

(EN) Automatic Transfer Switching Equipment

Instruction manual

6LE007621A

HIC4xxA



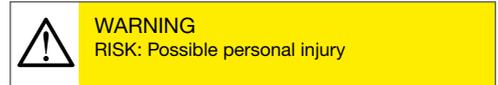
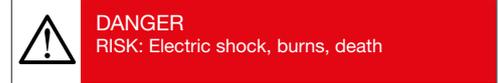
**Index**

1. General Safety Instructions	4
2. Introduction	5
3. HIC4xxA versions	7
3.1. Product presentation	7
3.2. Specifications and advantages	7
3.3. Supply types	7
4. Optional accessories	8
5. Technical data	9
6. Environmental conditions	10
7. Product installation	11
7.1. Changing the padlocking configuration	11
7.2. Recommended orientation	11
7.3. Dimensions	11
7.4. Back plate mounted	11
7.5. DIN rail mounted	12
8. Installation of optional accessories	12
8.1. Auxilliary contacts	12
8.2. Voltage sensing and power supply tap	12
8.3. Bridging bars 4P	13
8.4. Terminal shrouds	13
8.5. Sealable cover	13
9. Connection of the power circuits	14
9.1. Ratings / cross-sections table of correspondence	14
9.2. Parallel pole set-up for a device used in single phase	14
9.3. Network configurations	15
9.3.1. 230/400 VAC network configurations	15
9.3.2. 127/230 VAC network configurations	15
9.3.3. Three phase without neutral network	16
9.3.4. Auto-transformer connections	16
9.3.5. Procedure for the configuration and storage of the neutral position	17
9.3.6. Reset of neutral position	17

10. Connection of control/command circuits	18
10.1. Terminal connectors designation	19
10.2. Auxiliary contact operating schedule	20
11. Operation	20
11.1. Presentation of the product interface	20
11.1.1. Product interface	20
11.1.2. Reset	21
11.2. Manual mode	21
11.3. Manual switching	21
11.4. Padlocking	22
11.5. Programming	22
11.5.1. Single phase version	22
11.5.2. Three phase version	23
11.6. Sealable configuration cover	24
11.7. Automatic mode	24
11.7.1. Sealable Auto/Manual cover	24
11.8. Possible actions	24
11.9. Manual & Automatic Mode / Mains restoration conditions	25
11.9.1. Mode 1: Automatic retransfer	25
11.9.2. Mode 2a: Controlled retransfer	27
11.9.3. Mode 2b: Controlled transfer	29
11.9.4. Mode 3: Network - Network application with priority	30
11.9.5. Mode 4: Network - Network application without priority	32
12. Preventative maintenance	34
13. Troubleshooting guide	35

## 1. General Safety Instructions

- This manual provides instructions on safety, connections and operation of the HIC4xxA Automatic Transfer Switching Equipment.
- Whether the HIC4xxA is sold as a loose product, as a spare, as an enclosed solution or as any other configuration, this device must always be installed and commissioned by qualified and experienced personnel, in line with the manufacturers recommendations, following good engineering practices and after having read and understood the details in the latest release of the relative product instruction manual.
- Maintenance on the product and any other associated equipment including but not limited to servicing operations must be performed by adequately trained and qualified personnel.
- Each product is shipped with a label or other form of marking including rating and other important specific product information. One must also refer to and respect markings on the product prior to installation and commissioning for values and limits specific to that product.
- Using the product outside the intended scope, outside Hager recommendations or outside the specified ratings and limits can cause personal injury and/or damage to equipment.
- This instruction manual must be made accessible so as to be easily available to anyone who may need to read it in relation with the HIC4xxA.
- The HIC4xxA meets the European Directives governing this type of product and includes CE marking on each product.
- No covers other than that for auto/manu on the HIC4xxA should be opened (with or without voltage) as there may still be dangerous voltages inside the product such as those from external circuits.
- Do not handle any control or power cables connected to the HIC4xxA when voltage may be present on the product directly through the mains or indirectly through external circuits.
- Voltages associated with this product may cause injury, electric shock, burns or death. Prior to carry out any maintenance or other work on live parts or other parts in the vicinity of exposed live parts, ensure that the switch including all control and associated circuits are de-energized.
- As a minimum the HIC4xxA comply with the following international standards:
  - IEC 60947-6-1
  - GB 14048-11
  - EN 60947-6-1
  - VDE 0660-107
  - BS EN 60947-6-1
  - NBN EN 60947-6-1
  - IEC 60947-3
  - IS 13947-3
  - EN 60947-3
  - NBN EN 60947-3
  - BS EN 60947-3



The information provided in this instruction manual is subject to change without notice, remains for general information only and is non-contractual.

**Abbreviation and terms:**  
 ATS : Automatic transfer switch (as defined in 60947-6-1)  
 ATSE : Automatic transfer switching equipment (as defined in 60947-6-1)  
 RTSE : Remotely operated transfer switching equipment (as defined in 60947-6-1)  
 HMI : Human machine interface (includes DIP switch and LED info rmation available on the HZI815 or HZI825 front face).

## 2. Introduction

HIC4xxA “Automatic Transfer Switching Equipment” (ATSE) is designed for use in power systems for the safe transfer of a load supply between a normal and an alternate source. The changeover is done in open transition and with minimum supply interruption during transfer ensuring full compliance with IEC 60947-6-1, GB 14048-11 and other international TSE standards as listed.

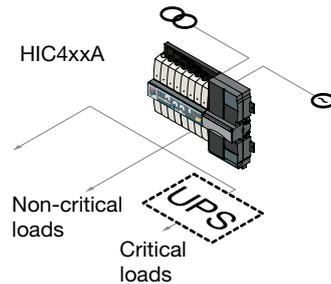
The HIC4xxA is a full load break (switch type) derived transfer switching equipment where the main components are proven technology devices also fulfilling requirements in IEC 60947-3 standards. As a Class PC ATSE, the HIC4xxA is capable of “making and withstanding short circuit currents” assigned to IEC 60947-3 utilization categories of up to AC23A, GB 14048-11, IEC 60947-6-1 and equivalent standards with utilization categories of up to AC33B.

HIC4xxA transfer switches ensure:

- Power Control and Safety between a normal and an alternate source.
- A complete product delivered as a fully assembled and tested solution.
- Intuitive HMI for emergency / local operation.
- Integrated and robust switch disconnection.
- Window with clearly visible position indication I – 0 - II.
- An inherent failsafe mechanical interlock.
- Stable positions (I – 0 - II) non affected by typical vibration and shocks.
- Constant pressure on the contacts non affected by network voltage.
- Energy Efficient with virtually no consumption whilst on the normal, alternate or off positions.
- Extremely rugged, error free and built in padlocking facility (configurable).
- Straight forward installation with effective ergonomics.
- Simple motorization control interface.
- ATS configuration through 4 potentiometers and DIP switches.
- Auxiliary contacts for switch positions I – 0 - II (optional).
- “Product availability” output.
- Ample accessories to suit specific requirements.
- Fully integrated ATS controller specifically designed for Mains / Mains and Mains / Genset applications.

### Network / Genset

Genset Applications for Standby Power



## Selection guide

Seven ratings: 20A/40A/63A/80A/100A/125A/160A

	HIC4xxA
<b>Applications</b>	
Normal/Backup with built-in automatic controller	•
Stable positions	•
<b>Functions</b>	
<b>Power supply</b>	
Integrated	•
<b>Operation</b>	
Backup manual operation of the 3 positions	•
Automatic control of positions I, 0 and II	•
<b>Monitoring</b>	
3 voltages on networks I and II	•
Frequency on networks I and II	•
<b>Automatic controller configuration</b>	
By potentiometer and micro-switch	•
$V_n$ , $F_n$ , V threshold, F threshold	•
Driving with or without priority	•
Adjustable operating timers	•
<b>Display</b>	
Position, fully visualised breaking	•
LED: source status, automatic mode, fault LED	•
<b>Remote control</b>	
<b>Outputs</b>	
Generator start/stop order	•
Product availability (not fault and not manual mode)	•
<b>Inputs</b>	
Test on load	•
Retransfer	•
Automatic mode inhibit	•
Priority	•

### 3. HIC4xxA versions

The HIC4xxA is available as 4P with the possibility of being used on virtually any automatic open transition type of application.

Measurement accuracy: Frequency: 1 % - Voltage: 1 %

#### 3.1. Product presentation

This quick-acting transfer switch incorporates:

1. 2 mechanically interlocked switches.
2. A quick-acting electric control unit enabling electric or manual system operation.
3. Electrical specifications compliant with product standards, and a version identification.
4. Changeover switch wiring identification.
5. Control connections.



**CAUTION**  
**RISK:** Ensure that the load is connected to the top of the switch with the motorisation on the right hand side as shown.

#### 3.2. Specifications and advantages

- 1 - Power section:  
A fully integrated and interlocked transfer switch, with high electrical performance offering microprocessor control and monitoring.
- 2 - Operation:  
A flexible operating mechanism enabling quick motorised transfer in automatic mode or locally in manual mode for emergency operations. Features a locking device to ensure (in position zero) a secured isolation of the load (padlocked).

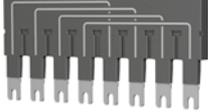
#### 3.3. Supply types

The power supply of HIC4xxA is required to be 220 VAC -20% to 240 VAC +20% at a frequency of 50/60 Hz and has been developed so as to meet most network configurations.

Product's working ranges:

	230 / 400 VAC Version		127 / 230 VAC Version		230 VAC Version	
	Umin	Umax	Umin	Umax	Umin	Umax
Ph-N	176	288	176	288	176	288
Ph-Ph	305	498	305	498	/	/

## 4. Optional accessories

<b>Auxiliary contacts</b>	<p>Each product can take up to 2 auxiliary contact blocks. Each accessory integrates 1 NOC auxiliary contact (for each position I, O and II) HZI300. Characteristics: 5A 250 VAC / 5A 30 VDC maximum.</p>		<p>Ref. : HZI300</p>
<b>Bridging bars</b>	<p>To provide a common point on the outgoing side of the switch (load side).</p>		<p>Three phase product: Rating <math>\leq</math> 125A: HZI400 Rating 160A: HZI401</p>
<b>Terminal shrouds</b>	<p>Protection against direct contacts with terminals or connecting parts. Other features: Perforations allowing remote thermographic inspection without removal. Possibility of sealing.</p>		<p>Ref. : HZC218 2 parts/ref.</p>
<b>Sealable cover</b>	<p>It prevents access to the configuration panel of the HIC4xxA.</p>		<p>Ref. : HZI210</p>

## 5. Technical data

Ratings		20 A	40 A	63 A	80 A	100 A	125 A	160 A
Frequencies		50/60 Hz						
Thermal current I <sub>th</sub> at 40 °C (A)		20	40	63	80	100	125	160
Thermal current I <sub>th</sub> at 50 °C (A)		20	40	63	80	100	110*	125
Thermal current I <sub>th</sub> at 60 °C (A)		20	40	50	63	80	100*	125
Thermal current I <sub>th</sub> at 70 °C (A)		20	40	40	50	63	80*	100
Rated assigned insulation voltage U <sub>i</sub> (V) (Power circuit)		800	800	800	800	800	800	800
Rated impulse withstand voltage U <sub>imp</sub> (kV) (power circuit)		6	6	6	6	6	6	6
Rated insulation voltage U <sub>i</sub> (V) (control circuit)		300	300	300	300	300	300	300
Rated impulse withstand voltage U <sub>imp</sub> (kV) (control circuit)		2.5	2.5	2.5	2.5	2.5	2.5	2.5
Rated operational currents (A) IEC 60947-3 at 415 V AC at 40 °C	AC21A / AC21B	20/20	40/40	63/63	80/80	100/100	125/125	160/160
	AC22A / AC22B	20/20	40/40	63/63	80/80	100/100	125/125	125/160
	AC23A / AC23B	20/20	40/40	63/63	80/80	100/100	125/125	125/160
Rated operational currents (A) IEC 60947-6-1 415 V AC at 40 °C	AC33B / AC32B **AC33iB	20/20	40/40	63/63	80/80	100/100	125/125	125**/160
Fuse protected short-circuit withstand if using gG DIN fuses	Fuse protected short-circuit withstand (kA eff)	50	50	50	50	50	50	40
	Associated fuses (gG DIN)	20	40	63	80	100	125	160
Short-circuit capacity	Rated short-term withstand current: I <sub>cw</sub> 1s (kA eff)	4	4	4	4	4	4	4
	Rated short-term withstand current: I <sub>cw</sub> 30ms (kA eff)	10	10	10	10	10	10	10
Switching time at I <sub>n</sub> excluding loss of supply sensing time and excluding any delay timers applicable.	I-II or II-I (ms)	180	180	180	180	180	180	180
	Duration of "electrical blackout" at U <sub>n</sub> (ms)	90	90	90	90	90	90	90
	I-O / O-I / II-O / O-II (ms)	45	45	45	45	45	45	45
Consumption	Inrush current(A)	20	20	20	20	20	20	20
	Consumption in stabilised state (VA)	6	6	6	6	6	6	6
Mechanical characteristics	Number of changeovers	10000	10000	10000	10000	10000	10000	10000
Connection cross-section (⚠ not compatible with aluminium cables)	Minimum size (Cu mm <sup>2</sup> ), flexible and rigid	10	10	10	10	10	10	10
	Maximum size (Cu mm <sup>2</sup> ), flexible and rigid	70	70	70	70	70	70	70
Equipment class (According to IEC 60947-6-1)		PC						
EMC environment		A	A	A	A	A	A	A

\* Possibility of reaching 125A with bigger connection cross-sections and use of the 160A bridging bar.

\*\* AC33iB 160A according to GB 14048.11.



This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

## 6. Environmental conditions



### Humidity

- 80 % humidity without condensation at 55 °C
- 95 % humidity without condensation at 40 °C



### Temperature

- -20 +40 °C without de-rating
- 40 °C < t ≤ 70 °C with de-rating (see Technical Characteristics)



### Altitude

- Max 2000 m without de-rating

Correction factors:

	2 000 m < A ≤ 3 000 m	3 000 m < A ≤ 4 000 m
Ue	0.95	0.80
Ie	0.85	0.85



### Storage

- 1 year maximum
- Maximum storage temperature: +55 °C
- 80 % humidity without condensation at 55 °C



### IP rating

- IP2x for non-enclosed modular product

Protection class: Class 1

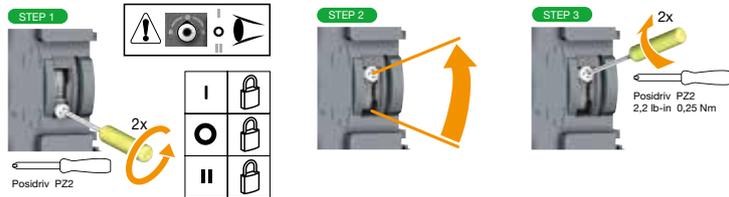
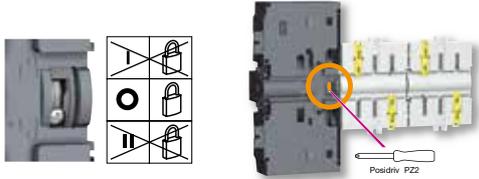
## 7. Product installation



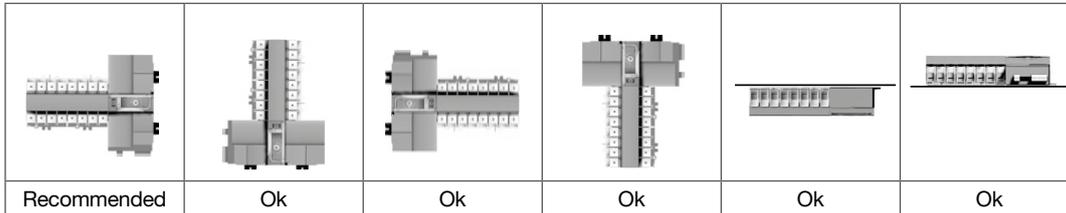
Prior to installation of the product ensure that the padlocking setting screw (located at the back of the product) is configured as per your requirements.  
For locking in Positions I, II and 0, refer to the following procedure

### 7.1. Changing the padlocking configuration

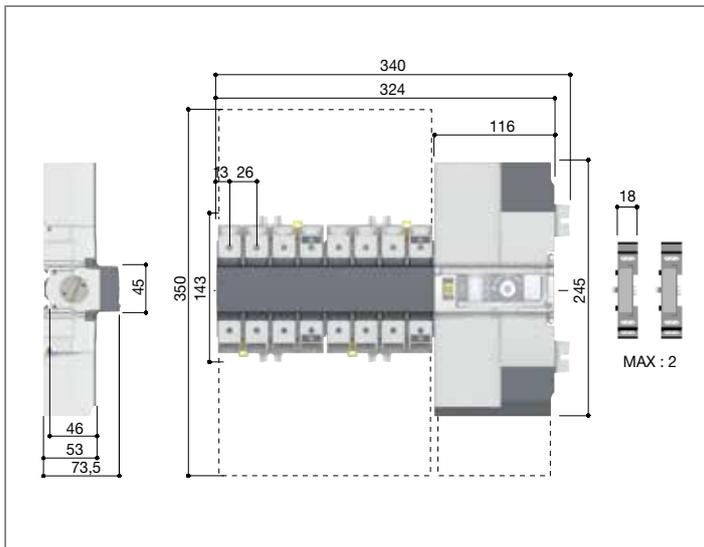
To configure the locking in the 3 positions:  
STEP1: loosen the screw at the back of the product as shown below.  
STEP2: slide the screw upwards.  
STEP3: tighten the screw in the top position as shown.



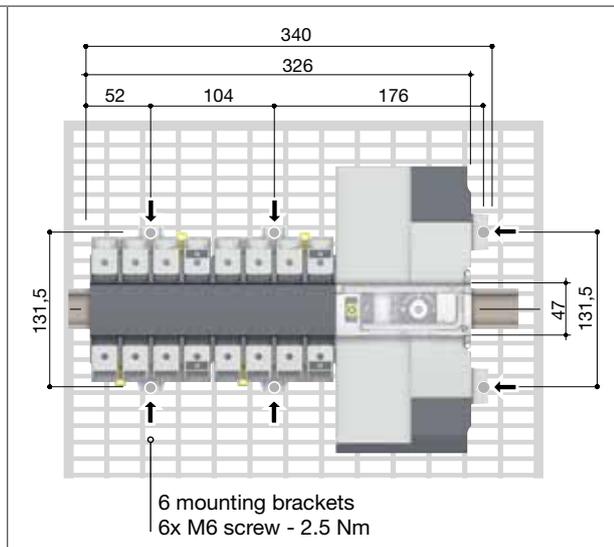
### 7.2. Recommended orientation



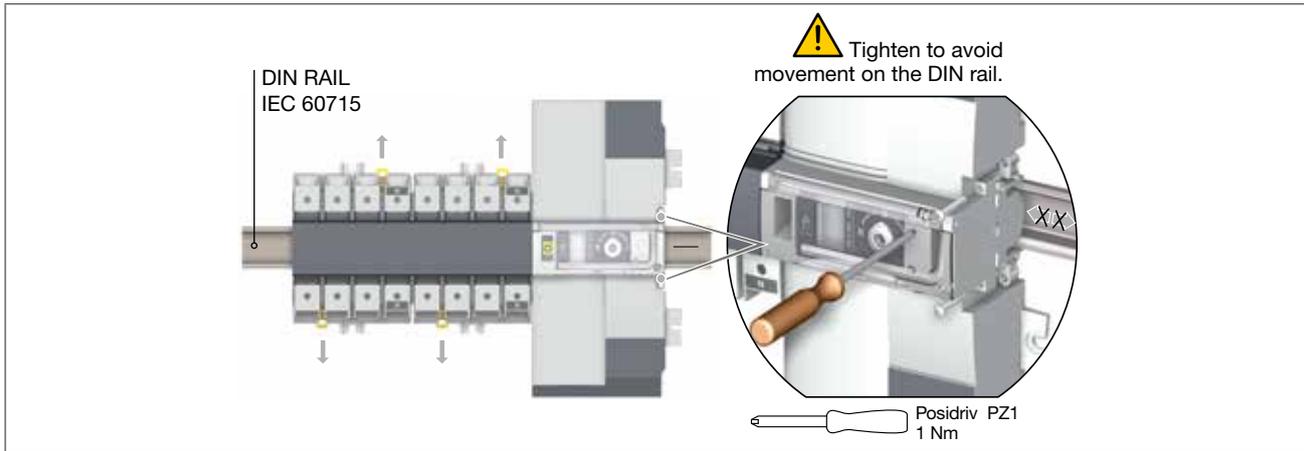
### 7.3. Dimensions



### 7.4. Back plate mounted



### 7.5. DIN rail mounted

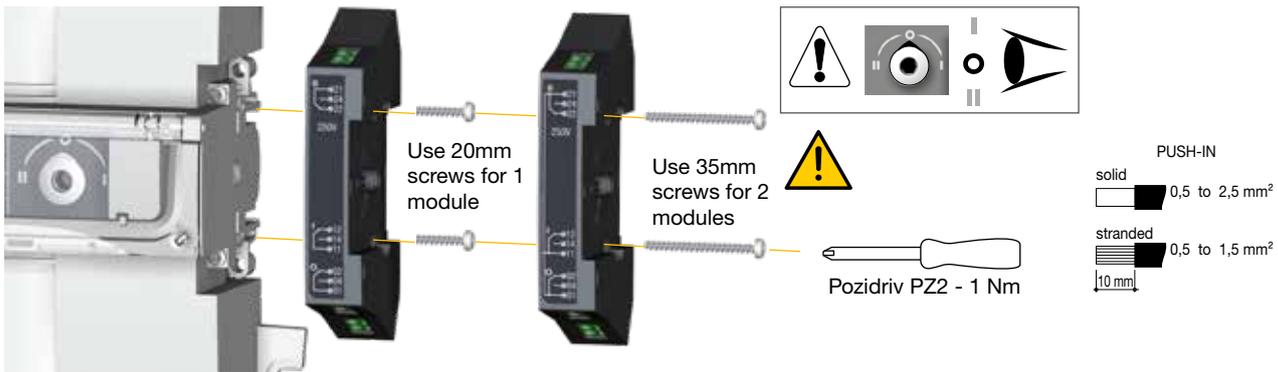


## 8. Installation of optional accessories

### 8.1. Auxilliary contacts

Ref. HZI300

To fit an AC, the switch must first be put in the 0 position. An auxiliary contact module comprises: one NO/NC changeover contact for each position (I-0-II). To install use the screws supplied with the module.

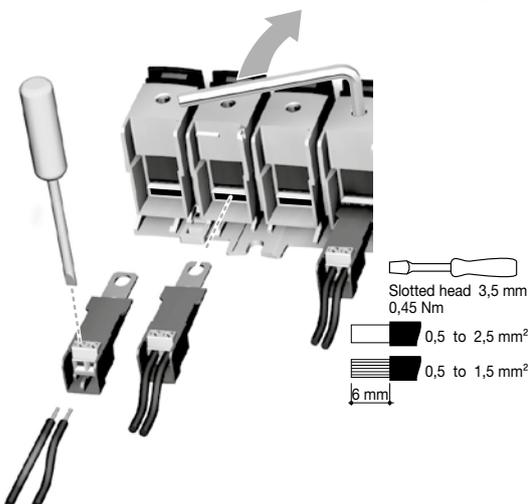


### 8.2. Voltage sensing and power supply tap

Ref. HZI230

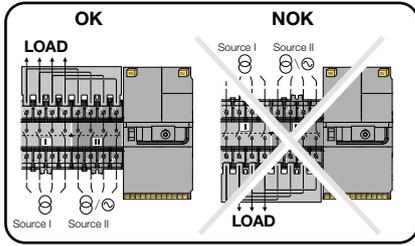
This provides 2 connection terminals for conductors with cross-section  $\leq 1.5 \text{ mm}^2$ . The single pole terminals can be fitted in any of the terminal cages without reducing the cage connection capacity.

2 parts/ref. Do not use in case of use of the bridging bar.

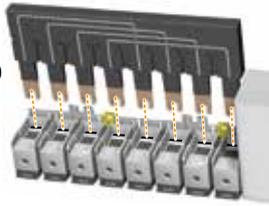


### 8.3. Bridging bars 4P

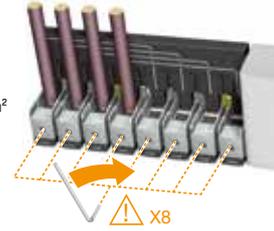
Ratings  $\leq 125\text{A}$ : ref. HZI400; 160A: ref. HZI401



Load side  
bridging bar.  
 $\leq 125\text{A}$ : HZI400  
160A: HZI401



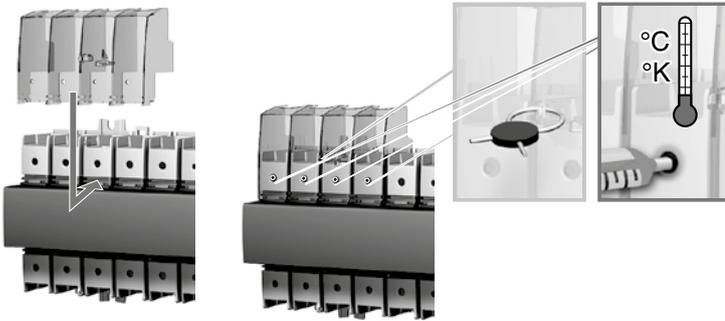
Hexagonal Metric  
Allen size 4  
5.0 Nm  
10 to 70 mm<sup>2</sup>  
15 mm



Make sure that the bridging bar is fitted to the correct set of terminals.  
There are two references available: one for ratings up to 125A, and another for 160A rating.

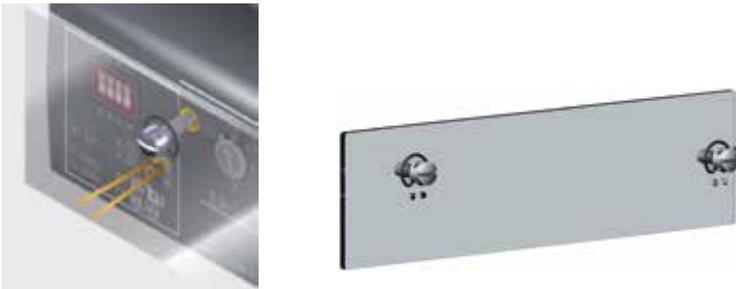
### 8.4. Terminal shrouds

Ref. HZC218



### 8.5. Sealable cover

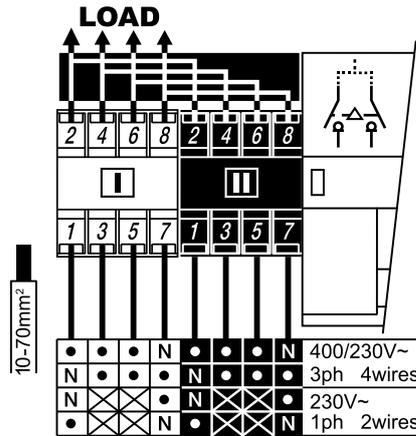
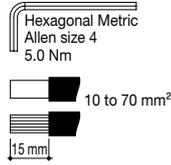
Ref. HZI210



## 9. Connection of the power circuits



Source supply side



It is essential to tighten all used terminals, with cables and/or bridging bars, before use.

### 9.1. Ratings / cross-sections table of correspondence

	20 A	40 A	63 A	80 A	100 A	125 A	160 A
Min cable size recommended (mm <sup>2</sup> )	10	10	16	25	35	50	50
Max cable size recommended (mm <sup>2</sup> )	50	50	50	50	50	70*	70*

\*With extension unit.



Not compatible with aluminium cables

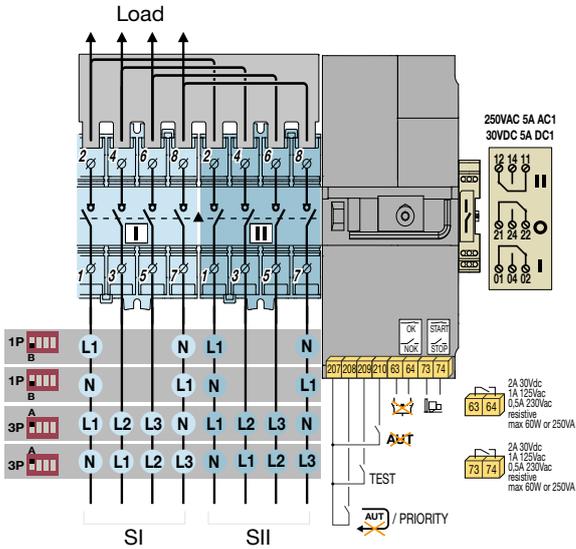
### 9.2. Parallel pole set-up for a device used in single phase

Rating conversion table for use in single phase and two-by-two parallel pole set up.  
(Max ambient temperature = 40 °C).

Nominal current rating in three-phase (A)	Nominal current rating in single-phase (2 poles in //) (A)
40	63
63	100
80	125
100	160
125	200
160	250

### 9.3. Network configurations

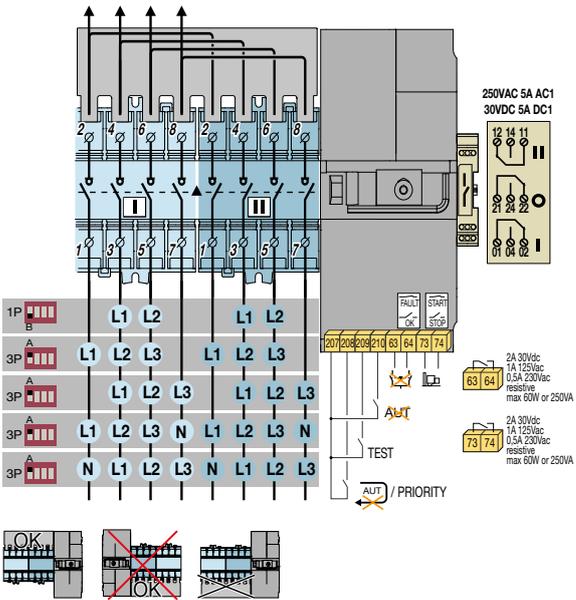
#### 9.3.1. 230/400 VAC network configurations



Type of network	Position of the first dip switch	Terminal 1	Terminal 3	Terminal 5	Terminal 7
1BL - Single phase	1P - Position B (dip switch down)	L1	/	/	N
		N	/	/	L1
4NBL - Three-phase with neutral	3P - Position A (dip switch up)	L1	L2	L3	N
		N	L1	L2	L3
3NBL - Three-phase without neutral*	3P - Position A (dip switch up)	L1	L2	L3	Neutral transfo
		Neutral transfo	L3	L2	L1

**!** In case of three-phase without neutral configurations you must first configure the neutral position by wiring the product for the first time with a network 4NBL.

#### 9.3.2. 127/230 VAC network configurations



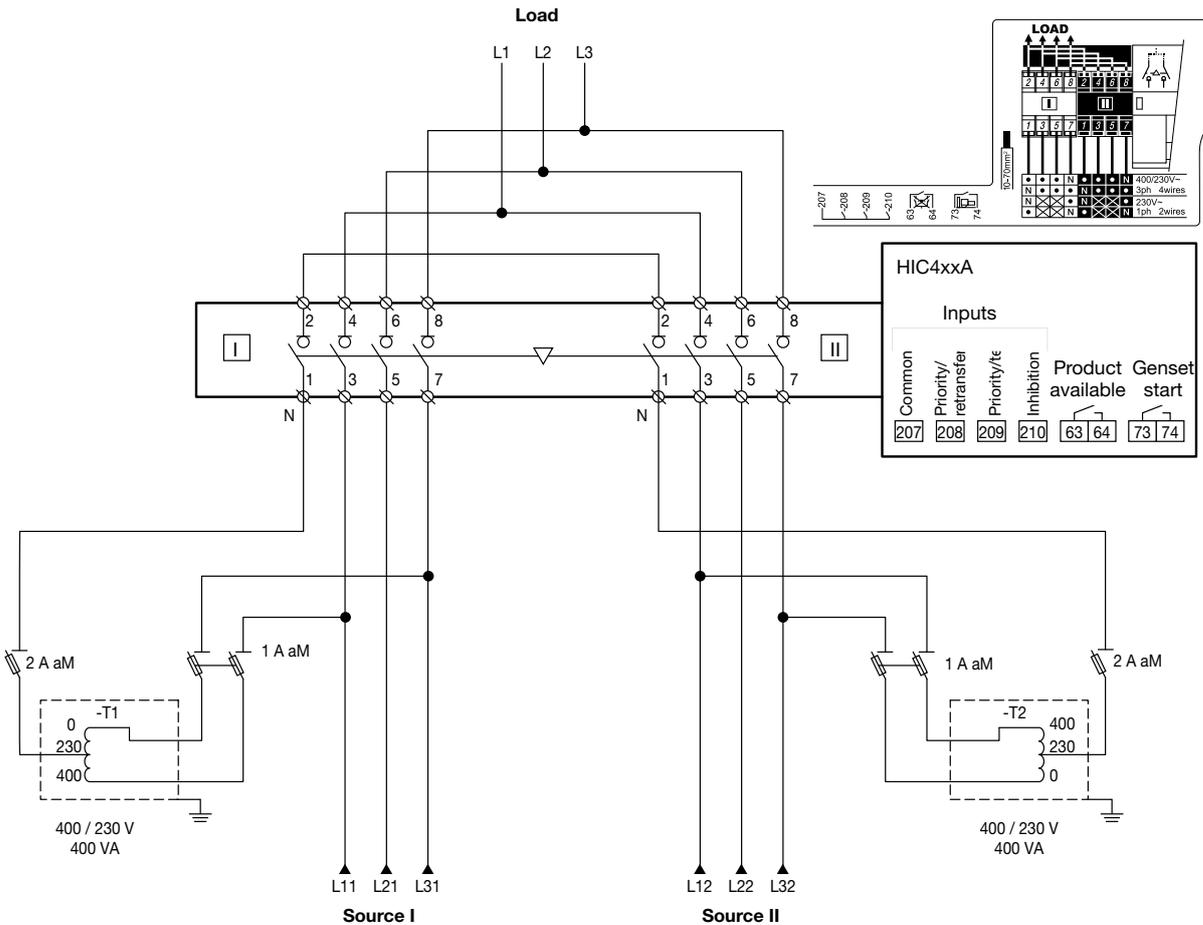
Type of network	Position of the first dip switch	Terminal 1	Terminal 3	Terminal 5	Terminal 7
2BL - Two-phase	1P - Position B (dip switch down)	/	L1	L2	/
3BL - Three-phase without neutral	3P - Position A (dip switch up)	L1	L2	L3	/
		/	L1	L2	L3
4NBL - Three-phase with neutral	3P - Position A (dip switch up)	L1	L2	L3	N
		N	L1	L2	L3

### 9.3.3. Three phase without neutral network

For three-phase networks without neutral (3NBL) 400 VAC, a neutral must be recreated to allow the HIC4xxA to operate at 230 VAC. To recreate the neutral, we recommend the use of quantity 2x 400 VA auto-transformers connected as shown below. The neutral position must be defined as neutral on the left or neutral on the right in advance and then wired accordingly. The example below shows the wiring for a product configured with neutral on the left.

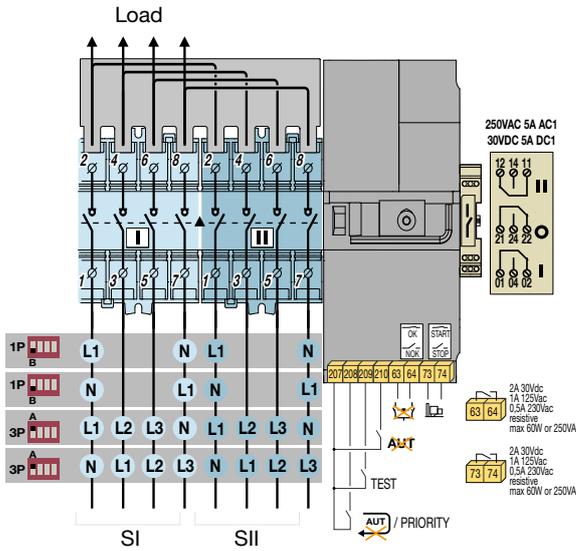
 A new product must have the neutral configuration pre-programmed as on the left or on the right at the first start up using a real (not a recreated) 3 phase + neutral supply.

### 9.3.4. Auto-transformer connections



### 9.3.5. Procedure for the configuration and storage of the neutral position

230/400 VAC network configurations without neutral conductors.



#### Step 1

It is first necessary to connect the HIC4xxA in three-phase + neutral (4NBL) to allow configuration of the neutral position (neutral position is detected at the first power-up).

#### Step 2

Connect the autotransformers.



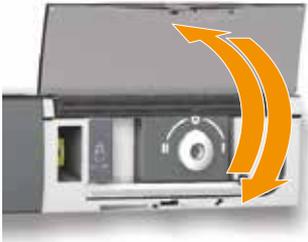
Neutral must be connected as shown in the drawing above in section "9.3.4. Auto-transformer connections", see previous page.

### 9.3.6. Reset of neutral position

In case the network is not recognized by the HIC4xxA (or in case you would like to change the neutral position), proceed as follows:

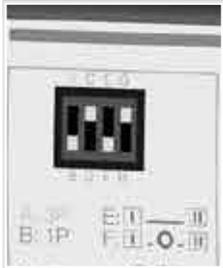
#### Step 1

Ensure that the product is powered and within voltage limits.  
Open the AUTO/MANU cover.



#### Step 2

Set DIP Switch 1 from 3P to 1P.



#### Step 3

Set DIP Switch 1 from 1P to 3P.

#### Step 4

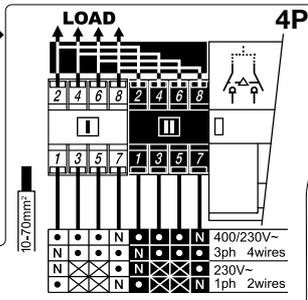
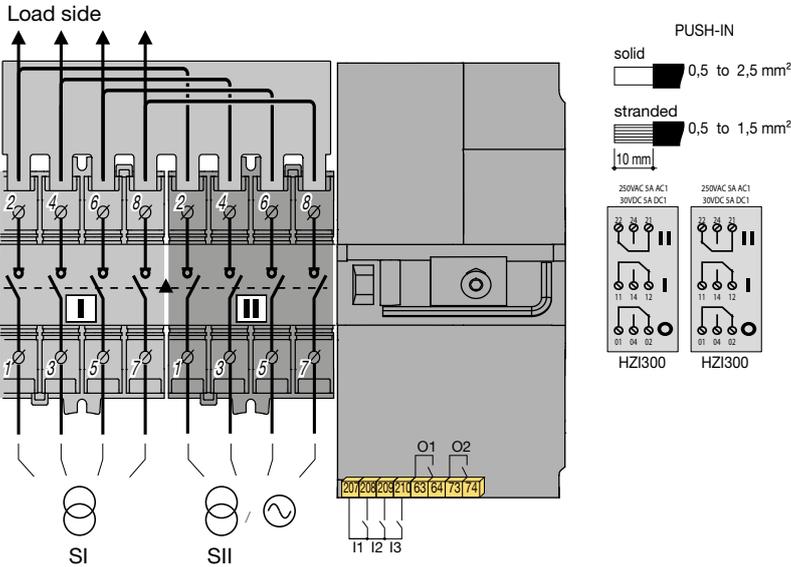
Close the cover.

**End of the procedure for detecting the neutral position.**

## 10. Connection of control/command circuits



Switch to manual mode before connecting the product. (Front Auto/Manu cover open).  
The product is delivered in the 0 position.



All pressure on the connector pins is to be avoided during wiring of the auxiliary cables



The product is delivered in the 0 position and in auto mode. Maximum control cables length = 10 m. In case of longer distance, use control relays.

Source must always be connected as show above.

Ensure that the product is in Manual Mode (front cover open).



See instruction sheet

207 208 209 210

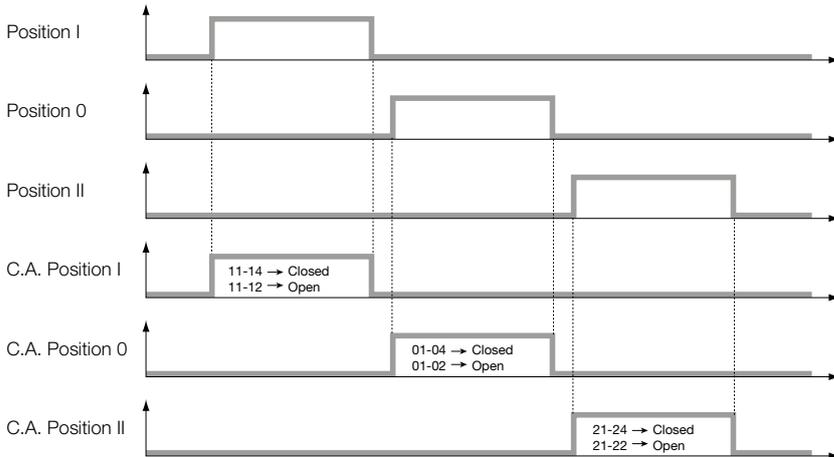
63 64 73 74

## 10.1. Terminal connectors designation

Type	Terminal no.	Application	Status of the contact	Description	Output characteristics	Recommended connection cross-section
Inputs	I1: 207/208	Network-Network		With priority	Dry potential free contact	0.5 to 2.5 mm <sup>2</sup> (rigid) 0.5 to 1.5 mm <sup>2</sup> (stranded)
				Without priority		
		Network-Genset		Automatic retransfer		
				Manual retransfer		
	I2: 207/209	Network-Network		Source priority I	Dry potential free contact	
				Source priority II		
		Network-Genset		Stop the test on load		
				Test on load		
	I3: 207/210	Network-Network or Network-Genset		AUTO mode	Dry potential free contact	
				Automatic mode inhibition		
Outputs	O1: 63/64	Network-Network or Network-Genset		Product not available : - Manual mode - Operation failure - Electronic failure - No power sources	Resistive load 2A 30 VDC 0.5A 230 VAC Pmax: 60W or 125 VA Umax: 30 VDC or 230 VAC	
				Product available		
	O2: 73/74	Network-Genset		No start command genset	Resistive load 2A 30 VDC 0.5A 230 VAC Pmax: 60W or 125 VA Umax: 30 VDC or 230 VAC	
				Generating set starting		

Type	Terminal no.	Status of the contact	Description	Output characteristics	Recommended connection cross-section
Auxiliary contact block HZI300	11/12/14		Changeover switch in position I	250 VAC 5A AC1 30 VDC 5A 250 VAC 2A AC13	0.5 to 2.5 mm <sup>2</sup> (rigid)
	21/22/24		Changeover switch in position II	250 VAC 5A AC1 30 VDC 5A 250 VAC 2A AC13	
	01/02/04		Changeover switch in position 0	250 VAC 5A AC1 30 VDC 5A 250 VAC 2A AC13	0.5 to 1.5 mm <sup>2</sup> (stranded)

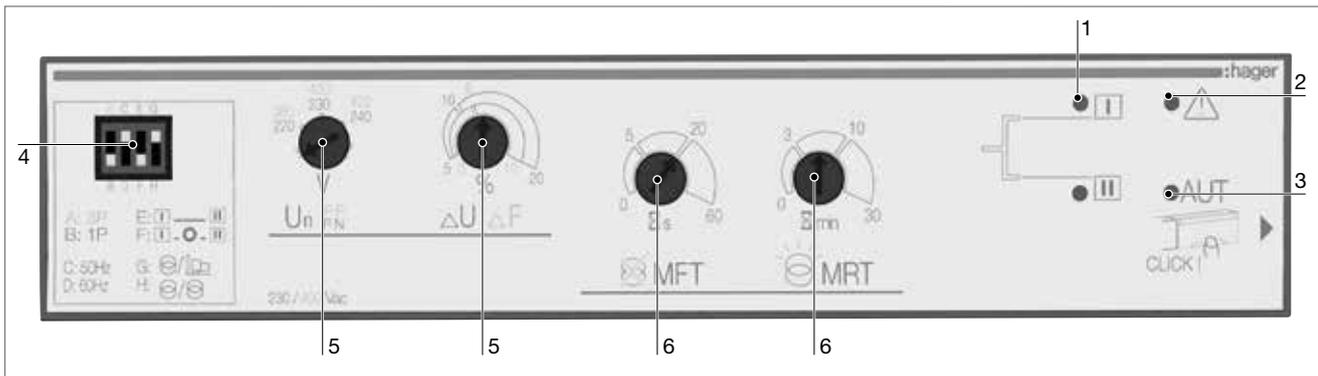
## 10.2. Auxiliary contact operating schedule



## 11. Operation

### 11.1. Presentation of the product interface

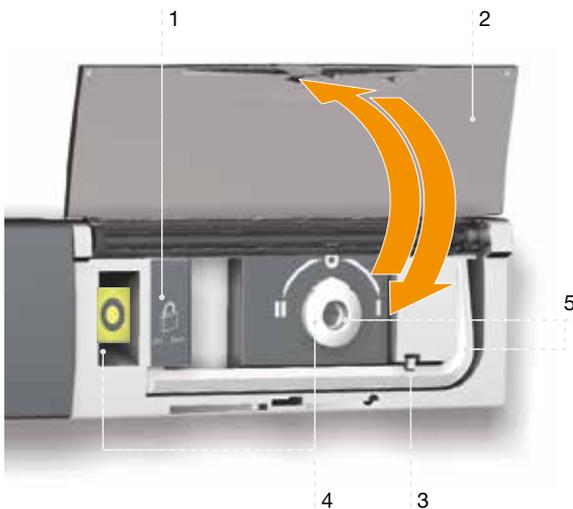
#### 11.1.1. Product interface



1. Source I and Source II availability indicators
2. Fault LED
3. Auto LED

4. Dip switches
5. Adjustment potentiometers of the rated voltage and frequency and voltage thresholds

6. Potentiometers to set timers



#### 1. Locking

- Option to padlock using a 1 x 8 mm max. padlock.

#### 2. AUT/MAN cover

- Open the cover to switch to manual mode.
- Close the cover to return to automatic (remote control) mode.
- Open and close the cover to clear faults.

#### 3. Auto/Manual mode sensor

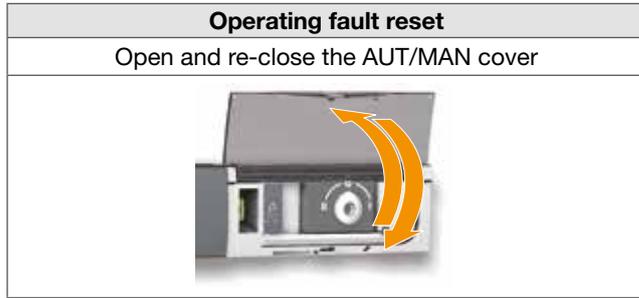
#### 4. Switch position indicators

- Display of position I, 0, II.

#### 5. Manual switching

- Insert the Allen key (5.0 mm) provided and turn to switch manually.
- Manual operation is not possible when padlocked.

### 11.1.2. Reset



### 11.2. Manual mode

To access manual mode, open the Aut/Man cover.

Once manual mode is active (cover open) it is possible:

- To lock the changeover switch.
- To access the DIP switches programming.
- To manually operate the changeover switch using the handle.



As soon as manual mode is activated, remote orders are inhibited (except the Genset start order in case of a mains loss).

#### MANUAL MODE

Padlocking

DIP switch  
programming

Changeover switching  
Manual

### 11.3. Manual switching

Use the handle situated on the front panel under the cover to manoeuvre the changeover switch. To simplify the operation, it is advised to also use the handle extension that is delivered with the product.

Check the changeover switch position on the indicator situated on the front panel before making any operation.

- From position I, turn anti-clockwise to get to position 0
- From position 0, turn anti-clockwise to get to position II
- From position II, turn clockwise to get to position 0
- From position 0, turn clockwise to get to position I



Do not force the product (Max 8 Nm).

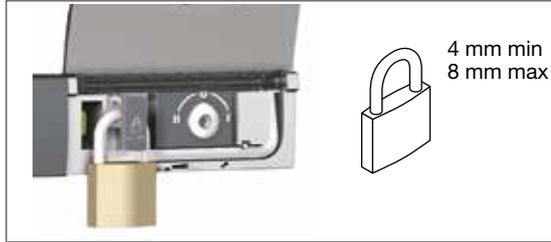


## 11.4. Padlocking

Enables locking in the 0 position (factory configuration) or in positions I, 0 or II (user configurable). It is necessary to configure padlocking to all positions before installation as access to configuration is at the back of the product. Refer to section "7.1. Changing the padlocking configuration", page 11

Locking is only possible in manual mode (cover open).

Pull on the locking handle to enable the interlock. Lock by inserting a padlock into the orifice provided for this purpose.



## 11.5. Programming

Whilst in manual mode check the wiring and installation. If ok power up the product. This product must always be put into service by qualified and approved personal. The LED signalling is only active when the product supply is on (supply LED lit). To set the dip switches, it is necessary to open the AUTO/MANU cover. The commissioning must always result in having at least 1 LED source available lit.

**Therefore, the voltage and frequency must be within the defined thresholds.**



Any action on the potentiometers changes the settings, even if the cover is closed.

### 11.5.1. Single phase version

## PROGRAMMING

(Manual operation)

### 1 Dip switch settings

**Type of network: A-B**

B: 1P

**Frequency: C-D**

C: 50 Hz  
D: 60 Hz

**Stop in O position: E-F**

E: No stop in O position  
F: 2 s stop in O position

**Type of application: G-H**

G: Network / Genset  
H: Network / Network

### 2 Source voltage supply configuration

Un (P-P): 380-420 Vac  
Un (P-N): 220-240 Vac

HYST: 20 %  $\Delta U/F$   
 $\Delta U$ : 5 - 20 %  
 $\Delta F$ : 3 - 10 %

### 3 Timer settings

**Loss of priority source timer**

MFT: 0-60 s

**Return of priority source timer**

MRT: 0-30 min.

### 4 LED's info

Source availability LED's

	Source I	Source II
<b>LED ON</b>	available	
<b>LED OFF</b>	missing or out of range	
<b>LED blinking</b>	- a timer is counting down - test mode	

Fault and state of the product LED's

	⚠	AUT
<b>LED ON</b>	Fault	Auto mode
<b>LED OFF</b>	Product OK	Manual mode
<b>LED blinking</b>	Wait	Manual retransfer

**Fault Reset**

The LED signalling and operation is only active when the product supply is available. To set the dip switches, it is necessary to open the Auto/Manual cover. Commissioning must always result in having at least 1 LED source available on. (Therefore, the voltage and frequency must be within the defined thresholds).

⚠ Any action on the potentiometers will change the settings, even when the cover is closed.

### 11.5.2. Three phase version

The LED signalling and operation is only active when the product supply is available. To set the dip switches, it is necessary to open the Auto/Manual cover. Commissioning must always result in having at least 1 LED source available on. (Therefore, the voltage and frequency must be within the defined thresholds).



Any action on the potentiometers will change the settings, even when the cover is closed.

## PROGRAMMING (Manual operation)

### 1 Dip switch settings

#### Type of network: A-B

A: 3P

#### Frequency: C-D

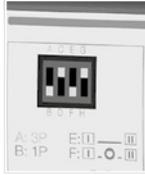
C: 50 Hz  
D: 60 Hz

#### Stop in O position: E-F

E: No stop in O position  
F: 2 s stop in O position

#### Type of application: G-H

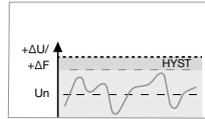
G: Network / Genset  
H: Network / Network



### 2 Source voltage supply configuration



Un (P-P):  
380-420 Vac  
Un (P-N):  
220-240 Vac

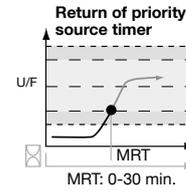
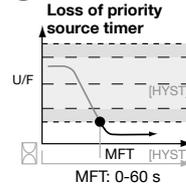


HYST: 20 % ΔU/F  
ΔU: 5 - 20 %  
ΔF: 3 - 10 %

The LED signalling and operation is only active when the product supply is available. To set the dip switches, it is necessary to open the Auto/Manual cover. Commissioning must always result in having at least 1 LED source available on. (Therefore, the voltage and frequency must be within the defined thresholds).

Any action on the potentiometers will change the settings, even when the cover is closed.

### 3 Timer settings



### 4 LED's info

Source availability LED's

	Source I	Source II
LED ON	available	
LED OFF	missing or out of range	
LED blinking	- a timer is counting down	- test mode

Fault and state of the product LED's

		AUT
LED ON	Fault	Auto mode
LED OFF	Product OK	Manual mode
LED blinking	Wait	Manual retransfer



## 11.6. Sealable configuration cover

Configuration settings may be protected by means of a sealable cover. Refer to section «4. Optional accessories», page 18.

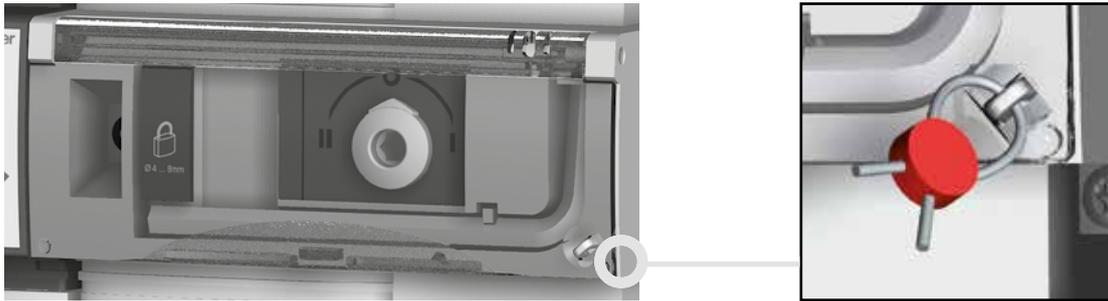


## 11.7. Automatic mode

Close the cover to enter automatic mode. Make sure that the changeover switch is in automatic mode (AUT LED lit).

### 11.7.1. Sealable Auto/Manual cover

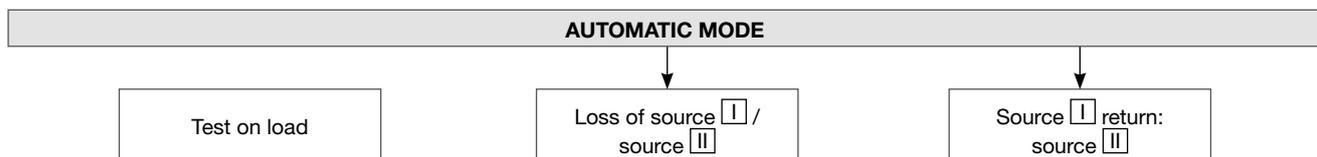
Auto/Manu mode can be protected by sealing the standard Auto/Manu cover as shown.



## 11.8. Possible actions

Once in automatic mode, it is possible to:

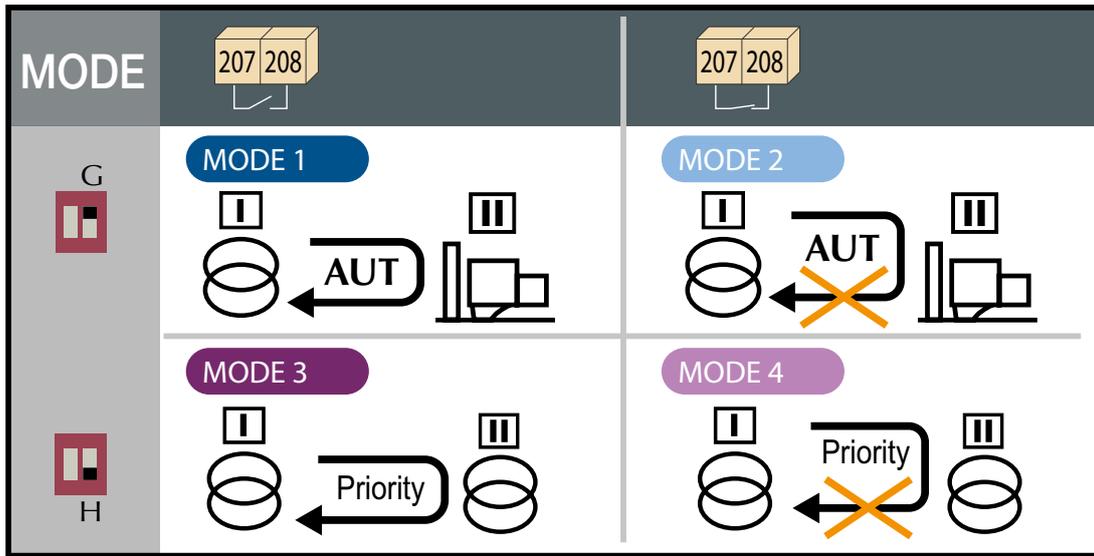
- Activates on load test
- Run a source **I** or source loss sequence **II**,
- Start a restoration sequence source **I** or source **II**.



## 11.9. Manual & Automatic Mode / Mains restoration conditions

- Automatic mode returns to active 2 seconds after switching from manual to automatic mode.
- Source I and source II voltages and frequencies are checked to define the changeover switch's new stable status.
- The same automatic mode recognition sequence must be executed following power-off and complete discharge of the power reserves.

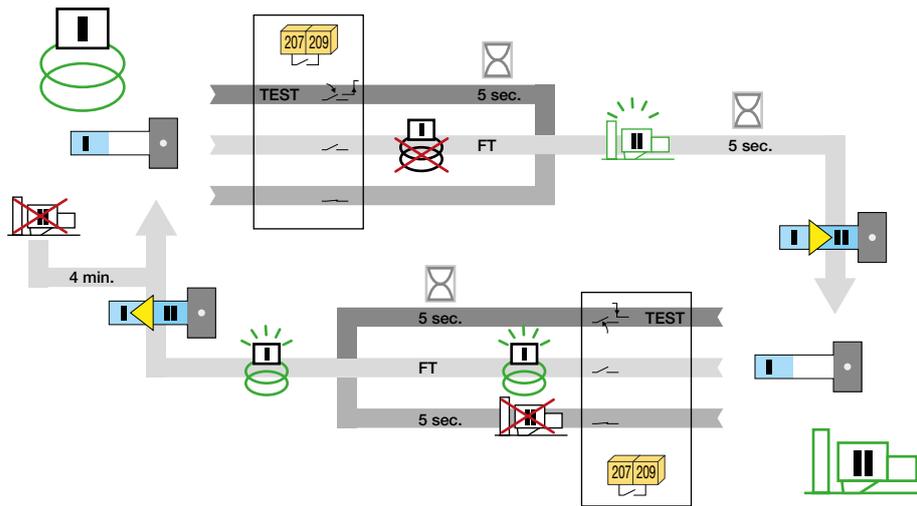
Mode settings

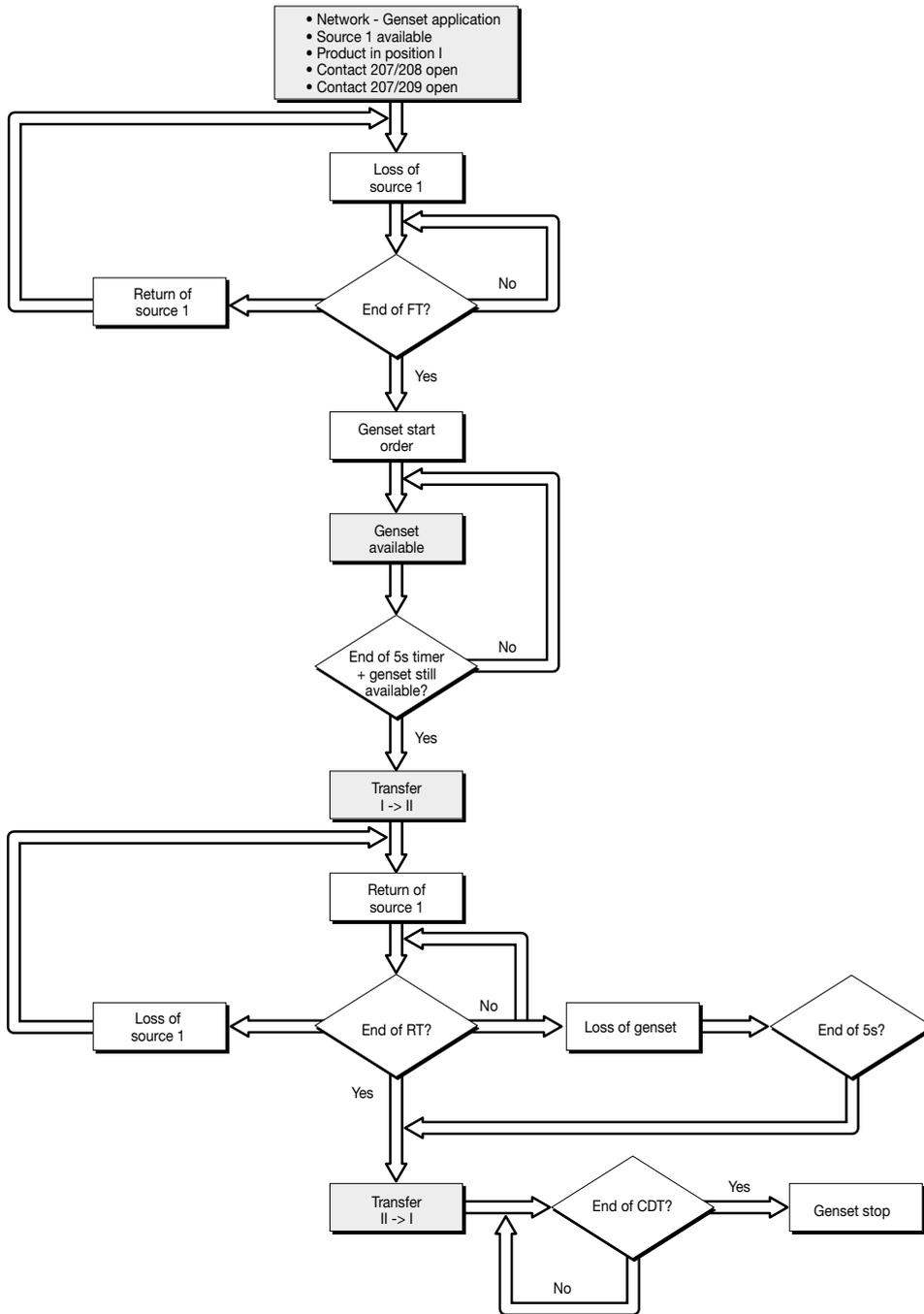


### 11.9.1. Mode 1: Automatic retransfer

Network - Genset applications

- Contact 207/208 open => automatic retransfer



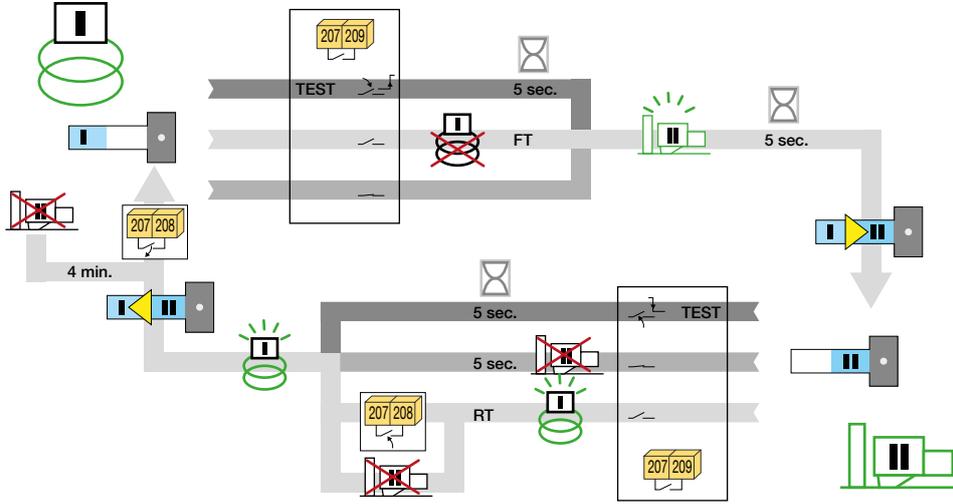


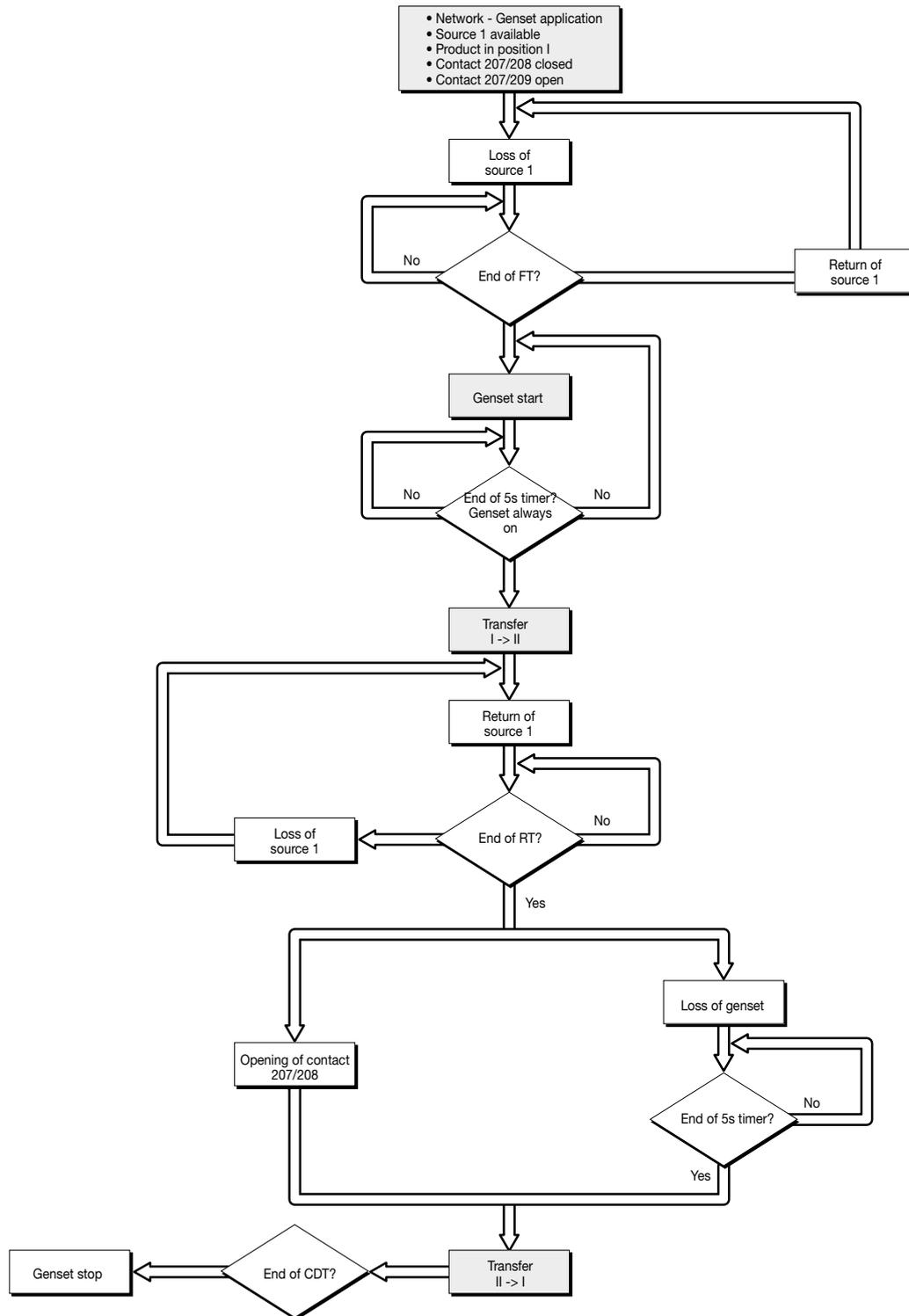
CDT = cool down timer fixed at 4 min.

### 11.9.2. Mode 2a: Controlled retransfer

Network - genset application

- Contact 207/208 closed => Manual retransfer

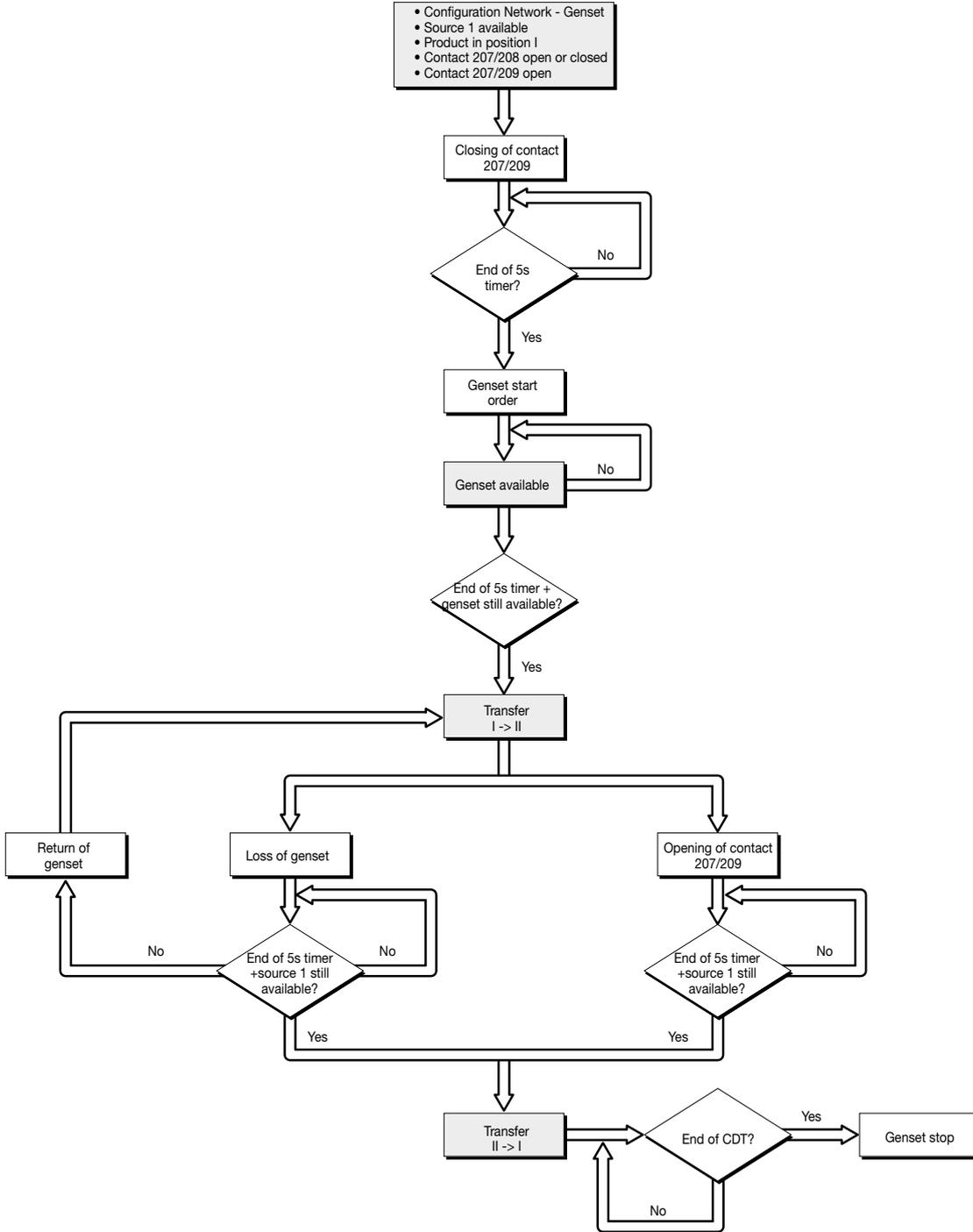




### 11.9.3. Mode 2b: Controlled transfer

Network - genset application

- Contact 207/208 closed => Test on load

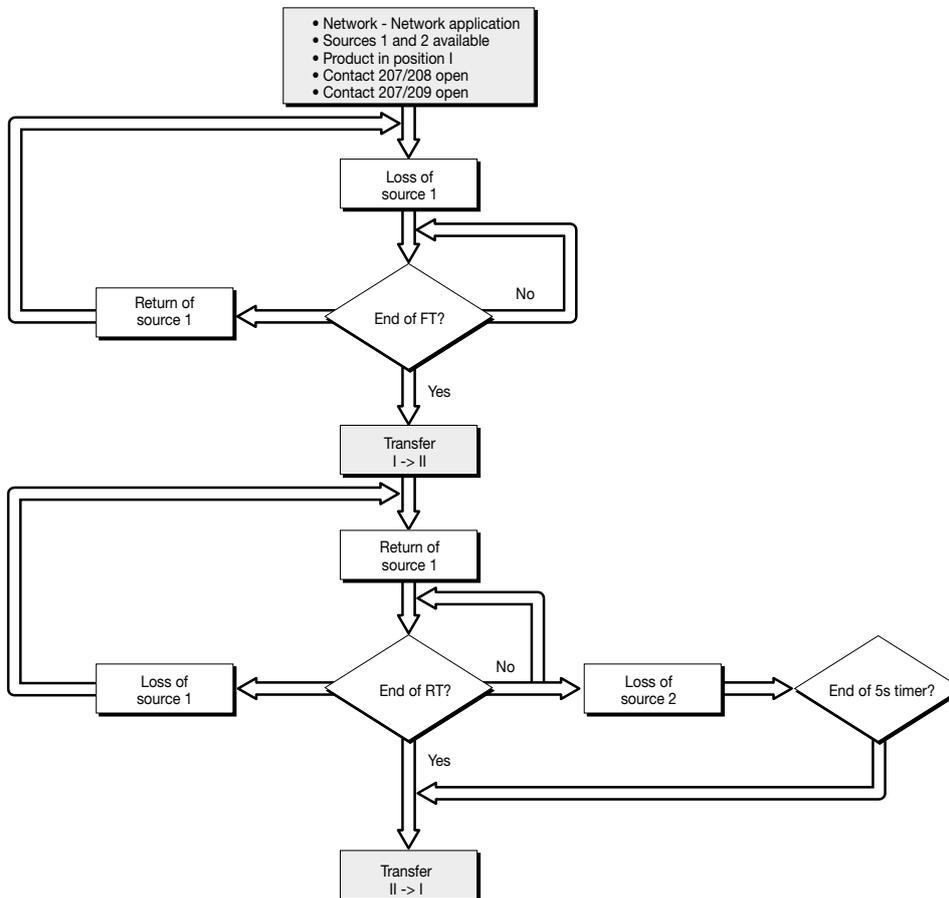
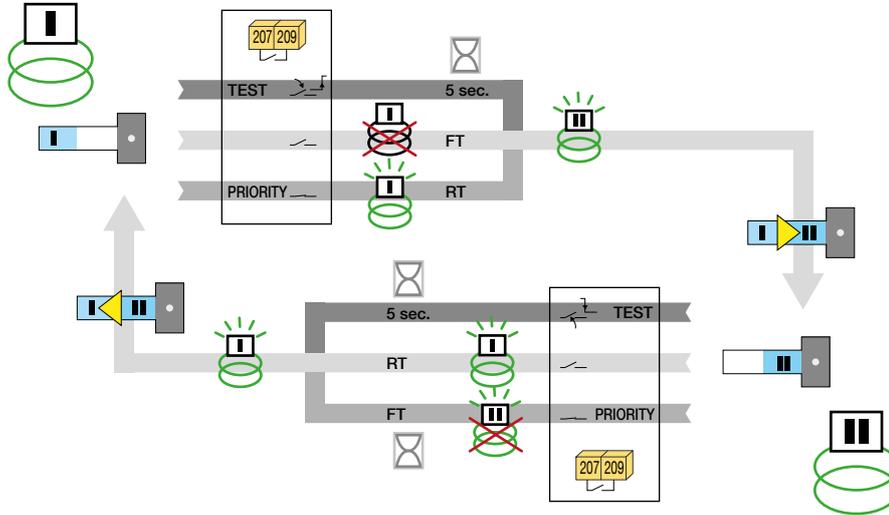


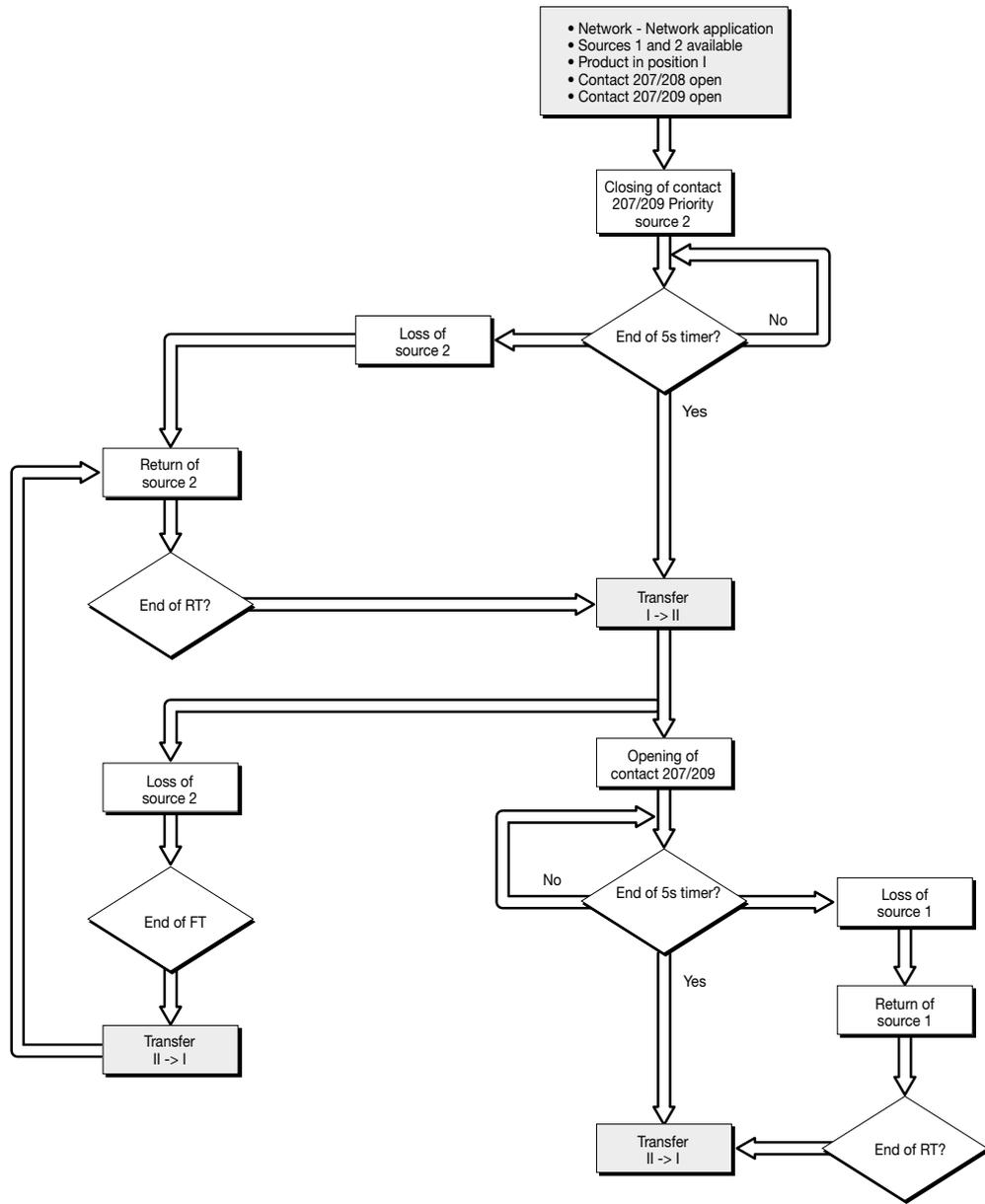
CDT = cool down timer fixed at 4 min.

## 11.9.4. Mode 3: Network - Network application with priority

Network - network application

- Contact 207/208 open => functioning with priority.

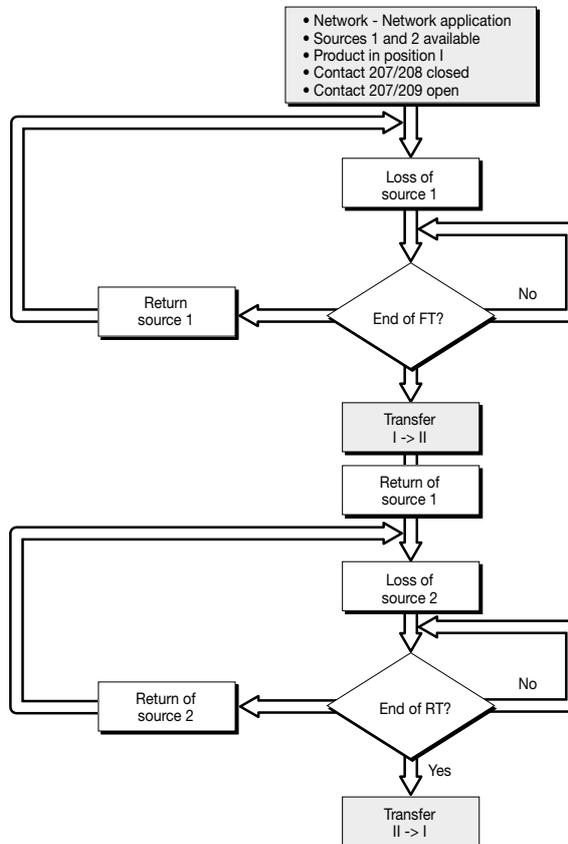
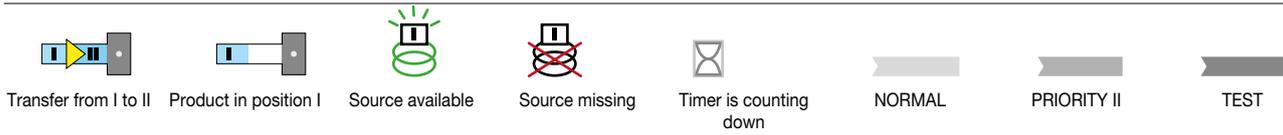
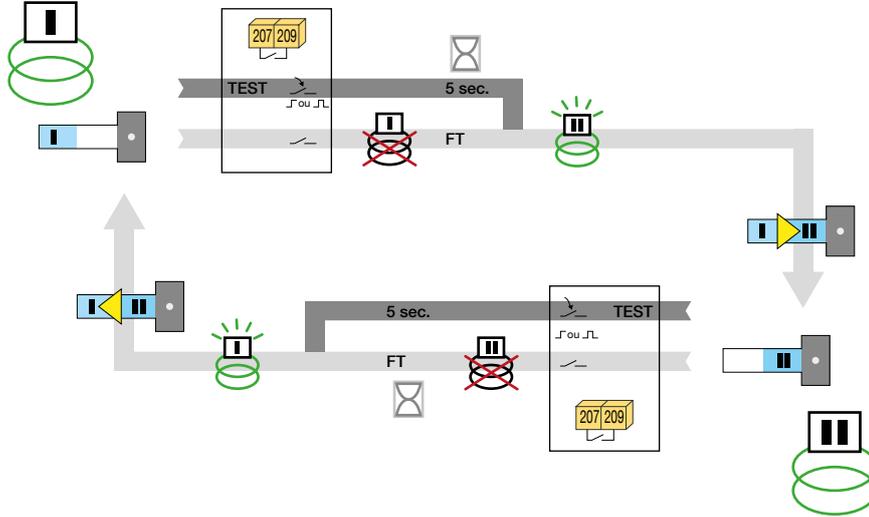


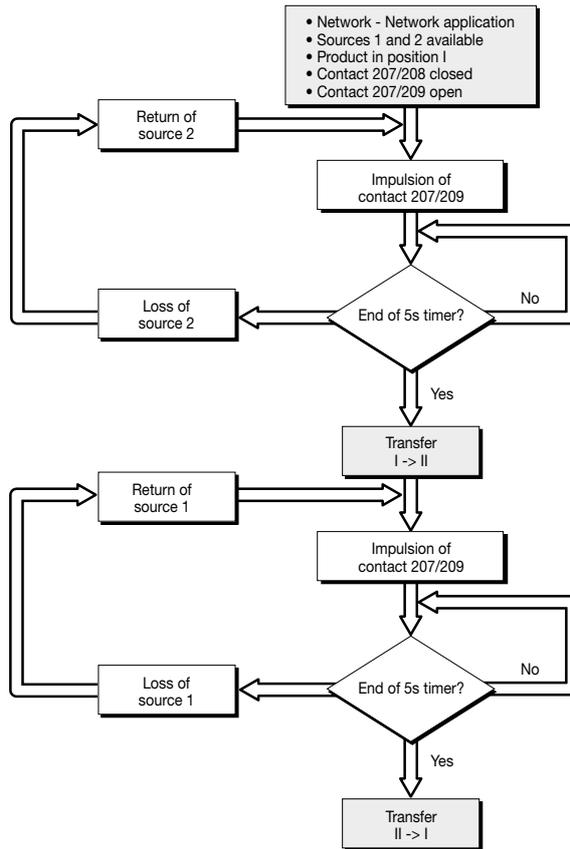


## 11.9.5. Mode 4: Network - Network application without priority

Network - Network application

- Contact 207/208 closed => functioning without priority.





## 12. Preventative maintenance

It is recommended to operate the product at least once a year.

I - O - II - O - I

Note: Maintenance should be planned carefully and carried out by qualified and authorised personnel. Consideration of the critical level and application where the product is installed should form an essential and integral part of the maintenance plan. Good engineering practice is imperative whilst all necessary precautions must be taken to ensure that the intervention (whether directly or indirectly) remains safe in all aspects.



The use of any Megohmmeter is prohibited on this product as the connection terminals are intrinsically connected to the sensing

## 13. Troubleshooting guide

	Symptoms	Action to be carried out	Expected results
1	Product is off, no LED is lit	Check for a voltage of 176 to 288 VAC on the supply terminals: - Terminals 1-7 correspond to SOURCE I - Terminals 1-7 correspond to SOURCE II	The "AUT" LED is lit (if the cover is closed)
2	The "Priority SOURCE Availability" LED does not come on	Check the following parameters: • the type of network => 3P (DIP Switch 1 on position A) 1P (DIP Switch 1 on position B) • frequency => 50 Hz (DIP Switch 2 on position C) 60 Hz (DIP Switch 2 on position D) • the nominal voltage => with a multimeter, measure the voltage across the terminals and report the value on the potentiometer	The "Priority SOURCE Availability" LED is lit
		Check the thresholds and hysteresis of rated voltages ( $\Delta U$ ) and frequencies ( $\Delta F$ ) and report them on the corresponding potentiometer	
		If using an Auto transformer - proceed as follows upon 1st switching on • Step 1: HIC4xxA must be connected to a three-phase + neutral network (4NBL) for setting the neutral position. Neutral position is detected upon first switching on • Step 2: Connect the autotransformers. Warning: Neutral must be connected on the same side as in step 1	
	 How to reset the neutral position: • Step 1: Open the cover • Step 2: Set DIP Switch 1 from 3P to 1P • Step 3: Set DIP Switch 1 from 1P to 3P • Step 4: Close the cover		
3	The "Emergency SOURCE Availability" LED does not come on	Check the following parameters: • the type of network => 3P (DIP Switch 1 on position A) 1P (DIP Switch 1 on position B) • frequency => 50 Hz (DIP Switch 2 on position C) 60 Hz (DIP Switch 2 on position D) • the nominal voltage => with a multimeter, measure the voltage across the terminals and report the value on the potentiometer	The "Emergency SOURCE Availability" LED is lit
		<b>CAUTION:</b> a generator operating off load can generate a Fr and a U lower than the nominal values: Check the thresholds and hysteresis of rated voltages ( $\Delta U$ ) and frequencies ( $\Delta F$ ) and report them on the corresponding potentiometer.	
		If using an Auto transformer - proceed as follows upon 1st switching on • Step 1: HIC4xxA must be connected to a three-phase + neutral network (4NBL) for setting the neutral position. Neutral position is detected upon first switching on. • Step 2: Connect the autotransformers. Warning: Neutral must be connected on the same side as in step 1	
	 How to reset the neutral position: • Step 1: Open the cover • Step 2: Set DIP Switch 1 from 3P to 1P • Step 3: Set DIP Switch 1 from 1P to 3P • Step 4: Close the cover		
4	The product remains switched off after the Priority SOURCE is lost	Check if voltage is between 176 to 288 VAC across the power supply terminals of emergency SOURCE: - Terminals 1-7 correspond to the Emergency Source	The "AUT" LED is lit
		In case of transformer/ Genset, check that FT timer (Main Failure Timer) has finished counting down. • Use a stopwatch. • Start the stopwatch when the product has lost its Priority SOURCE. - Contact 73 - 74 must be closed after 60 s max (M-G application) - GENSET run command = contact 73-74 closed - GENSET stop command = contact 73-74 open	The Genset works and the LED "Emergency Source Availability" is lit
5	The product does not switch over after the Priority SOURCE is lost	Check that the product is not in manual mode: • Automatic mode = cover closed • Manual mode = cover open	The "AUT" LED is lit
		Check that automatic operation has not been inhibited by an external order (terminals 207-210).	
		Check the status of led « Emergency SOURCE availability ». If it is off, refer to the symptom concerned (higher in the list)	The "AUT" and "Emergency SOURCE Availability" LEDs are lit
	In case of Transformer / Transformer, check the setting of FT timer (Main Failure Timer). The duration of this time delay is between 0 and 60 s. If necessary, use a stopwatch to check switching to SOURCE after FT countdown	At the end of the time delay, the product switches to mechanical position 0, and to emergency SOURCE	
6	The product does not switch over when the Priority SOURCE is restored	Check that the product is not in manual mode: • Automatic mode = cover closed • Manual mode = cover open	The "AUT" LED is lit
		Check that automatic operation has not been inhibited by an external order (terminals 207-210).	
		Check the state of the "Priority Source Availability" LED. If it is off, refer to the symptom concerned (higher in the list)	The "AUT" and "Emergency SOURCE Availability" LEDs are lit
		Check the setting of RT timer (Main Return Timer). The duration of this delay is between 0 and 30 min. Use a stopwatch to check the switch to Priority SOURCE after the RT timer	At the end of the time delay, the product switches to mechanical position 0, and to priority SOURCE
	Check that the "manual retransfer" function is not active* • Retransfer mode activated = contact 207-208 closed • Retransfer mode deactivated = contact 207-208 open  * if this function is not required	Contact 207-208 must be open to enable switching to priority SOURCE	
7	Return to Priority SOURCE has been executed, but the Emergency Source (for a Generator) continues to operate	Check CDT timer (Cool Down Timer) has finished counting down - Fixed time delay: 4 min • Use a stopwatch. - Start the stopwatch when the product has switched over to the Priority SOURCE. - Contact 73-74 must be open after time delay CDT has finished counting down	The GenSet switches off and led "Emergency SOURCE availability" is OFF
		Check that the product is not in automatic mode: • Automatic mode = cover closed • Manual mode = cover open	The "AUT" LED is lit
		Check that automatic operation has not been inhibited by an external order (terminals 207-210).	