Fault input 1. The fault led is blinking as soon as the input is active and Ft1 is displayed on LCD. Reset when the input is de-activated.
Ft2	Fault input 2. The fault led is blinking as soon as the input is active and Ft2 is displayed on LCD. Reset when the input is de-activated
Ft3	Fault input 3. The fault led is blinking as soon as the input is active and Ft3 is displayed on LCD. The transfer switch is immediately driven in 0 position (only in contactor mode). Keypad action (Validation) necessary to Reset the fault
Ft4	Fault input 4. The fault led is blinking as soon as the input is active and Ft4 is displayed on LCD. The transfer switch is immediately driven in 0 position (only in contactor mode). Keypad action (Validation) necessary to Reset the fault
Pri ⁽¹⁾	Priority network selection. Network 1 has priority when input is not activated. Network 2 has priority if input is active
Mtf	Remote manual re-transfer. Feature identical to manual retransfer on keypad. Re-transfer from priority network to backup network is allowed from input activation (1 s front). The Mtf variable in the setup menu must be selected (Yes) to allow input recognition
S2A	Information source 2 available (Genset) used instead of voltage / frequency measurement (inhibited when S2A is selected)
Man	Information transfer system in manual mode All automatic commands (+ test on load) are inhibited as soon as the input is activated
CtS	Remote transfer control. Possible to initiate transfer from priority source to backup source before DTT ends. If DTT is set to its maximum value (60s), the transfer is initiated as soon as the input is activated (1 s front)
tol	Remote test on load. Started from input activation. Re-transfer is blocked until input de-activation
tfl	Remote test off load Started from input activation (remote genset start/ stop)
EJP	2 inputs are automatically affected to EJP <ul style="list-style-type: none"> • input 1 for EJP advice, to start generator • input 2 to transfer on emergency source Retransfer is activated when input 2 disappears



(1) This information is the only considered in case of option configuration. Programming variable Pri is then inhibited.



4.2. Programming (cont.)

4.2.7. Inputs / Outputs Menu (cont.)



Outputs

Variable	Description
S1A	Source [1] available. Output activated as soon as source [1] is considered available (similar to front led source [1]).
S2A	Source [2] available. Output activated as soon as source [2] is considered available (similar to front led source [2]).
LS	Load shedding relay. LS timer corresponds to time available to disconnect the shed loads. The relay is activated before permutation on standby network according to LS timer. The relay is de-activated after retransfer on mains network and LS timer countdown.

In case of LS function selection, it is required to configure associated LS timer.

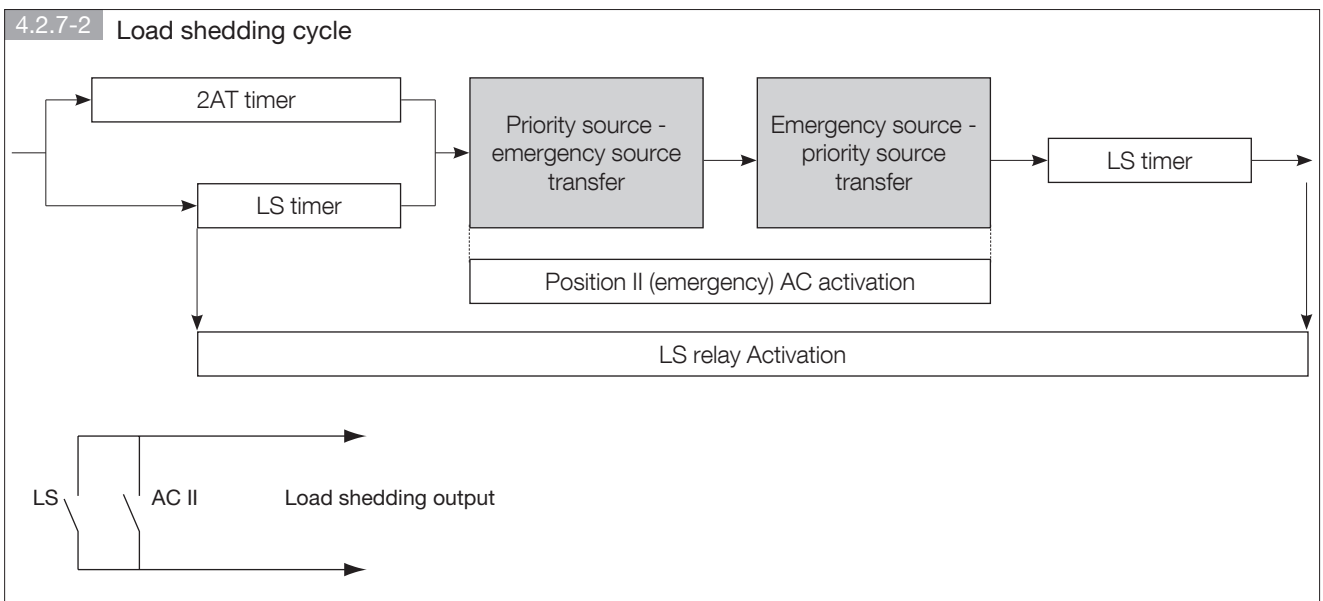
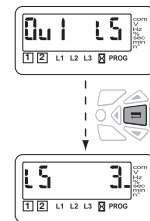
Output	Function	Setting range	Default value
 	S1A, S2A, LS	For LS: 0 to 60 s ($\leq 2AT^*$)	For LS: 3 s

* In case of 2AT variable configuration below LS, LS will be automatically set to 2AT value.

Example: LS configuration (output relay Ou1, 3 seconds):



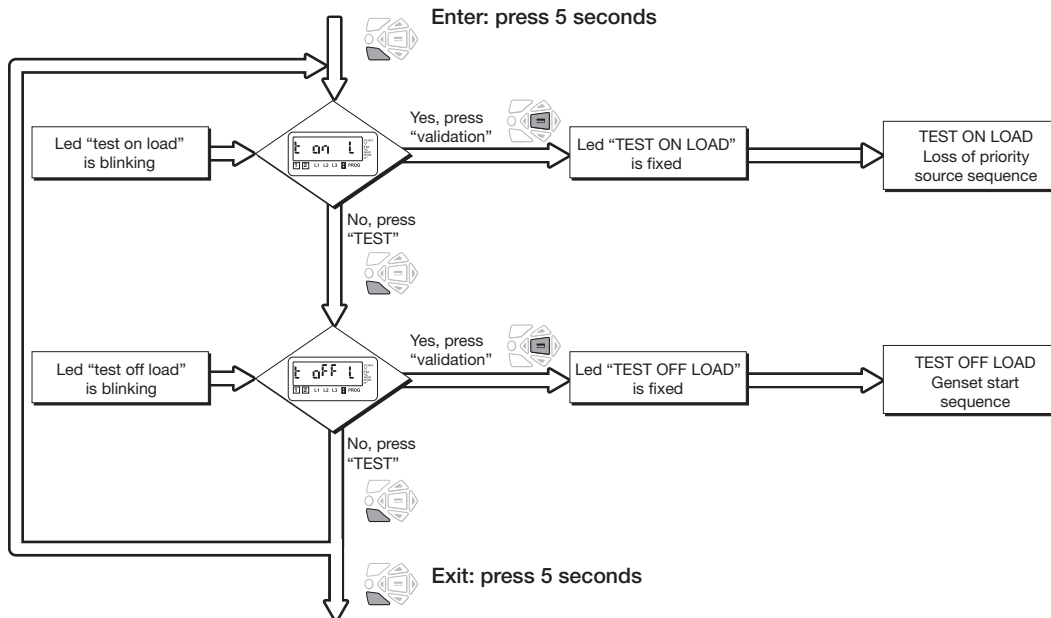
The load shedding can't be used with the priority network (priority source = source [2]). In this case, LS output is not valid.



The output is de-activated in case of loss of power. It may then be required to put in parallel with the load shedding output relay, position II auxiliary contact. This would avoid taking back the load in case of loss of emergency source in emergency position.

4.3. Operation

4.3.1. Operation mode architecture



4.3.2. Test Off load (accessible in AUT / modes)

It can be activated from:

- operation mode
- programming input (TFL) if selected.

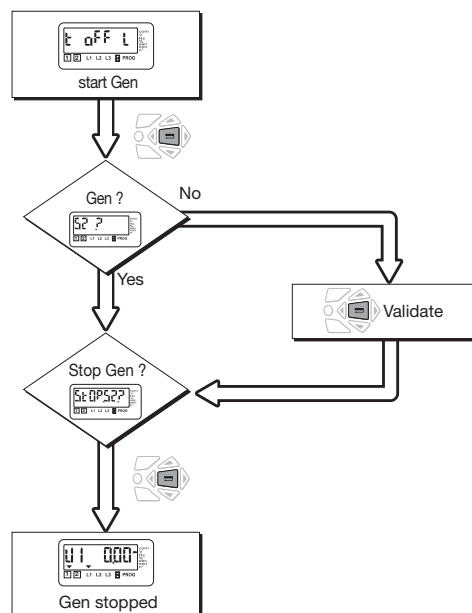
This test is made for applications where emergency source is typically a ger be activated, in automatic mode, changeover switch in position I, source a

Description

- This mode will start and stop remotely genset operation without load transfe
- The test is not possible during an automatic sequence.

Keypad activation

After operation mode access, press mode push button to make the test off lo



4.3. Operation (cont.)

4.3.3. Test On load (accessible In AUT mode)



It is activated from:

- operation mode
- programming input (TOL) if selected.

Description

This test simulates a loss of priority source situation. The sequence generates load transfer from priority source to emergency source after backup source start up operation (in case of genset). The return sequence always keeps manual re transfer feature activated (from priority source availability). All timers are counted down.

Keypad activation

After operation mode access, press mode push button to make test on load led blink and validate to start a cycle.

The test is only possible in automatic mode, the changeover switch in priority source position, priority source being available.

Remote activation via specific input


It is also possible to start a test on load remotely with the programming input TOL if selected. The cycle is started from contacts closure. The re-transfer is initiated from contacts opening.




Automatic cycle keeps priority.

Manual retransfer to validate on keypad. In retransfer sequence from emergency source to priority source, the 1RT count down is set to 10 seconds (maximum), unless a lower value has been programmed.

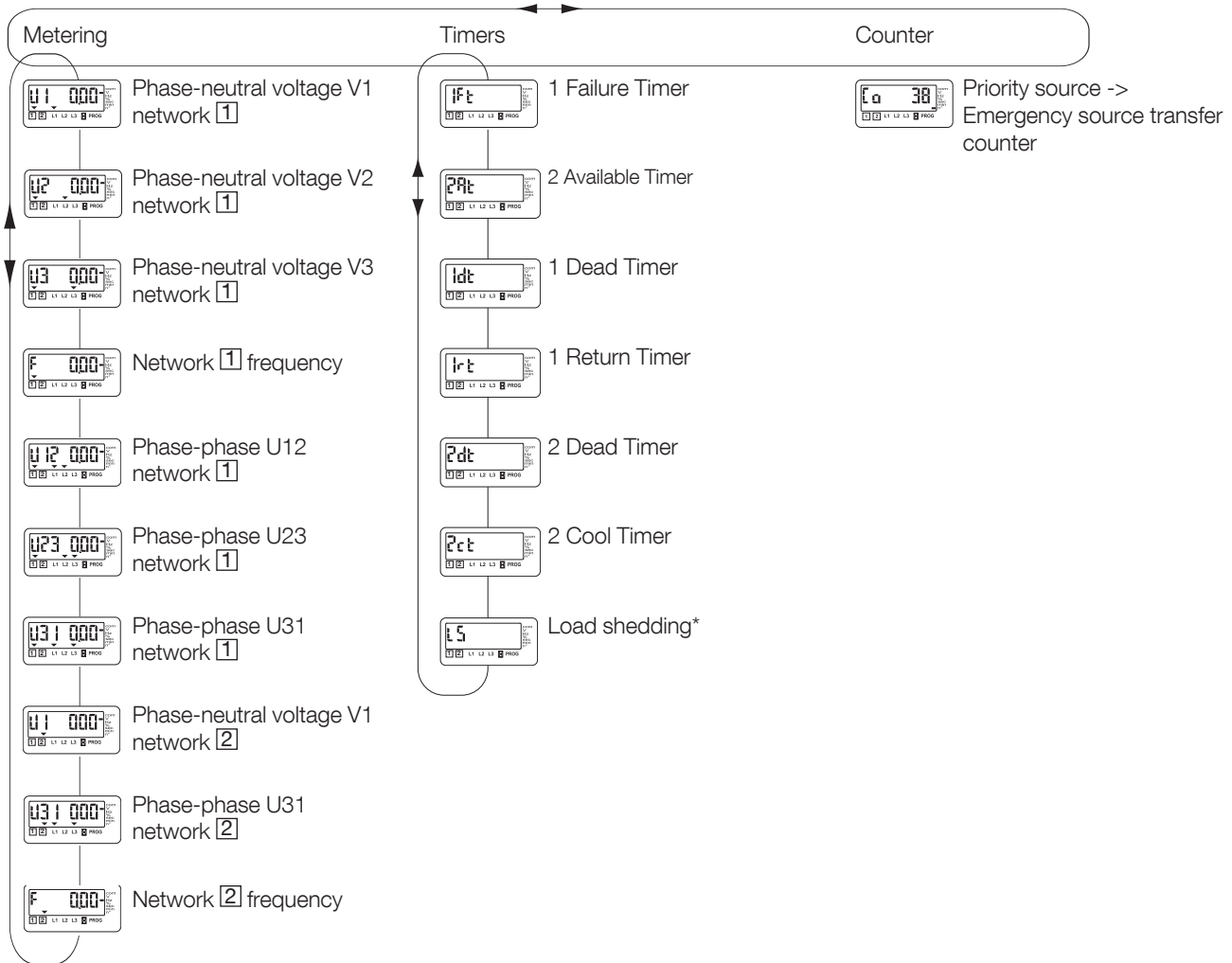
The re-transfer from emergency source to priority source is blocked and only authorized after manuel retransfer validation (keypad activation) or terminals opening.

Start gen relay is closed if source  has priority.

4.4. Visualisation

- This mode allows parameters to be displayed independently from mode  / AUT switch position
- No code required to access parameters visualisation
- Without any action during 5 seconds on the keypad, the LCD displays voltage available on active network. In case of changeover switch on 0 position, priority network voltage is displayed.

4.4.1. Menus

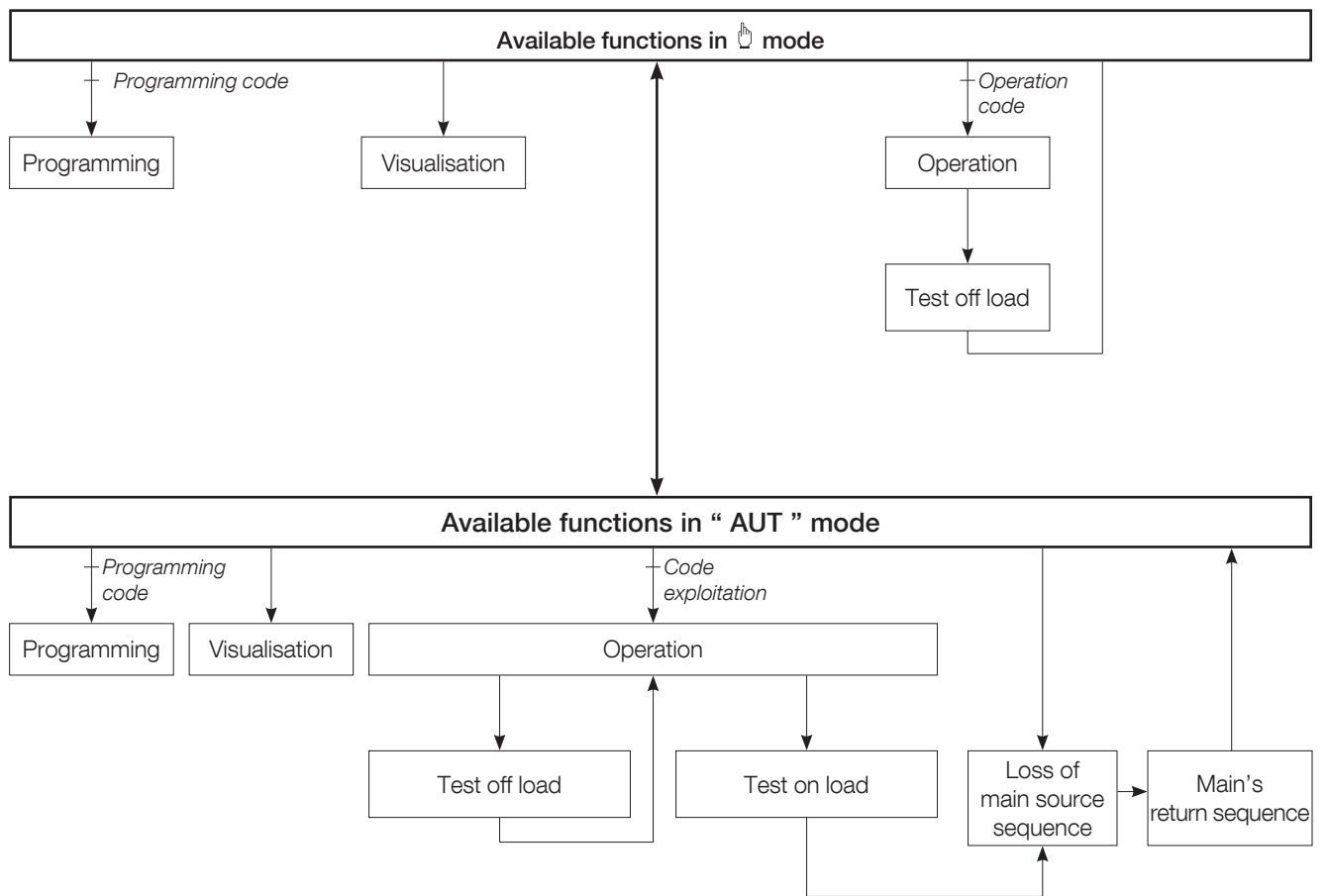


* If selected.



All values indicated might not be available according to programmed network. Refer to annexes.

4.5. Automatic sequences



4.5. Automatic sequences (cont.)

4.5.1. Manual mode/automatic mode

Manual mode - Automatic mode permutation / power supply reappearance

- As soon as manual input disappears (if selected), the automatic mode is active
- Voltages and frequencies are verified to define the new stable position of the changeover switch
- The same table can be taken into account after complete power supply loss (the product must be completely discharged to reset = 3 minutes.)

New stable position of the changeover switch

Changeover switch initial position	Sources availability	New position
Priority source	Priority source available, emergency source available or unavailable	Priority source
Priority source	Priority source unavailable for at least 1FT time period, emergency source available or unavailable	Emergency source. If emergency source unavailable start emergency source first and wait for 2AT timer period before transferring
Emergency source	Emergency source available, priority source unavailable	Emergency source
Emergency source	Emergency source available, priority source available for at least 1RT time period	Priority source
Emergency source	Emergency source not available, priority source available	Priority source
Position 0	Priority source available, emergency source unavailable	Priority source
Position 0	Priority source available, emergency source available	Priority source
Position 0	Priority source unavailable, emergency source available	Emergency source
Position 0	Priority source unavailable, emergency source unavailable	No action (because no supply). When supply becomes available change to priority source or emergency source.



The switch transfers to new stable position as soon as Automatic mode is active.

4.5.2. Loss of priority source automatic sequence

Available source

Specific feature: remote transfer control

4.5. Automatic sequences (cont.)

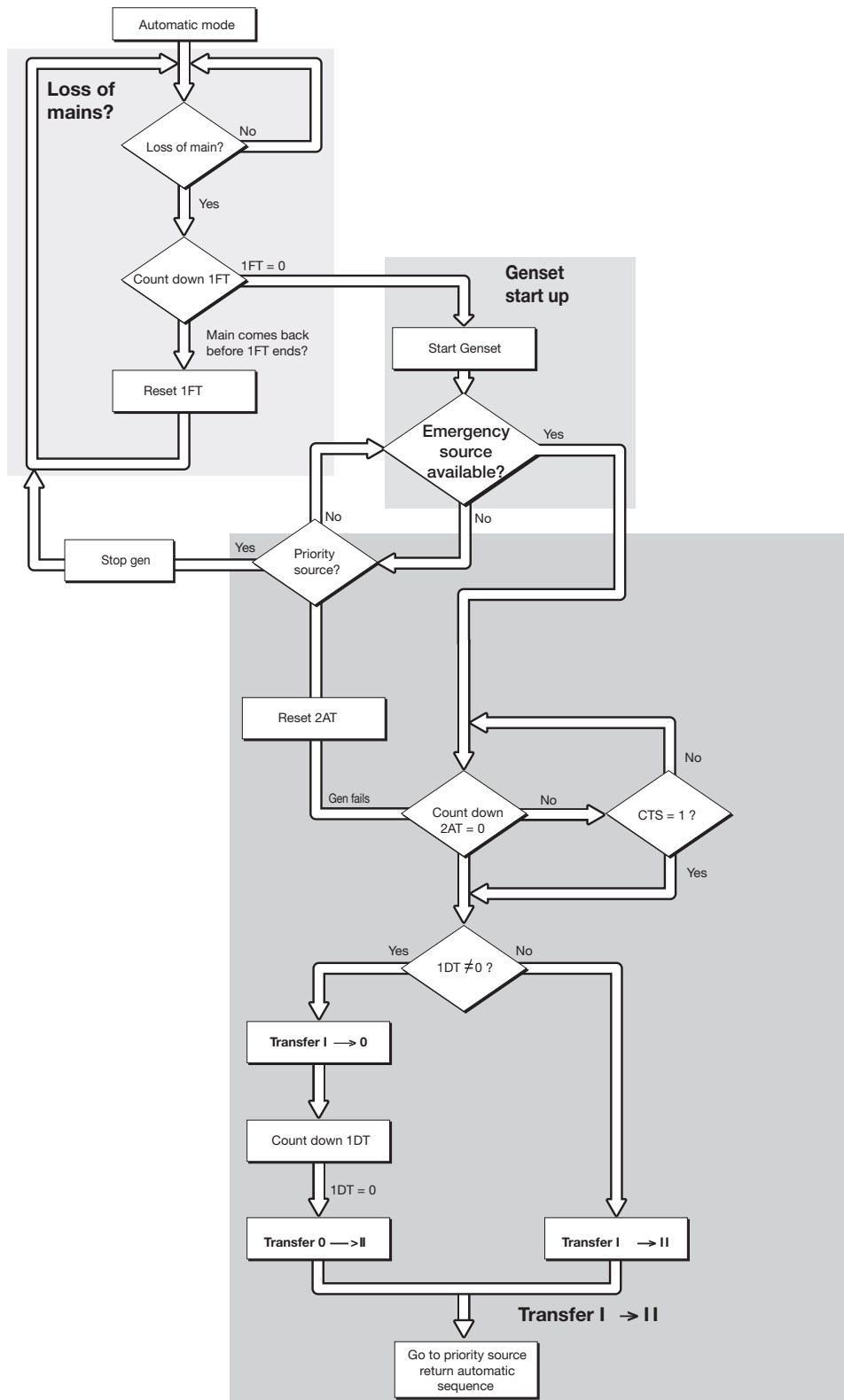
4.5.2. Loss of priority source automatic sequence (cont.)

Sequence description

Example:

position I = priority source (1)

position II = emergency source type Genset (2)



4.5. Automatic sequences (cont.)

4.5.3. Return to priority source

This sequence is activated as soon as the changeover switch is in automatic mode and in emergency position (position II) :

- the priority source 1 is not available
- the changeover switch is in emergency position (ex: genset)
- the emergency source 2 is available.

Specific feature: manual re-transfer

- When priority source comes back, it can be required not to automatically retransfer and wait for a more adequate moment.
- It is possible by validating manual retransfer feature (refer to programming), to block the re-transfer.

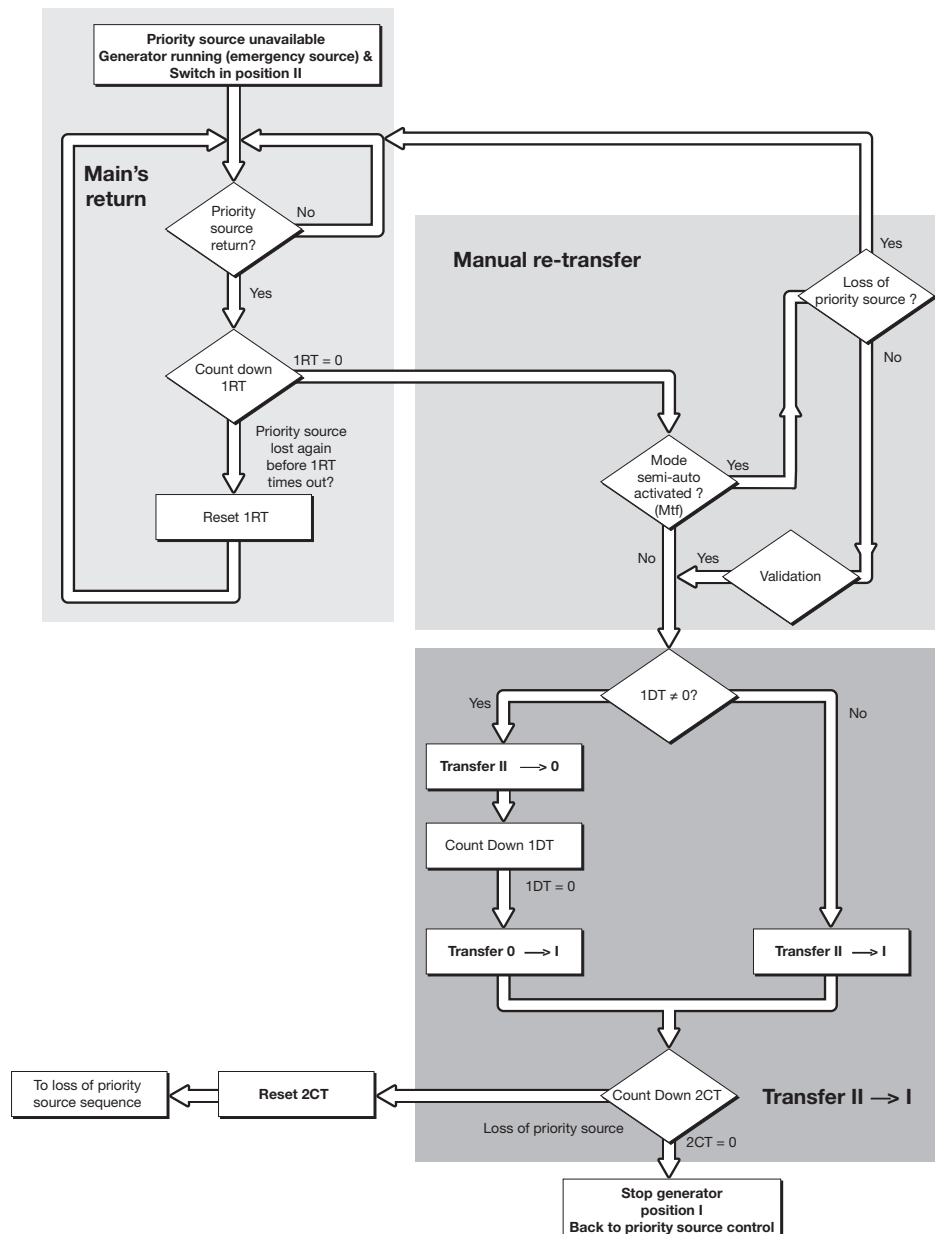
It is initiated from:

- validation push button locally
- via a programming input if MTF option is selected.



Manual retransfer = validation press
Or optional input activation, Mtf feature

Sequence description



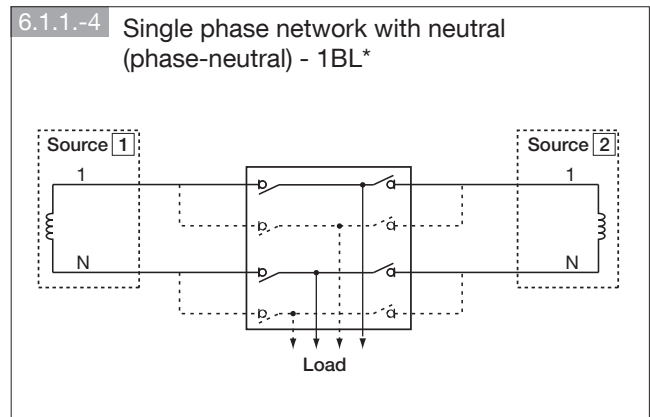
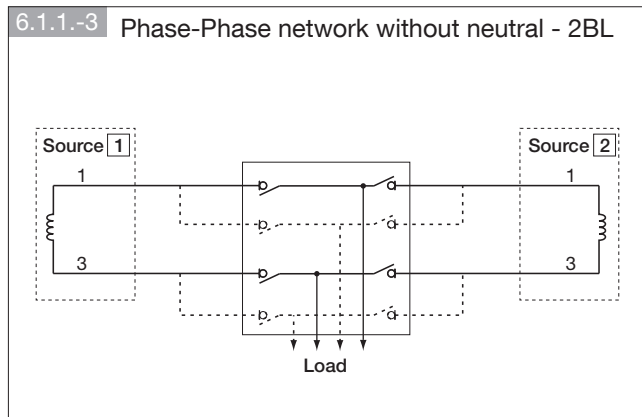
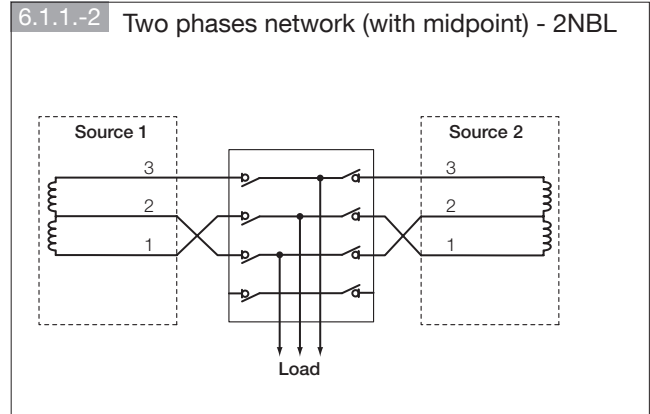
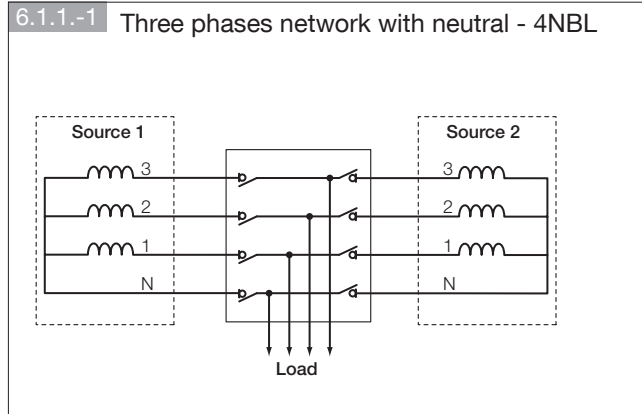
5. TROUBLESHOOTING GUIDE

State	Action
Electrical operation is not operational	<ul style="list-style-type: none"> • Verify voltage applied on terminals 100 Vac to 440 Vac or 9 Vdc to 30 Vdc for DC version. • Verify state MAN of input if selected.
Product is faulty (fault is active) FT1, FT2, FT3, FT4	<ul style="list-style-type: none"> • Disconnect power supply to try to reset the fault. • In case of programming inputs FT1 or FT2, verify if external fault is not active (automatic reset). • In case of programming inputs FT3 or FT4, verify if external fault is not active. The fault must be reset and you must validate with the push button. • Verify there is no message PROT 1 displayed (problem of phases rotation of source 1).
Source available led is never active when available	<ul style="list-style-type: none"> • Press test lamp to verify if led is operational (push 5 seconds). • Verify nominal preset values (voltage and frequency). It is imperative to maintain the voltage level at a given level for all phases of two sources. In case of excess voltage in one of the phases, it is necessary to change the previously set value of the nominal voltage to the average. • Verify voltage and frequency thresholds. • Verify phases sequence.
The changeover switch does not transfer after loss of main	<ul style="list-style-type: none"> • Verify state MAN of input, if selected. • Verify emergency source is available (ex: genset is started). • Verify voltage applied on terminals.
Test on load and off load can not be activated from keypad	<ul style="list-style-type: none"> • Verify password to access test (4000). • Verify state MAN of input, if selected.
The changeover switch does not re-transfer after main's return	<ul style="list-style-type: none"> • Verify 1RT is counted down. • Verify state MAN of input if selected. • Verify manual retransfer feature is not active (press validation to allow retransfer).
Retransfer has been realised but emergency source is still running (did not stop)	<ul style="list-style-type: none"> • Verify 2CT is counted down. • Verify Start Gen output relay command, terminals 13-14 (disconnect connector if required).
Electrical operation doesn't correspond to commands	<ul style="list-style-type: none"> • Verify control logic (impulse, breaker or contactor mode).
The product is in faulty position (FLT POS)	<ul style="list-style-type: none"> • Verify the number of AC (auxiliary contacts) in the setup menu. It must be in conformity with the number of AC connected. • Verify the switch position.
Error LCD Err XXXX	<ul style="list-style-type: none"> • Send the product back to the manufacturer.

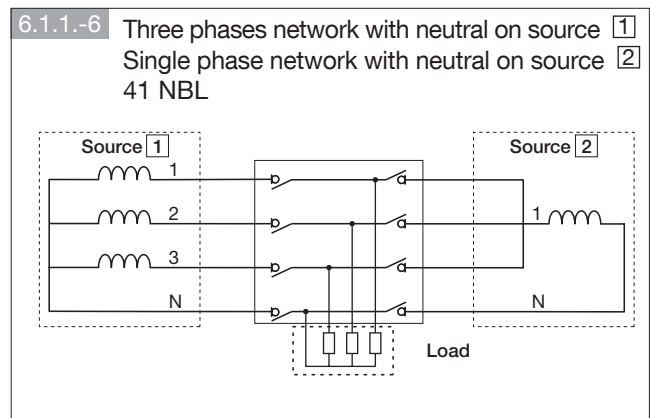
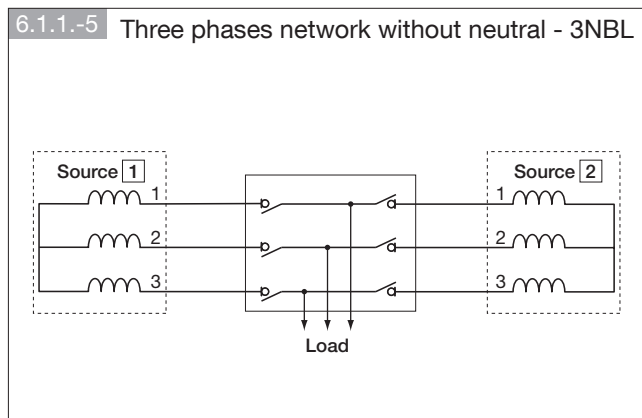
6. ANNEXES

6.1. Networks analysis

6.1.1. Types of networks



*to power supply the product, make a strap between 103 (N) and 104 terminals (power supply input 104-106 on source 1).



Only single phase loads.