

TECHNICAL
INSTRUCTION
MANUAL

ATI

Transfer Panel

EN



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1. GENERAL SAFETY INSTRUCTIONS

- a. This leaflet provides indispensable instructions in terms of the safety, the connection and the operation of the automatic transfer switch.
- b. This system must exclusively be installed by specialised, qualified personnel.
- c. Before making the connections, it is essential that the earth cable be connected.
- d. Keep the cabinet clean using a dry cloth.
- e. It is recommended that this leaflet be kept in a place easily accessible to all those who may need it.
- f. The maintenance operations must be carried out exclusively by authorised and appropriately trained personnel.
- g. This system complies with the community directives applicable to this product. Thus, it bears the CE mark.



- h. Compliance with IEC 61439. The product inside is conforms to the standard IEC 60947-6-1.

Information available in this instruction manual are not contractual.

2. INTRODUCTION

2.1. General introduction

ATI enclosure integrates a new 4-pole changeover switch including electronic's control to meet standard IEC 60947-6-1. Thanks to the changeover switch technology, it is always possible to manually operate the system to guarantee the changeover panel operation in any situation.

The new enclosure design allows switch front panel access to:

- Avoid opening of the enclosure for manual operation
- Allow electronic module access for programming and monitoring
- Simplify connections between the mechanical switch and the electronic module.

With the mode switch in manual position, Padlocking, as well as handle insertion operations are then directly accessible from the front panel.

The electronic module, also accessible from the front panel, includes:

- Sources monitoring
- Metering display (V and f as standard)
- Test operations and Sequences programming using keypad.

2.2. ATI transfer panel range

The new ATI panel range will be available from 250 A to 3 200 A.

New ATI range models

- ATI 250 A
- ATI 400 A
- ATI 630 A
- ATI 800 A
- ATI 1 000 A
- ATI 1 250 A
- ATI 1 600 A
- ATI 2 000 A
- ATI 2 500 A
- ATI 3 200 A



Standard offer includes Bottom cable entry. Top cable entry is offered as an option.

2.3. New motorized changeover switch

The new switch included in the enclosure is made of 3 different parts:

- 1. A mechanical switch.
- 2. A motorized block to operate the switch electrically.
- 3. An electronic module on the top of the motorized block, driving loss of mains and main's return sequence.
- 4. A reset button.

Features and benefits:

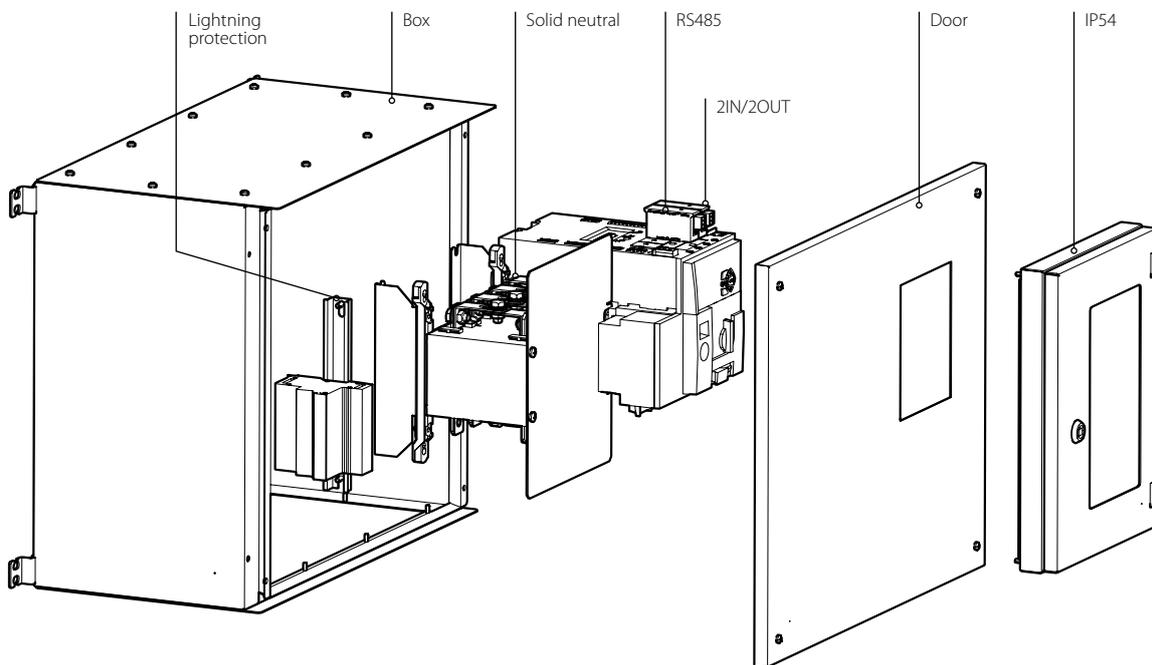
The new Motorisation block is included in a moulded case

- It is possible to remove the motorized block and the electronic module without being obliged to disconnect the

power cables

- Manual operation directly acts on the shaft of the mechanical switch for better reliability
- The complete enclosure meets standard IEC 60947-6-1 (ATS applications)
- The enclosure is self-powered (from Main and Gen sources). There is no need for an external power source to allow automatic sequence after loss of power
- All thresholds and timers can be set using the display and the keypad, or via modbus (optional)
- The standard product integrates voltage and frequency control for better diagnostic
- Main sensing circuit is 3 phases and Gen sensing circuit is single phase
- Standard product includes, phase to phase + phase to neutral voltage measurement and displays system frequency (phase 1) and switch number of operations.
- The product including metering allows current measurement as well as power metering (kW, kVar, kVA and PF).

2.4. Options availability



Loose options are available, for customer mounting in the enclosures

Option 1:

- **IP54** protection rating is available as an option. A specific protection window must be installed on the front panel of the enclosure to avoid water infiltration in the enclosure. Option code is TIP5.

Option 2:

- **Solid neutral** link is available as an option on the switch itself, when switching of the neutral cable is not required. Option code is TLNK.

Option 3:

- **Lightning protection** is also available as an option to avoid ATS damage in case of a strike on the power cables. This option is highly recommended in stormy areas. Option code is TLPR and TIO2 is included.

Option 4:

- **2IN / 2OUT.1** plug in module allowing auxiliary contacts for Main and Generator available information is also available as an option. Option code is TIO2.

Option 5:

- 1 plug in **communication** module, JBUS / MODBUS protocole, can optionally be ordered allowing remote communication of the changeover system. Option code is TCOM.

2.5. Environment

The complete enclosure meets following environmental requirements:

Ingress protection of IP41 with overall rating of IP21

- Operating temperature of -10 °C to 40 °C without de-rating
- Operating temperature of 40 °C to 65 °C with de-rating
- Maximum storage is one year at:
 - Maximum temperature +55 °C
 - 95% humidity non condensing
- 80 % humidity non condensing at 55 °C
- 95 % humidity non condensing at 40 °C
- Maximum operating altitude without switch de-rating

3. TECHNICAL CHARACTERISTICS

Chacacteristics										
Thermal Current I _{th} (40 °C)	250 A	400 A	630 A	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200A
Assigned isolement voltage U _i (V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Assigned voltage to chocks U _{imp} (kV)	12	12	12	12	12	12	12	12	12	12
IEC 60947-6-1 Characteristics										
Assigned current I _e (A) (B categorie)										
Rated insulation voltage U _i (V)	250 A	400 A	630 A	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A
Operating Class										
Material class	PC									
Maximum short circuit current using gG DIN fuse										
Max short circuit (kA eff)	50	50	50	50	100	100	100			
Fuse size (A)	250	400	630	800	1000	1250	2x800			
Short circuit Operation										
Rated short time withstand current (kA eff)	8	8	10	26	35	35	50	50	50	50
Rated short circuit making capacity (kA max)	22	22	17	48	73,5	73,5	110	110	110	110
Other Characteristics										
Commutation duration										
I-II ou II-I (s) ⁽¹⁾	0,85	0,85	0,85	1,6	1,6	1,6	1,6	1	1	1
I-0 ou II-0 (s) ⁽¹⁾	1,3	1,3	1,3	2,6	2,6	2,6	2,6	2	2	2
Black time during commutation under U _n (ms)	0,6	0,6	0,6	1,5	1,5	1,5	1,6	1	1	1
Power input										
Alim. 230 V AC mini / maxi (V)	166/332	166/332	166/332	166/332	166/332	166/332	166/332	166/332	166/332	166/332
Consumption during switching operation										
230 Vac maxi / average (VA)	298/137	298/137	298/172	482/206	482/206	482/206	482/252	834/344	834/344	834/344
Mechanical characteristics										
Number of commutation (durability)	8000	8000	5000	4000	4000	4000	3000	3000	3000	3000
Weight (complete std enclosure) kg	8,5	8,9	14,4	15,1	33,3	34,7	40,5	62,7	62,7	76,4

All these characteristics are given as information and are not contractual

Temperature Derating					
Nominal Rating (A)	De rate			IEC 60947-6-1 AC31-B 415V	
	50	60	65	35°C	60° C 415 V
35					
250	250	240	230	250	240
400	360	340	330	400	340
630	550	485	430	630	480
800	700	610	545	800	610A
1000	880	770	680	1000A	770
1250	1100	960	850	1250A	960A
1600	1400	1230	1090	1600A	1230
2000	1750	1540	1360	2000A	1540
2500	2190	1930	1700	2500A	1930
3200	2810	2470	2170	3200A	2470

Single phase configuration

Table available for single phase configurations using a 4 poles switch and connecting 2 poles in parallel
 Max ambient Temperature = 35 °C
 Use with 2 poles in parallel.

I _n (triphasé)	I _n (monophasé) (*)
250	395
400	632
630	995
800	1260
1000	1580
1250	1975
1600	2520
2000	3160
2500	3950
3200	5050

(*) Refer to the short-circuit values of table of the general characteristics.

Metering accuracy

Voltage and frequency: 1 % on power input range.

4. ENCLOSURE INSTALLATION

4.1. First operation

The system is delivered in position 0 and in manual mode with the generator start contact closed.

4.2. Wall mounting installation

The enclosure 250 A and 400 A must be fixed on a wall using solid fixing screws (not supplied).
Recommended size : M6 50 mm (minimum).

4.3. Floor installation

Enclosed 630A to 3200A must be installed on the floor.

4.4. Dimensions

	250 A	400 A	630 A	800 A*	1000 A*	1250 A*	1600 A*	2000 A*	2500 A*	3200 A*
Height (mm) (A1)	500	600	800	1000	1000	1300	1500	1800	1800	1800
Distance (mm) (A2)	441	541	-	-	-	-	-	-	-	-
Width (mm) (B1)	600	600	600	775	775	1000	1000	1000	1000	1000
Distance (mm) (B2)	648	648	-	-	-	-	-	-	-	-
Depth (mm) (C)	300	375	475	650	650	650	800	1000	1000	1000

(*) Without 100mm pedestal

4.5. Mounting accessories

4.5.1. RS485 & 2IN/2OUT option



RS485 MODBUS* communication

- RS485 link with MODBUS* protocol (speed up to 38400 bauds).



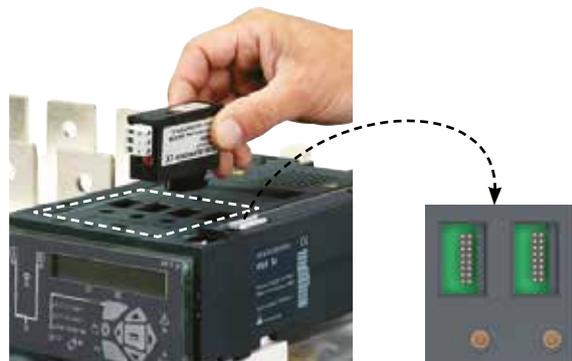
2 inputs - 2 outputs

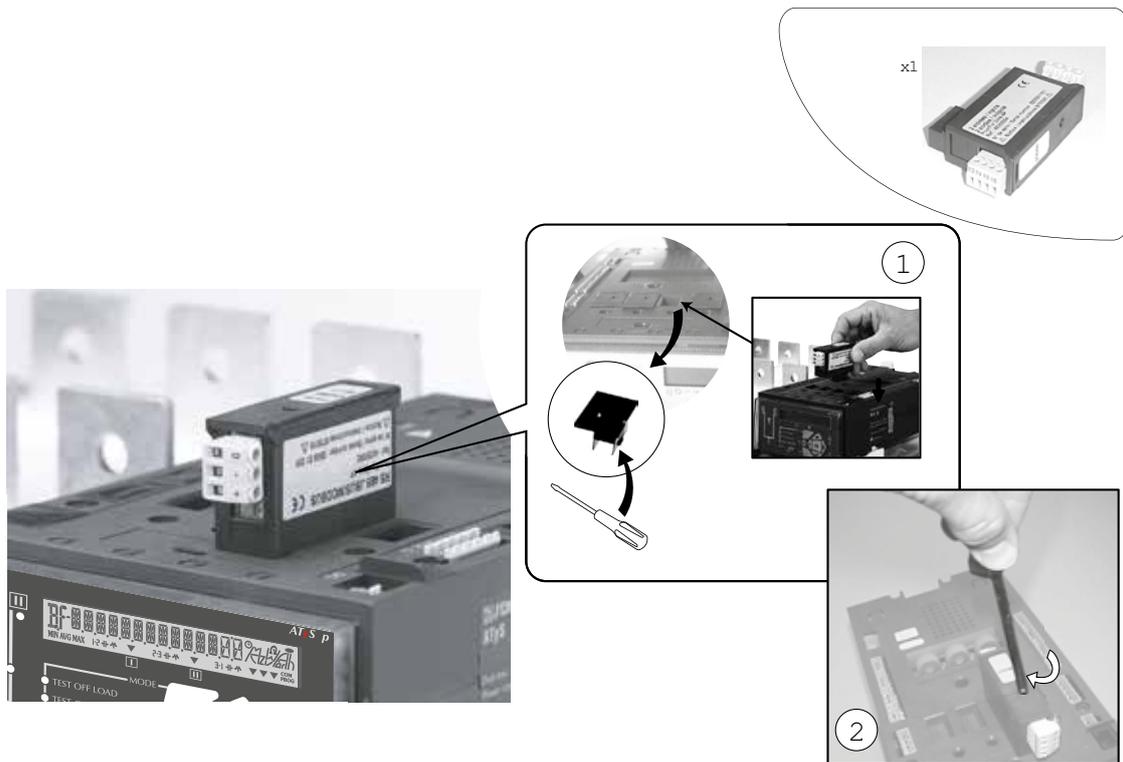
- Each module has 2 programmable inputs and 2 programmable outputs available.

The ATI includes two slots on the top part of the ATS controller that are dedicated to fixing of optional modules. The modules are available as an option so as to suit the various user requirements.

Depending on the option mix selected an ATI may accept a maximum of 2 single module.

The modules may be mounted in any slot and configured according to their location.





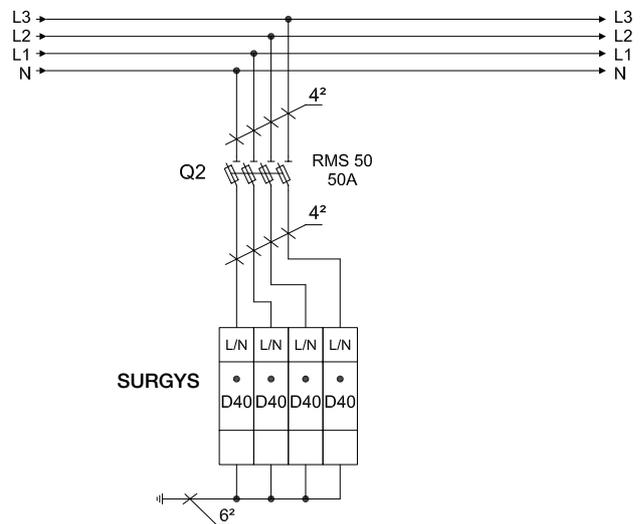
	CAUTION	<p>Connect the modules with the power off. Ensure that the option fixing bolts are tightened correctly. A 3 minute power outage is required to recognize an optional module.</p>
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4.5.2. Lightning protection

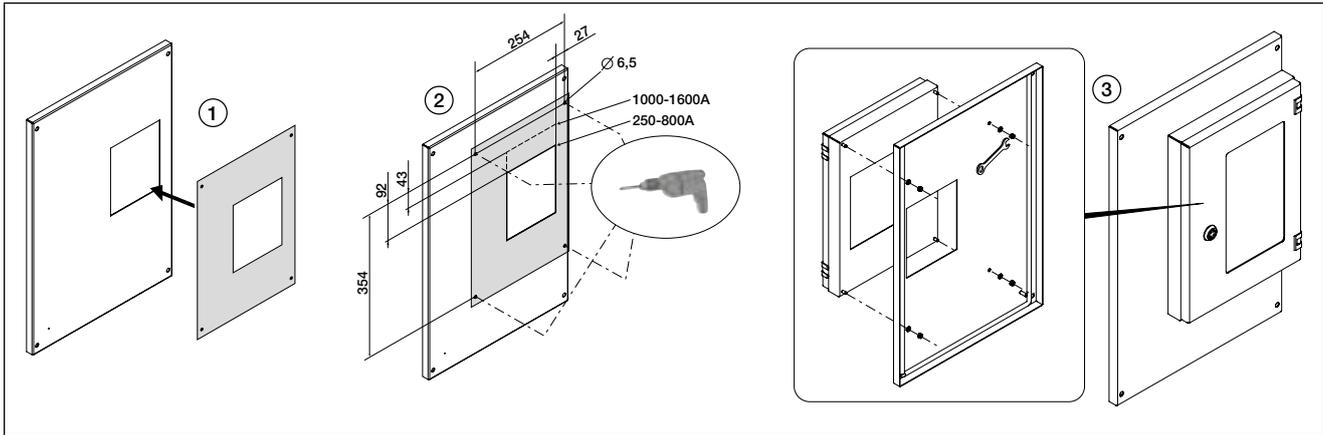
The lightning protection system is hardly recommended to ensure changeover safety.

This option is provided mounted on a din rail which can be fixed with the 2 screws available on the enclosure back plate (on the top or bottom).

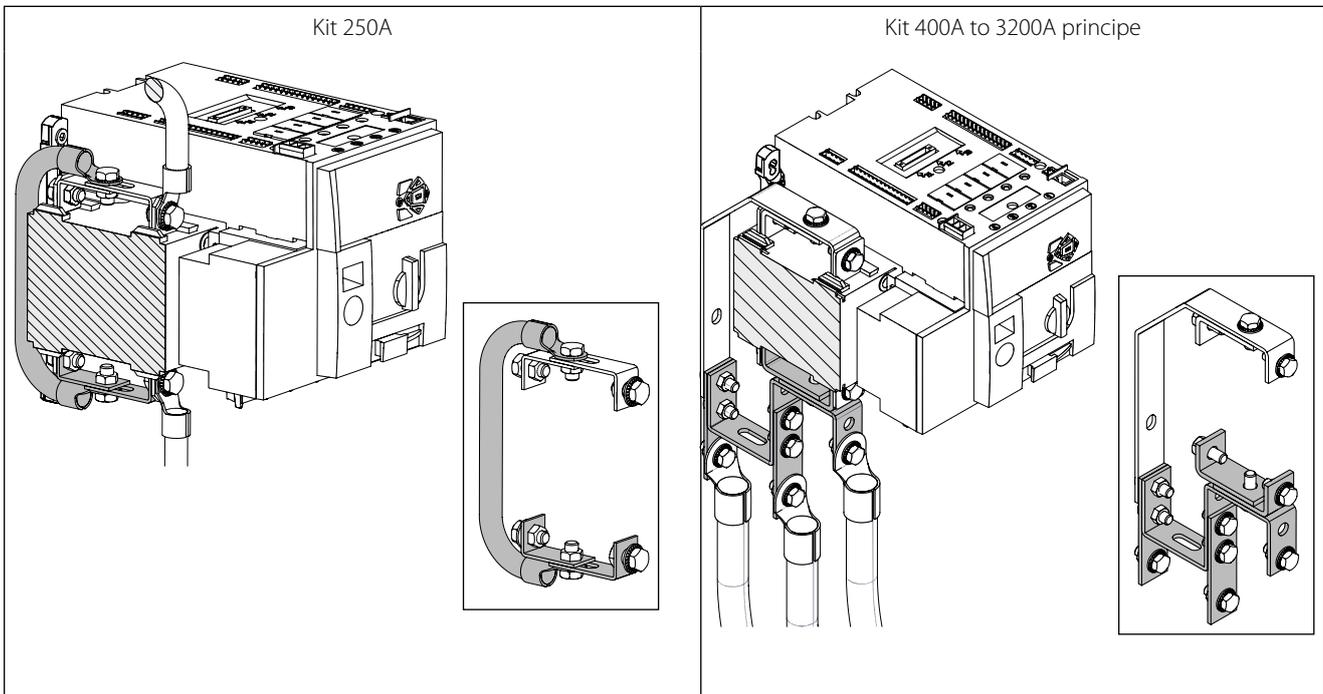
The phases and neutral lines can be connected on the upstream side of the source which presents more risks.



4.5.3. IP54 kit



4.5.4. Solid neutral kit



4.6. Power cables connection

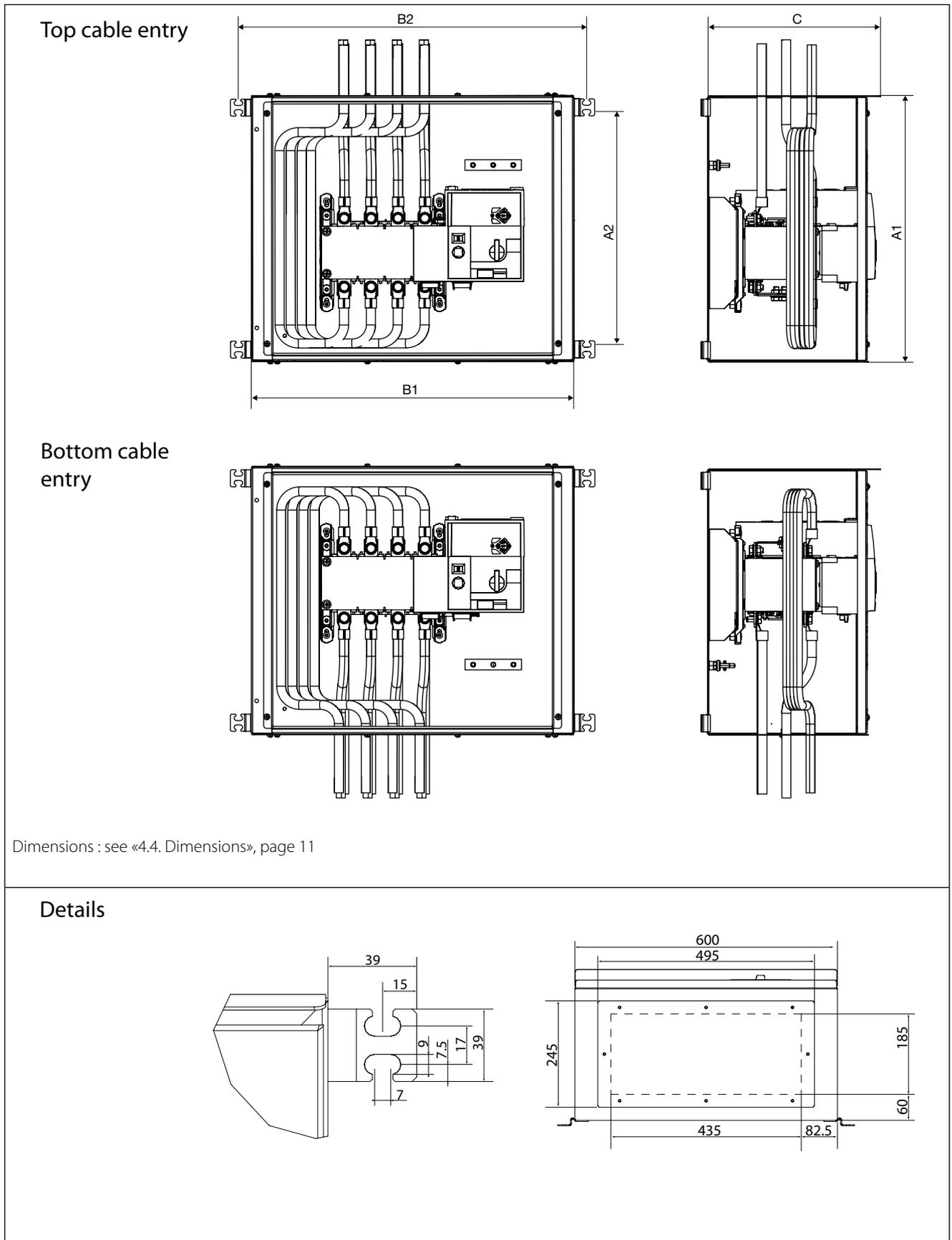
4.6.1. Cable size according to the ratings

The connection are provided for copper cable.

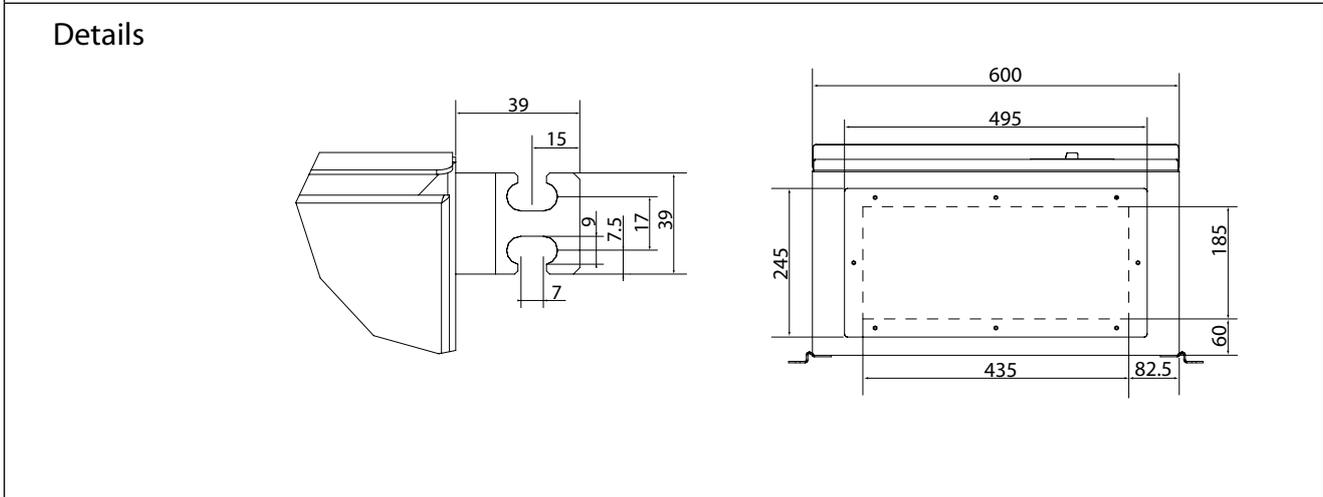
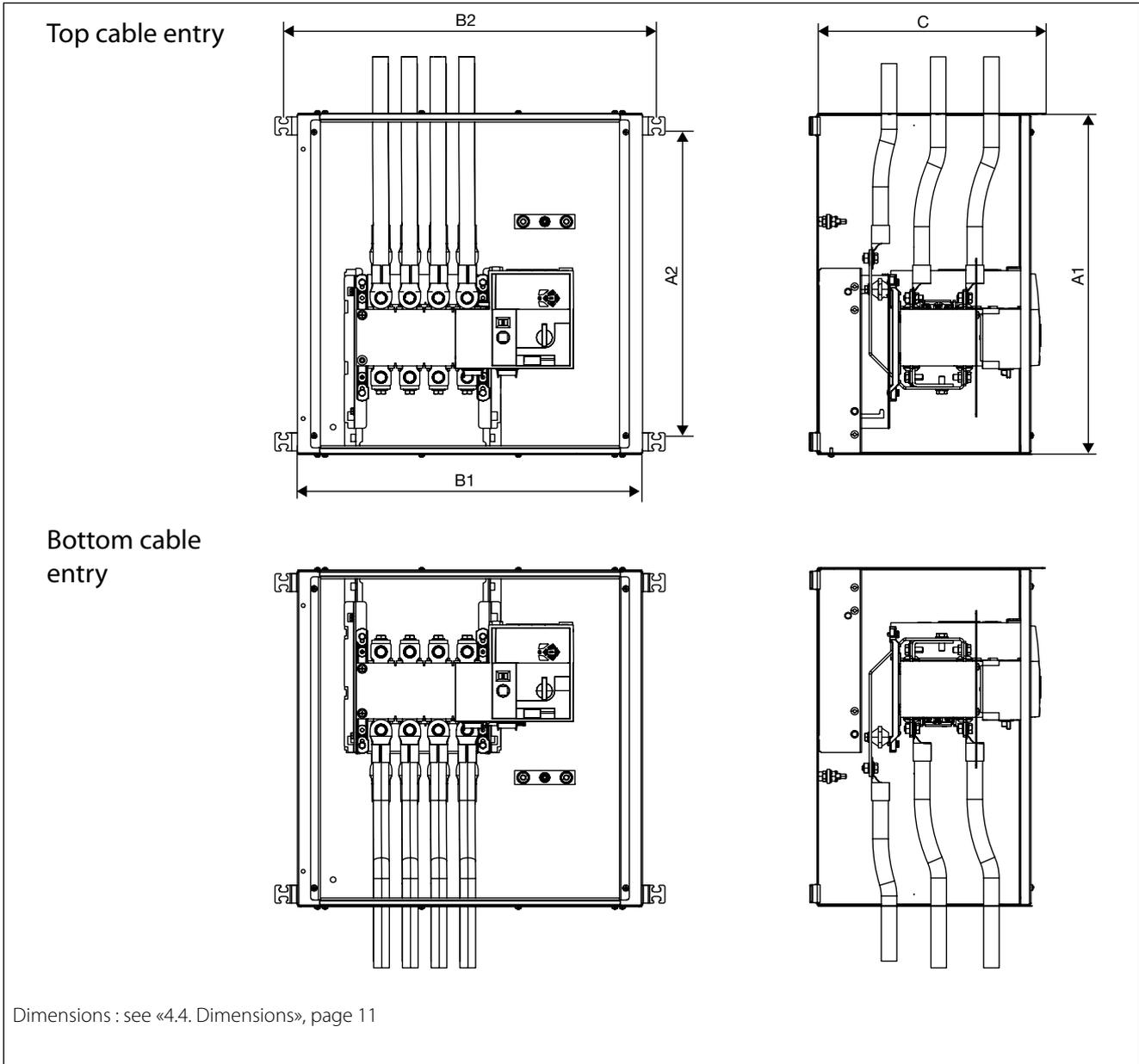
	250 A	400 A	630 A	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A
Minimum cable size (mm ²)	70	240	2x185	2x240	4x150	4x185	4x250	8x150 5x240	8x185	8x240
Maximum cable size (mm ²)	150 2x70	240 2x120	2x300 2x240	2x300 3x240 4x120	4x185 4x240	4x185 4x240	6x185 6x240	8x300	8x300	8x300

4.7. Enclosure installation

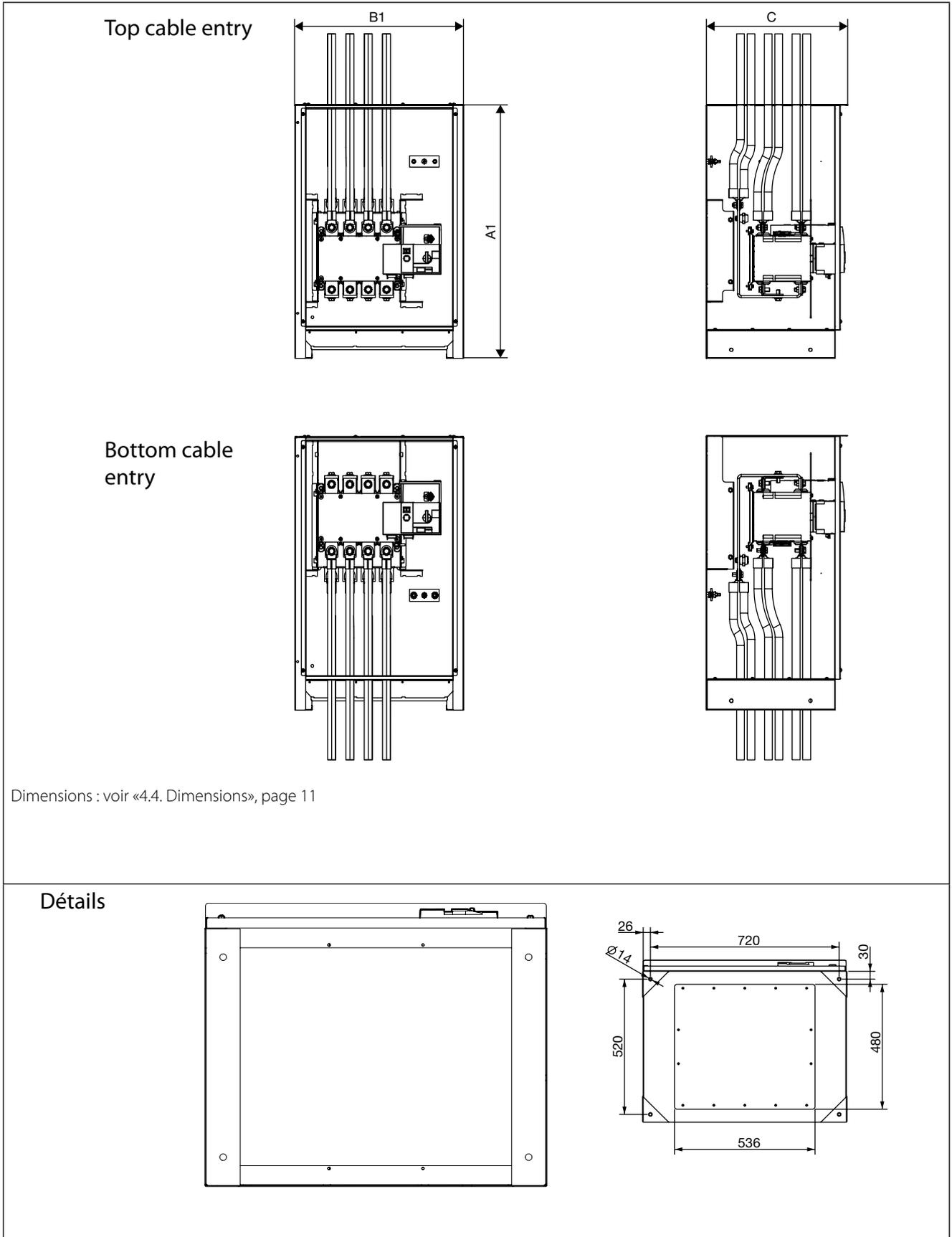
4.7.1. Rating 250 A



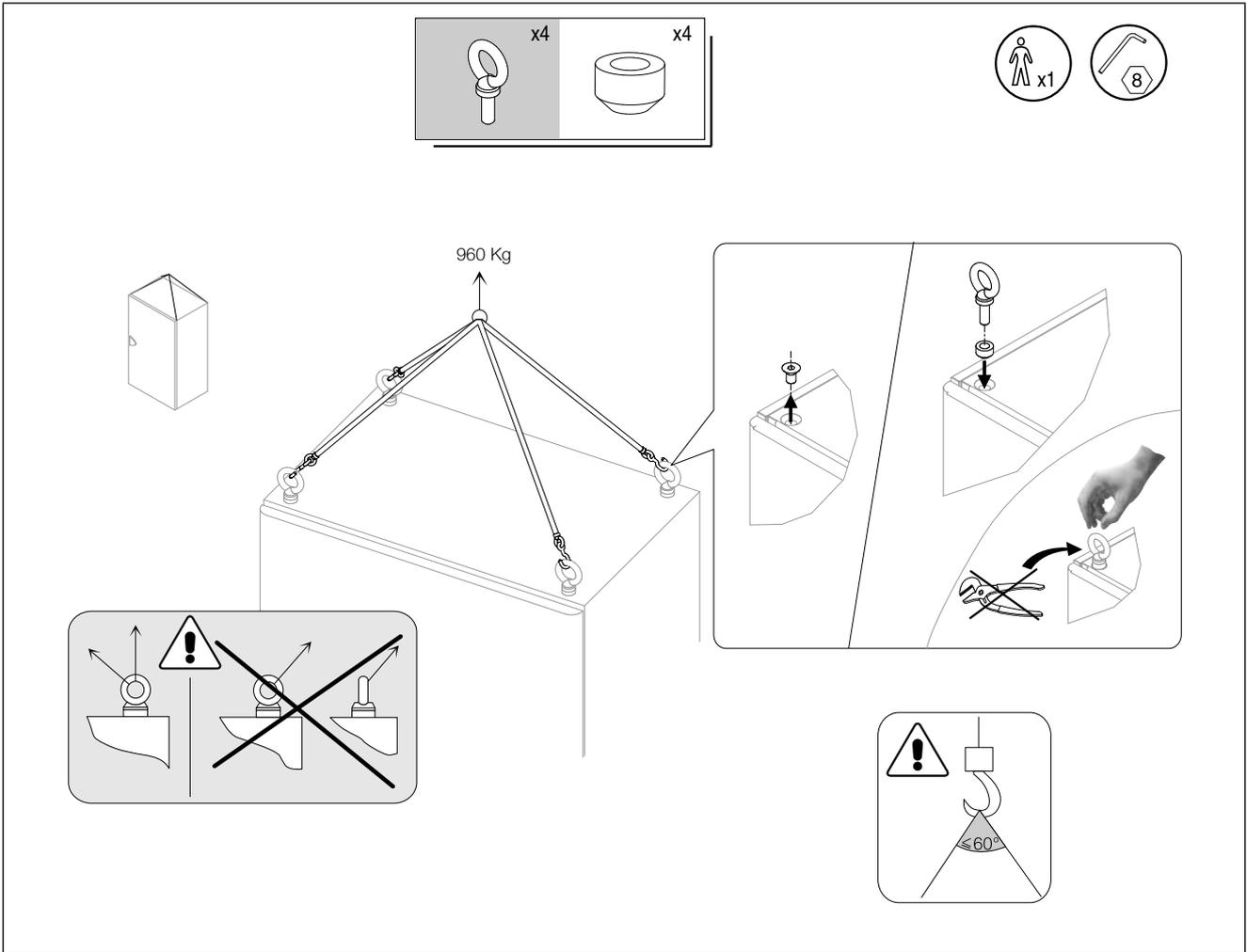
4.7.2. Rating 400 A



4.7.3. Ratings 630 to 3200 A



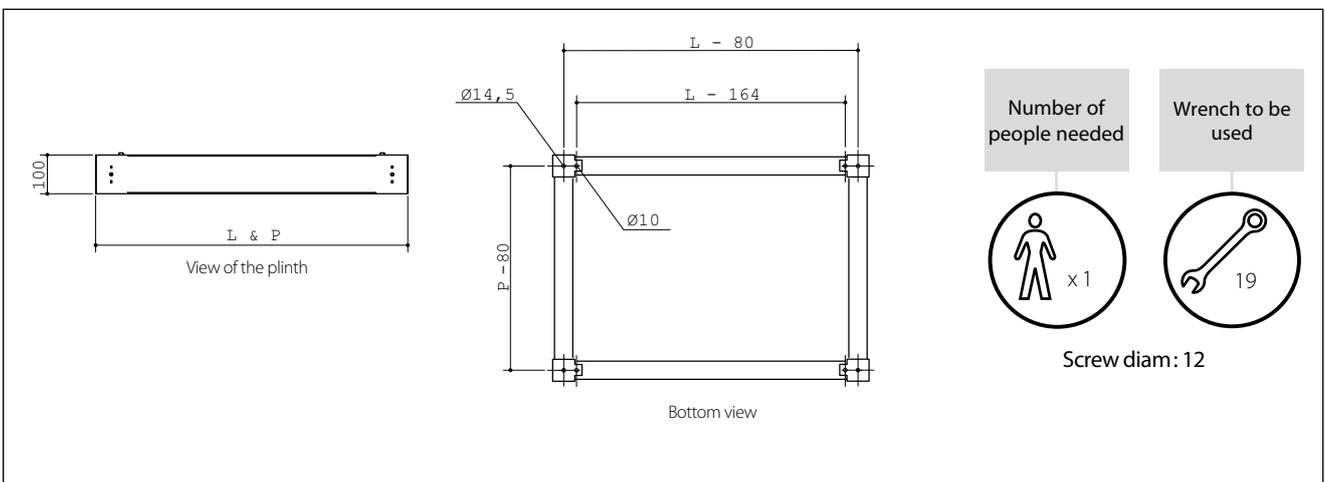
4.7.4. Lifting



4.7.5. Floor installation

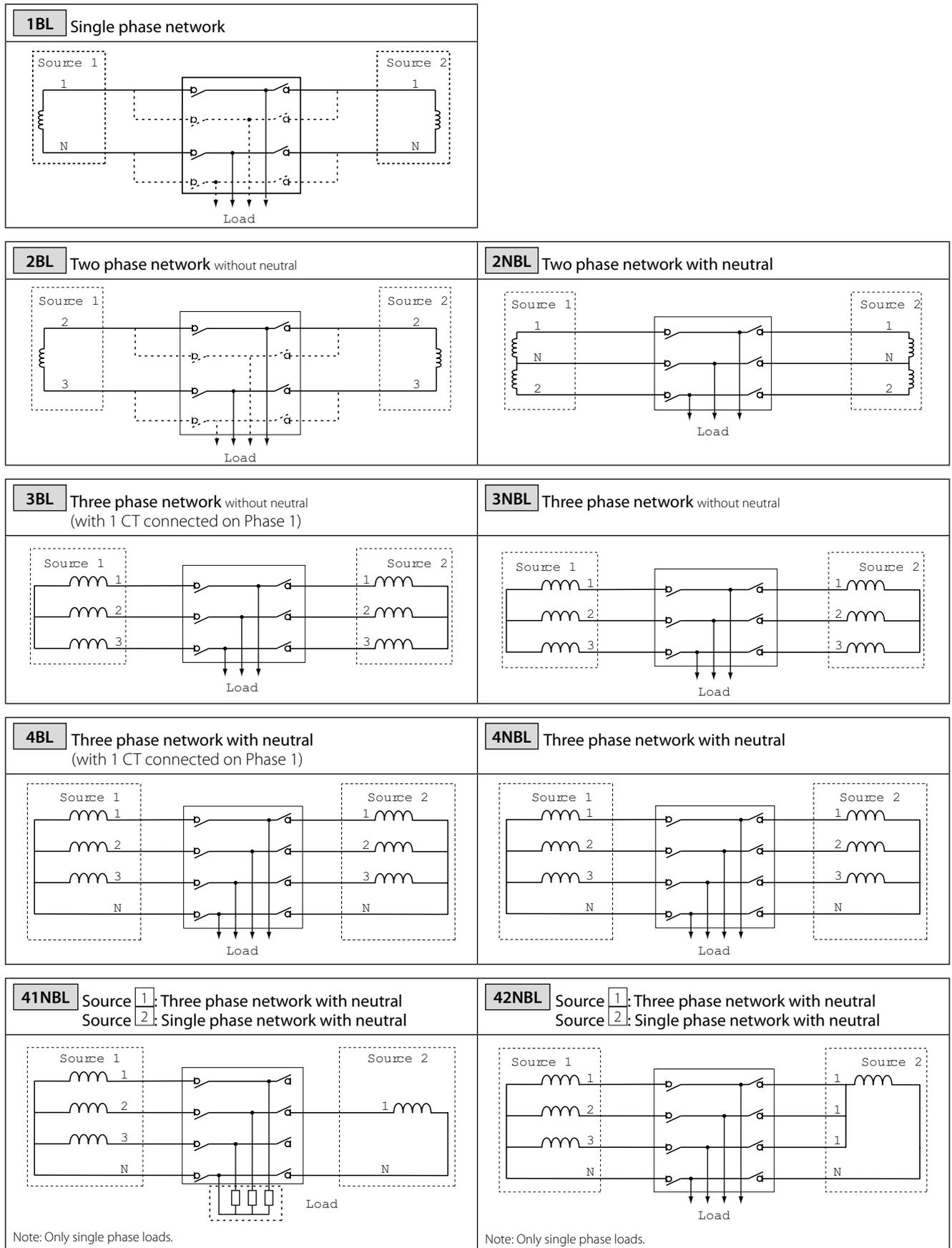
Enclosure ≥ 630 A

The equipment is designed for floor standing. It is recommended to fix the equipment to the floor using the plinth as per the recommendations below.



4.8. Networks and Power Connection possibilities

4.8.1. Type of networks



4.8.2. Metering and sensing details

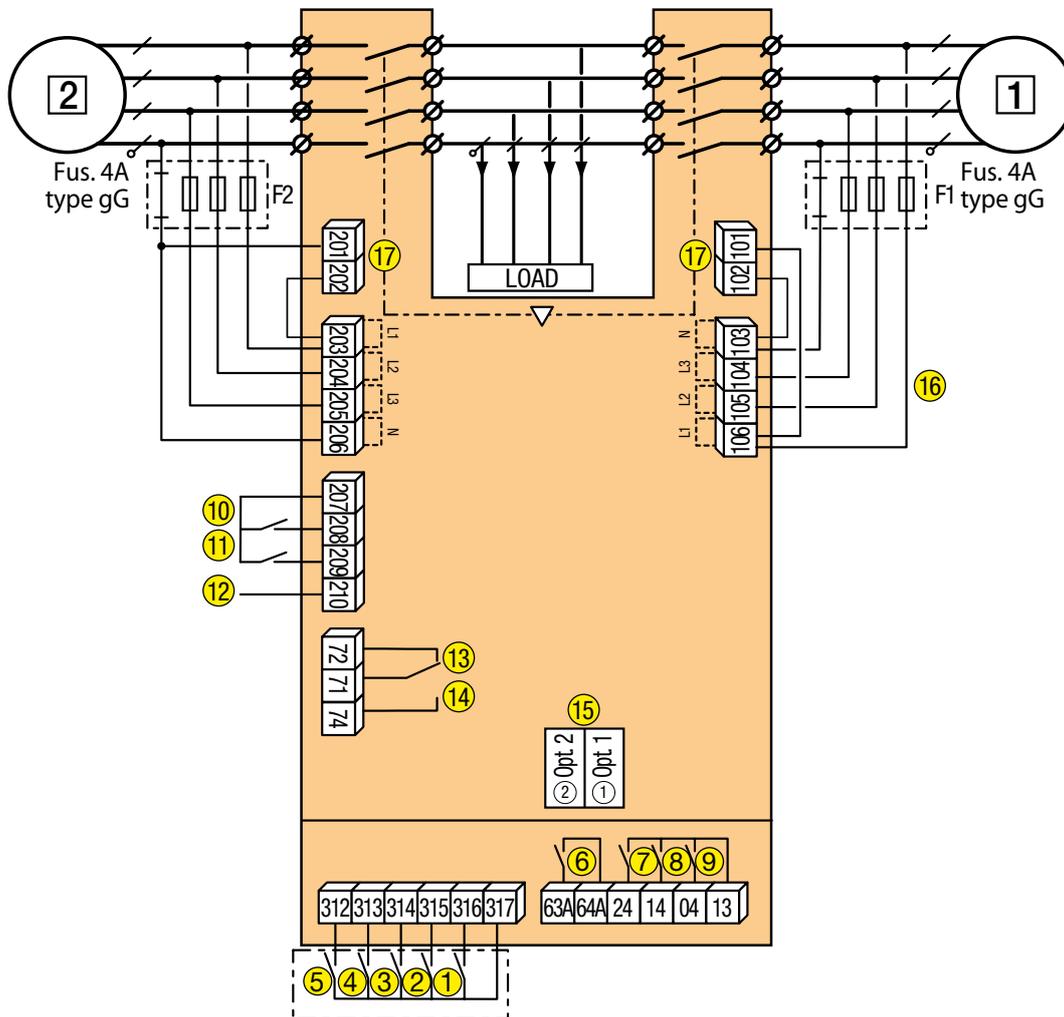
Product type	ATI								
Network type									
	1BL	2 BL	2NBL	3BL	3NBL	4BL	4NBL	41NBL	42NBL
Source 1	1 phase 2 wire	2 phase 2 wire	2 phase 3 wire	3 phase 3 wire	3 phase 3 wire	3 phase 4 wire	3 phase 4 wire	3 phase 4 wire	3 phase 4 wire
Source 2								1 phase 2 wire	3x1 phase 4 wire
Source 1									
Source 2									
ATI p CT cabling (load side)									
Voltage sensing									
Source 1	- V1	U23	U12 V1, V2	U12, U23, U31	U12, U23, U31	U12, U23, U31 V1, V2, V3			
Source 2	- V1	U23 -	U12 V1, V2	U12, U23, U31 -	U12, U23, U31 -	U12, U23, U31 V1, V2, V3	U12, U23, U31 V1, V2, V3	- V1	- V1, V2, V3
Source presence (source available)	3	3	3	3	3	3	3	3	3
Source in ranges (U, V, F)	3	3	3	3	3	3	3	3	3
Rotation phase order	-	-	-	3	3	3	3	S1 only	S1 only
Neutral position	-	-	3	-	-	3	3	S1 only	S1 only
Voltage unbalanced is lower than threshold	-	-	-	3	3	3	3	S1 only	S1 only

* Values, only visible on Source 2

4.9. Control circuits

4.9.1. Typical ATI wiring

Example: Control wiring for a 400VAC application having a 3 phase and neutral supply.



- 1 preferred source 2 alternate source
1. Position 0 order
 2. Position I order
 3. Position II order
 4. Zero position priority order
 5. Remote Control Enable (Priority over Auto)
 6. Product Available output (Motor)
 7. Position II aux contact
 8. Position I aux contact

9. Position 0 aux contact
- 10-11. Programmable Inputs 5-6
12. Aux. Supply (207/210) to be used with ATI optional I/O modules
13. Signal to Start / Stop the Genset NC with S1 unavailable (71/72)
14. Signal to Start / Stop the Genset NO with S1 unavailable (71/74)
15. Option Module Slots 1 to 2

16. Voltage sensing inputs
17. Power supply Inputs



CAUTION

Verify that the Auxiliary power supply feeding terminals 101 and 102 / (201 and 202) are within the limits of 208VAC -> 277VAC $\pm 20\%$

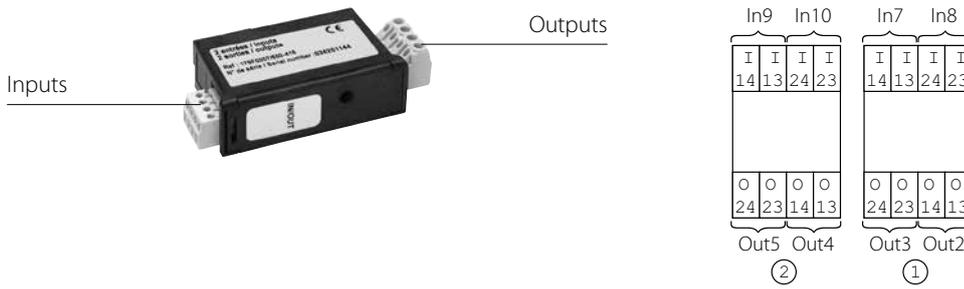


DANGER

Do not handle any control or power cables connected to the ATI when voltage may be present.

4.9.2.3. ATI (Optional Module) Input / Output Wiring Connections

The ATI can accept a total of 2 plug in I/O modules.



4.9.2.4. Terminal denomination, description and characteristics.

Denomination	Terminal	Description	Characteristics	Recommended Cable Section
Output Contacts (Motorisation Module)	04	Aux Contact Position 0 - Normally Open Contact	Dry Contacts 2A AC1 / 250V	1.5 – 2.5mm ²
	13	Common for Aux Contacts positions I - 0 - II		
	14	Aux Contact position I: Normally Open Contact		
	24	Aux Contact position II: Normally Open Contact		
	63A	Motorisation module available output. Closed when the ATI p is in Auto mode and motorisation is operational. (No Fault powered and ready to changeover)		
	64A			
ATS Output Contact	63B	Programmable output dry contacts. (By default set as POP à ATS control module available output, closed when the ATI p is in Auto mode and ATS is operational. (No Fault, powered and ready for a changeover sequence)	Dry Contacts 2A AC1 / 250V	1.5 – 2.5mm ²
	64B			
Genset Start/ Stop Signal	71	Signal to Start / Stop the Genset: Common for 72 & 74	Dry Contacts 2A AC1 / 250V	1.5 – 2.5mm ²
	72	Signal to Start / Stop the Genset: NC contact. (71/72)		
	74	Signal to Start / Stop the Genset: NO contact. (71/74)		
Additional Aux Contact <i>Included with 2000A to 3200A</i> <i>Optional for 800A to 1600A</i>	81	Common for Aux Contacts positions I	Dry Contacts 2A AC1 / 250V	1.5 – 2.5mm ²
	82	Aux Contact position I: Normally Closed Contact		
	84	Aux Contact position I: Normally Open Contact		
	91	Common for Aux Contacts positions II		
	92	Aux Contact position II: Normally Closed Contact		
	94	Aux Contact position II: Normally Open Contact		
ATS Power supply Input I	101	Power supply I – L	208 - 277VAC ± 20% : 50/60Hz	1.5 – 2.5mm ²
	102	Power supply I – N		
ATS Voltage Sensing Input* Source Supply I	103 - N	S I - Neutral voltage sensing input	600 VAC (ph-ph) max 332VAC (ph-n) max	1.5 – 2.5mm ²
	104 - L3	S I – Phase 3 voltage sensing input		
	105 - L2	S I - Phase 2 voltage sensing input		
	106 - L1	S I - Phase 1 voltage sensing input		
ATS Power supply Input II	201	Power supply II – L	208 - 277VAC ± 20% : 50/60Hz	1.5 – 2.5mm ²
	202	Power supply II – N		
ATS Voltage Sensing Input* Source Supply II	203 - L1	S II - Phase 1 voltage sensing input	600 VAC (ph-ph) max 332VAC (ph-n) max	1.5 – 2.5mm ²
	204 - L2	S II - Phase 2 voltage sensing input		
	205 - L3	S II – Phase 3 voltage sensing input		
	206 - N	S II - Neutral voltage sensing input		

Denomination	Terminal	Description	Characteristics	Recommended Cable Section
ATS Module Programmable Inputs	207 -	Common control terminal for inputs 5 & 6, 208 – 209 and negative for optional module extension I/O supply	Attn: To be used with dry contacts fed from 207 ONLY.	1.5 – 2.5mm ²
	208	Programmable Input number 5		
	209	Programmable Input number 6		
	210 +	+ dc Power supply for optional module extension I/O supply	To Ext I/O Only	
Motorisation Module Control Inputs	312	Remote Control Mode Enable when closed with 317	Attn: Do not connect to any Power supply Max cable length 100m	1.5 – 2.5mm ²
	313	Position 0 order if closed with 317. (Priority order input forcing the product to remote control mode and 0 position)		
	314	Position II order if closed with 317		
	315	Position I order if closed with 317		
	316	Position 0 order if closed with 317		
	317	Common control terminal for 312 - 316 ATI (Specific Voltage Supply)		
I/O Extension Modules 2xInput 2xOutput (Optional)	I 13+	Programmable Input	To be powered from terminals 207 – 210 10 – 30Vdc	1.5 – 2.5mm ²
	I 14 -			
	I 23 +	Programmable Input		
	I 24 -			
	O 13	Programmable Output	Dry Contacts 2A AC1 / 250V	1.5 – 2.5mm ²
	O 14			
	O 23			
	O 24			
MODBUS Module (Optional)	0	RS 485 MODBUS Communication module terminals		
	-			
	+			



CAUTION

Do not connect terminals 312 to 317 or 207 to 209 to any power supply. These order inputs are powered through terminal 207 (317 respectively) and external dry contacts ONLY.

4.10. ATS Control module interface



 Verify power applied on the electronic module power inputs terminals 101-102 or 201-202 before powering up the unit.

4.10.1. General introduction

The product provides

- sources availability monitoring,
- Automatic / Manual Retransfer, Manual / Automatic
- Test operation monitoring, voltage and frequency metering, and good operation or error information.
- The product provides sources ...error information.
- Furthermore, the metering module allows current and power metering on a large backlit display.

The product requires at least one type of network configuration and a network nominal voltage configuration to be input via the keypad by the user.

Other default values can be kept or modified according to hereafter programming guidelines.

4.10.2. Electronic module usage

Front Panel Introduction

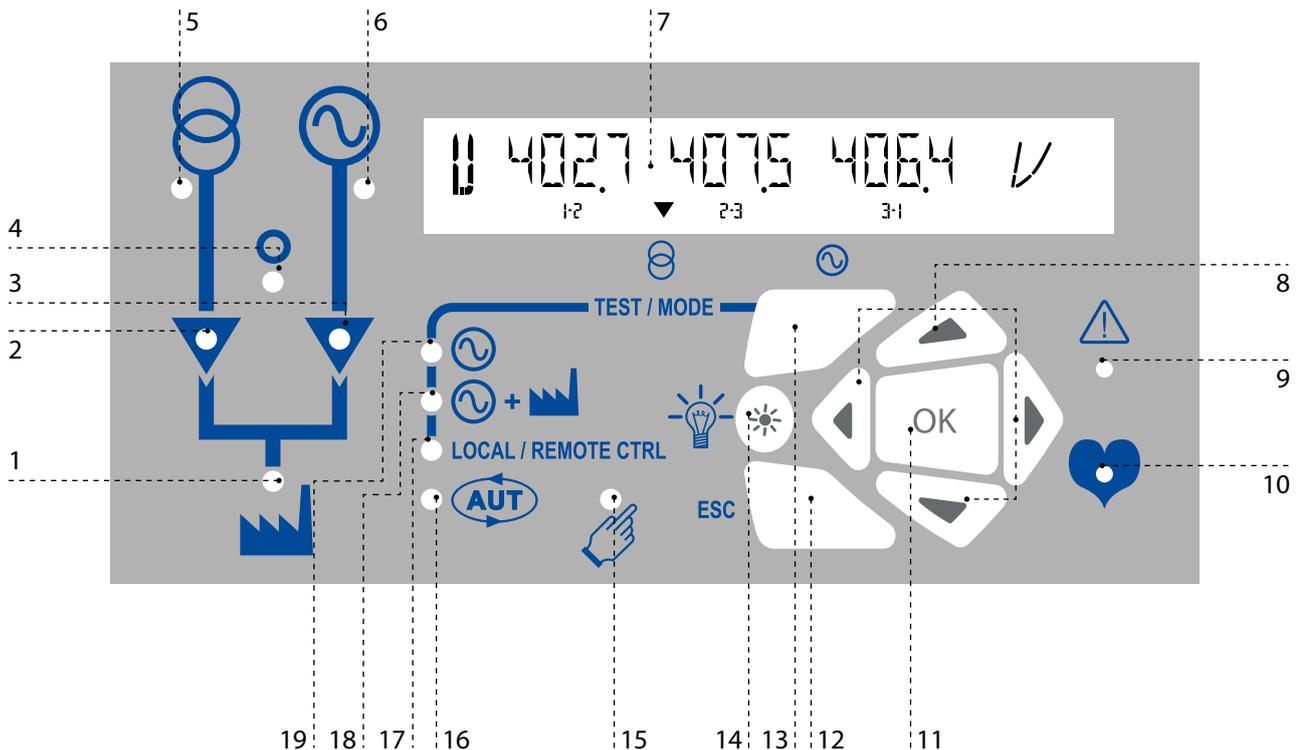
The electronic module is directly mounted on the motorized block.

It integrates the following features:

- - Voltage and frequency metering
- - Automatic transfer controls

Following diagram introduces product front panel.

Led indication is only active once the product is powered (power led activated).



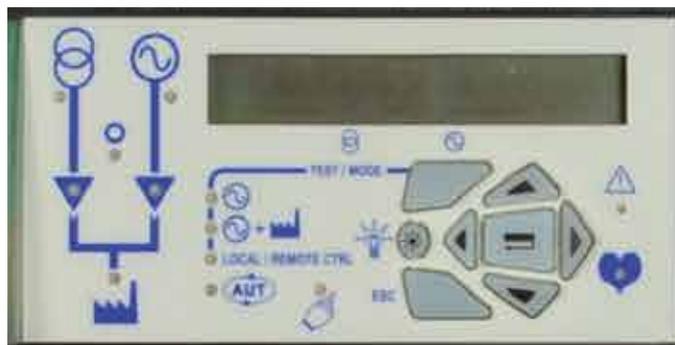
1. Load Supply On LED (Steady green when the load is normally supplied and flashing green when the load is supplied with load shedding output LSC active).
2. Switch 1 LED position indication. (Green when in position I).
3. Switch 2 LED position indication. (Green when in position II).
4. Zero position LED indication. (Yellow when in position 0).
5. Source supply I availability LED indication. (Green when supply I voltage is within the set limits).
6. Source supply II availability LED indication. (Green when supply II voltage is within the set limits).
7. LCD Display Screen: (Status, measurement, timers, counters, events, faults, programming...)
8. ATI Keypad for direct access to the product configuration, programming and parameters. (Navigation Keys to browse through the ATI menus without software).
9. FAULT LED indication. (Red steady light in case of an ATS controller internal fault. Switch the product from Auto to Manual and back to Auto to reset a fault condition).
10. READY LED indication. (Green steady light: Product is powered and in AUTO, Watchdog OK. The Product is Available to changeover).
11. Enter Key used to enter Prog Mode (Press and hold for 5 seconds) and to validate the settings programmed through the keypad.
12. ESC key used to escape from a specific screen up to the main menu.
13. MODE key to shift between operation modes.
14. Lamp test key to check the LED's and LCD screen.
15. MANUAL Mode LED indication. (Yellow steady light when in Manual Mode).
16. AUTO Mode LED indication
Green steady light when in Auto mode with no timers running.
Green flashing light when in Auto with timers running.
17. LOCAL / REMOTE CONTROL Mode LED indication.
Yellow steady light when in Local / Remote control mode.
Local Control selectable and operable through the ATI keypad.
Remote control mode is achieved with the Auto/Manu selector switched to Auto and terminals 312 closed with terminal 317. Remote control orders are received through closing 314 to 316 with 317.
REMOTE Control is also achievable through EasyConfig ATI p software when connected to the product through Ethernet or MODBUS. (Optional modules)
18. TEST ON LOAD CONTROL Mode LED indication. (Yellow steady light when in TON mode).
19. TEST OFF LOAD CONTROL Mode LED indication. (Yellow steady light when in TOF mode).



- 20. Green LED Indication: Power
- 21. Red LED Indication: Product Unavailable / Manual Mode / Fault Condition
- 22. Auto / Manual mode selector switch
(Key version available as an option)
- 23. Padlocking facility
(Up to 3 padlocks of dia. 4 - 8mm)
- 24. Emergency manual operation shaft location (Accessible only in manual mode)
- 25. Switch position indication window:
I (On switch I) O (Off) II (On switch II,)

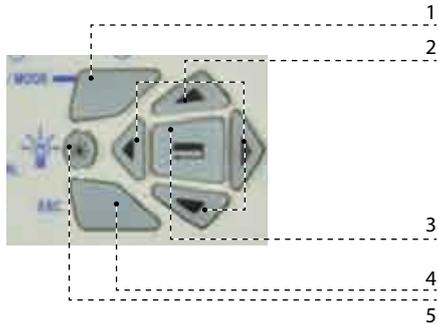
4.11. Presentation of the LCD display

Display mode is activated as soon as the device is switched on. It enables parameter visualisation whatever the functioning mode that is running. The switchover cycles take priority over any other display, and will show the time delay countdowns as soon as they are activated. After this time, or following a switchover cycle, the screen will return to source 1 (depending on the switch position) phase to phase voltage display (depending on the network type).



4.12. Programming with the ATI keypad

ATI devices may also be programmed through the ATS controller keypad. The keypad is a useful interface and programming method most especially when changing a few parameters or simply interrogating the product.



1. MODE key to shift between operation modes.
2. Navigation Keys to browse through the ATI menus without software.
3. Enter Key used to enter Prog Mode (Press and hold for 5 seconds) and to validate the settings programmed through the keypad.
4. ESC key used to escape from a specific screen up to the main menu.
5. Lamp test key to check the LED's and LCD screen.

Programming access through the keypad is possible in Automatic or Manual mode, when the product is in a stable position (I, 0 or II) with at least one supply source available.

Programming is not accessible whilst any cycle sequence is running.

4.13. Keypad Operational Modes

4.13.1. Visualisation

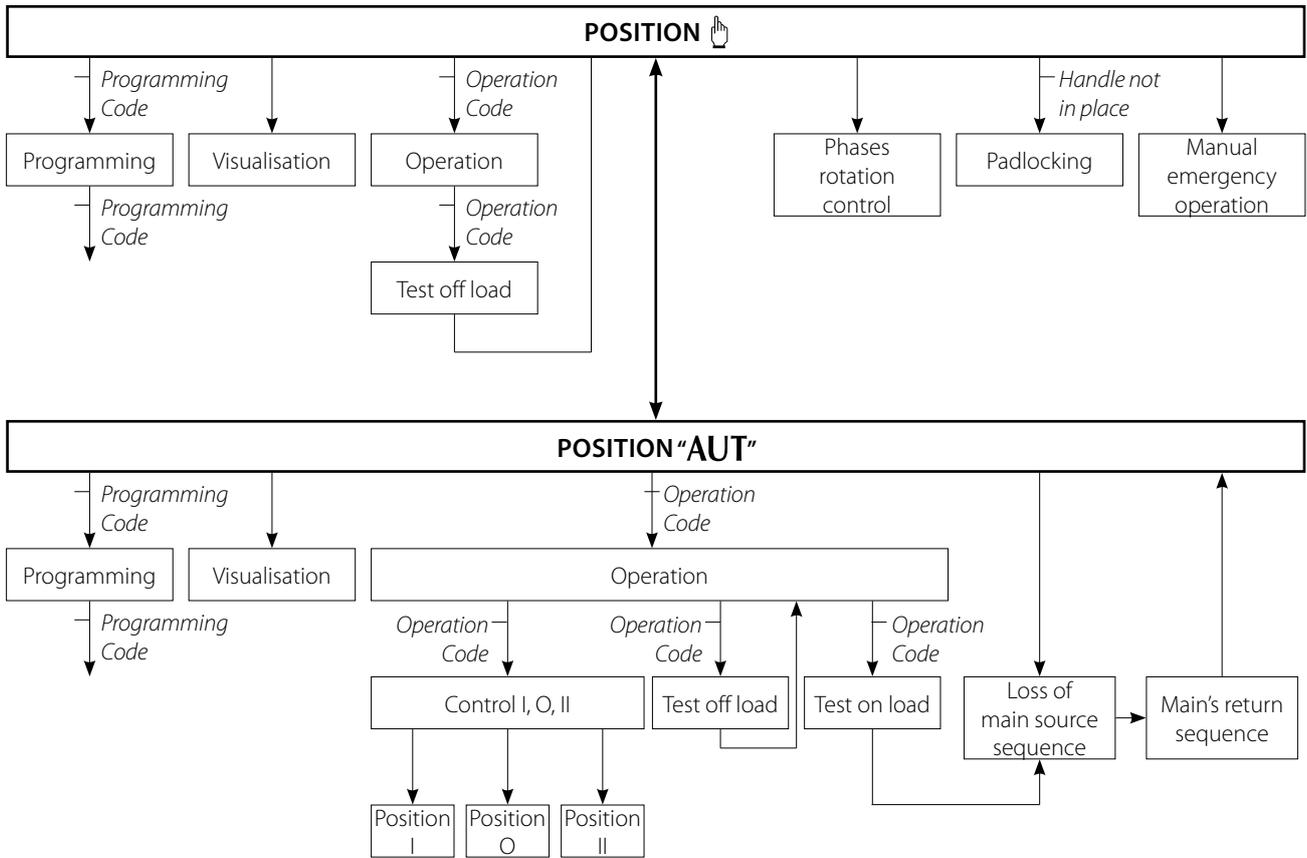
Measured values & parameter timers display.
Always accessible without a password code.

4.13.2. Operation

Test sequences or electrical control of the position.
Password access (code 0000).

4.13.3. PROGRAMMING:

Parameters configuration.
 Password access (code 1000).



NOTE:

One can quit the menu without saving by pressing the ESC key.

4.14. Keypad programming - general information

Programming mode allows product parameter configuration through the keypad:

- It is always accessible when the product is in Manual position
- It is always accessible in AUT with the load on the priority source and priority source available.

The minimum configuration parameters that must be programmed before use are:

- type of network
- nominal voltage
- nominal frequency.

Navigation in the programming menu	
	• To enter the programming menu press and hold the validation key until "SETUP" appears on the screen.
 or 	• For parameter access: Press the "up – down" or "left – right" keys to navigate.
Programming	
	• Navigate to the parameter to be changed and press the validation key. Note: The product will request a password.
 +  + 	• Input the password by using the "up – down" keys to change the value and the "left – right" keys to change the cursor position. (The default factory setting is 1000). • Press the validation key to validate the password and enable programming.
 +  + 	• Change the parameter value by using the "up – down" keys to change the variable and the "left – right" keys to change the cursor position. • Press the validation key to validate the change. • If necessary, navigate to other parameters in the menu, change the value and validate each change. • To save all changes, press and hold the validation key until "SAVED" is displayed. Note: After saving, "SAVED" will be displayed for 2s, the product will automatically exit programming mode and will then return to the main menu.
Exiting programming mode without saving	
	• To quit programming mode without saving briefly press the "ESC" key. This will allow navigating back to the main menu. Note: Whilst in programming mode, should the product remain idle for longer than 2 minutes it will automatically exit and return to the main menu without saving.

4.15. Configuration navigation screen

1	SETUP	2	VOLT. LEVELS	3	FREQ. LEVELS	5	TIMERS VALUE	6	I-O	7	COMM	8	DATE/TIME
NETWORK	4NBL	OV. U	I 115%	OV. F	I 105%	1FT	0003 SEC	IN 1	--- NO	ADDRESS	005	YEAR	
AUTOCONF	NO ⁽²⁾	OV. U HYS	I 110%	OV. F HYS	I 103%	1RT	0180 SEC	IN 2	--- NO	BDRATE	9600	MONTH	
NEUTRAL	AUTO	UND. U	I 085%	UND. F	I 095%	2FT	0003 SEC	IN 3	--- NO	STOP BIT	1	DAY	
ROT PH.	---	UND. U HYS	I 095%	UND. F HYS	I 097%	2AT	0005 SEC ⁽¹⁾	IN 4	--- NO	PARITY	NONE	HOUR	
NOM. VOLT	400 V	UNB. U	I 00%	OV. F	II 105%	2CT	0180 SEC ⁽¹⁾	IN 5	--- NO			MINUTE	
NOM. FREQ	50 Hz	UNB. U HYS	I 00%	OV. F HYS	II 103%	2ST	0030 SEC ⁽¹⁾	IN 6	--- NO			SECOND	
APP	M-G	OV. U	II 115%	UND. F	II 095%	ODT	0003 SEC	OUT 1	POP NO				
PRIOTON	NO ⁽¹⁾	OV. U HYS	II 110%	UND. F HYS	II 097%	TOT	UNL ⁽¹⁾	OUT 2	--- NO ⁽³⁾				
RETRANS	NO	UND. U	II 085%			TOT	0010 SEC ⁽¹⁾	OUT 3	--- NO ⁽³⁾				
S1=SW2	NO	UND. U HYS	II 095%			TFT	UNL ⁽¹⁾	OUT 4	--- NO ⁽³⁾				
BACKLGHT	INT	UNB. U	II 00%										
CODE P	1000	UNB. U HYS	II 00%										
CODE E	0000												
BACKUP	SAVE												

(1) When «APP» is set to «M-G»

(2) If the product is in manual mode

(3) With optional I/O modules

(4) Only if a communication module is used

Setup by Auto Configuration

(Volts, Hz, Neutral pos., Ph rotation)

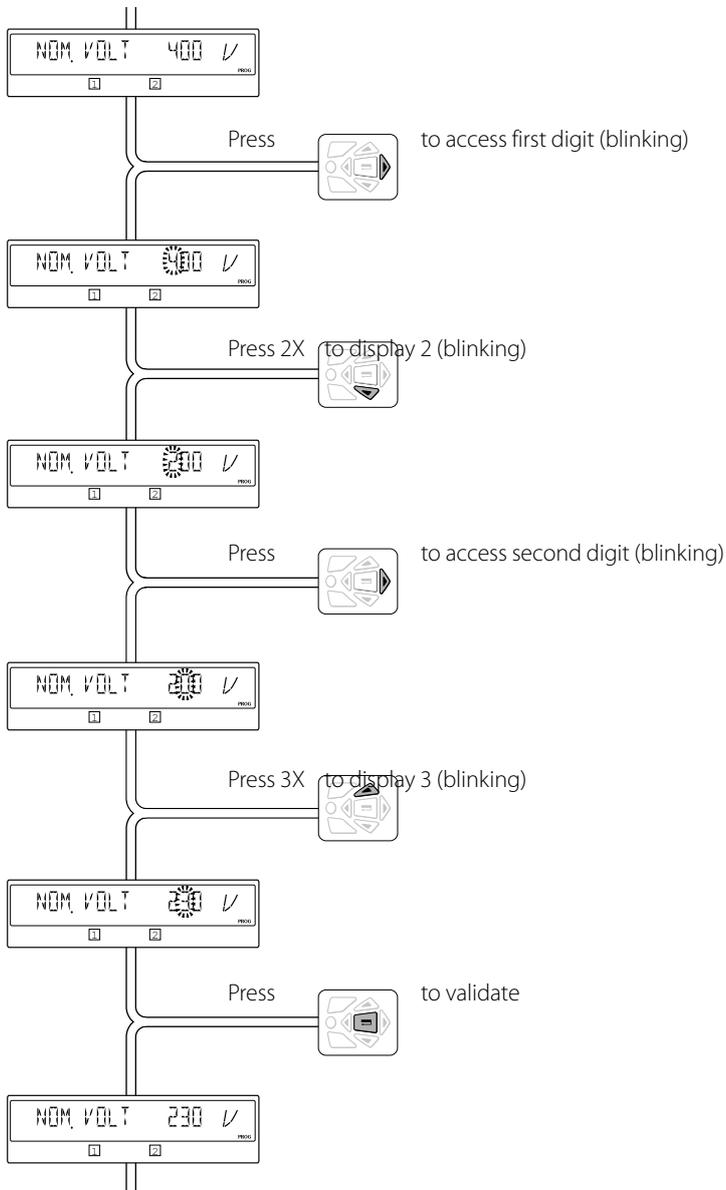
Press 5s	
Go To	1 SETUP
Scroll to	AUTOCONF
Enter code	1000
Set to	YES
Press 60 ms	
LEDs flash	
Save : press 5s	

Note: Source I or source II must be available to set by Auto Configuration.

4.16. Parameter modifications

> Example:

To modify network nominal voltage from 400 to 230 V.



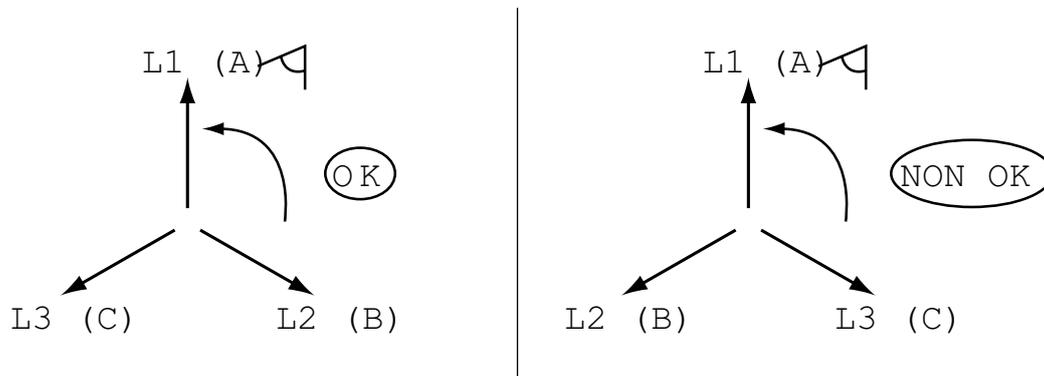
4.17. Setup menu – keypad navigation

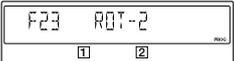
1 SETUP			
		Definition	Adjustment Range
NETWORK	4NBL	Network Type	1BL/2BL/2NBL/3BL/3NBL 4BL/4NBL/41NBL/42NBL
AUTOCONF	NO	Auto Configuration: (visible in manual mode) Network Voltage, Frequency, phase rotation and neutral position	NO YES
NEUTRAL	AUTO	Neutral Position: visible if the makes sense with the seleted network type. Neutral fixed on the LEFT - (N, L3, L2, L1) Neutral fixed on the RIGHT - (L1, L2, L3, N) Auto Detection of Neutral LEFT or RIGHT	LEFT RIGHT AUTO
ROT PH.	---	Select and Verify Phase Rotation as: compatible between S1 and S2, ABC or ACB visible if the makes sense with the seleted network type. It is also possible to check for consistency of direction of rotation between 2 sources (----). (Refer to ** Phase Rotation Check" below for details). Both supply sources must be present for this verification.	ABC ACB ----
NOM. VOLT	400 V	Nominal Network Voltage	1BL: 208-277V 2NBL: 416-554V Others: 360 – 479V
NOM. FREQ	50 Hz	Nominal Network Frequency	50Hz 60Hz
APP	M-G	Application Type: M – G: Main Network to Genset Supply	M-G
PRIOTON	NO	In case of a Test On Load sequence, in case source 2 is no longer available you may: NO - Exit the test and switch to source 1 YES - Stay in position II Note: The MSR input (refer to I/O Menu) takes priority over this parameter.	NO YES
RETRANS	NO	Inhibit the automatic retransfer: NO: Automatic retransfer to the priority source YES: "Valid" or input RTC must be pressed to execute the return to priority.	NO YES
S1=SW2	NO	Inverted power section switch wiring. Switch 1 (Front) cabled as Switch 2 and Switch 2 (Back) cabled as Switch 1. NO: Not Inverted YES: Inverted	NO YES
BACKLGH	INT	The LCD backlight may be set to: OFF: Always Off ON: Always On INT: On after pressing the keypad and during operating sequences only. (Turned off after 2 minutes of inactivity).	OFF ON INT
CODE P	1000	Password Code to modify and save settings in Programming Mode. Default factory setting: 1000	0000 to 9999
CODE E	0000	Password Code to modify and save settings in Operating Mode. Default factory setting: 0000	0000 to 9999
BACKUP	SAVE	Save the settings in the backup so as to recall them later within the same menu. Load to charge the backup data	SAVE LOAD

4.18. Phase rotation check:

This functionality checks the consistency of phase rotation i.e. of the wiring prior to commissioning.

Example: If the parameter ROT PH = ABC:



Display  or  depending on the non-compliant source (Rotation check on sources **1** and **2**).

	WARNING	Function available on both sources in case of 4NBL/4BL or 3NBL/3BL type of network and only on source 1 in case of 41NBL or 42NBL network.
---	----------------	---

4.19. Voltage levels menu – keypad navigation

2 VOLT. LEVELS				
			Definition	** Adjustment Range
OV. U	I	115%	Overvoltage threshold: Source Supply 1	102 – 130%
OV. U HYS	I	110%	Over-voltage hysteresis: Supply 1	101 – 129%
UND. U	I	085%	Undervoltage threshold: Supply 1	60 – 98%
UND. U HYS	I	095%	Undervoltage hysteresis: Supply 1	61 – 99%
UNB. U	I	00%	Phase unbalance threshold: Supply 1 Refer to next paragraph for further details	0 – 30%
UNB. U HYS	I	00%	Hysteresis unbalance threshold: Supply 1 Refer to next paragraph for further details	0 – 29%
OV. U	II	115%	Overvoltage threshold: Source Supply 2	102 – 130%
OV. U HYS	II	110%	Over-voltage hysteresis: Supply 2	101 – 129%
UND. U	II	085%	Undervoltage threshold: Supply 2	60 – 98%
UND. U HYS	II	095%	Undervoltage hysteresis: Supply 2	61 – 99%
UNB. U	II	00%	Phase unbalance threshold: Supply 2 Refer to next paragraph for further details	0 – 30%
UNB. U HYS	II	00%	Hysteresis unbalance threshold: Supply 2 Refer to next paragraph for further details. Note 0% = function deactivated	0 – 29%

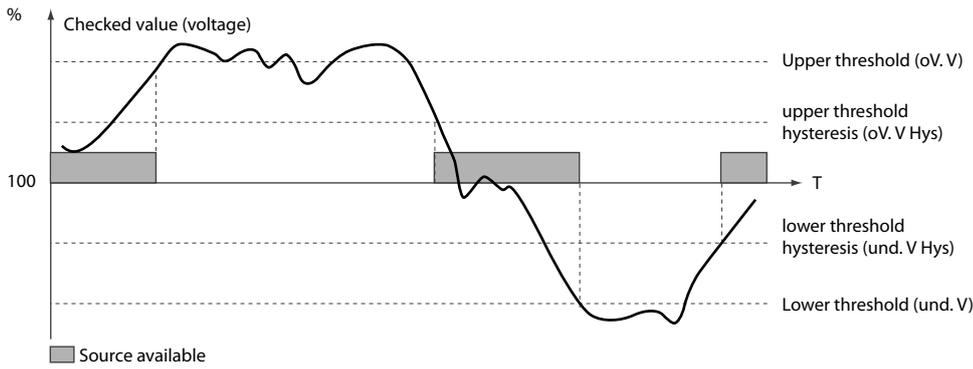
** Adjustment range given:

- As a % of U nominal for Over and Undervoltage
- As a % of U avg in case of unbalances.

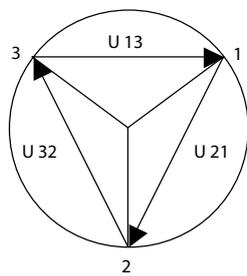
4.19.1. Over-voltage and under-voltage

The thresholds and hystereses are defined as percentages of nominal voltage.

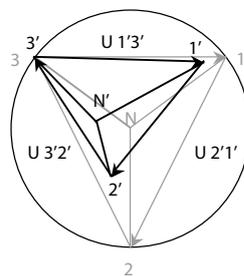
The hystereses define return to normal levels following an under-voltage or over-voltage.



4.20. Voltage unbalance measurement



Balanced network



Unbalanced network

4.21. Frequency levels menu – keypad navigation

3 FREQ. LEVELS				
			Definition	** Adjustment Range
OV. F	I	105%	Over Frequency Threshold: Source 1	102 – 130%
OV. F HYS	I	103%	Over Frequency Hysteresis: Source 1	101 – 129%
UND. F	I	095%	Under Frequency Threshold: Source 1	60 – 98%
UND. F HYS	I	097%	Under Frequency Hysteresis: Source 1	61 – 99%
OV. F	II	105%	Over Frequency Threshold: Source 2	102 – 130%
OV. F HYS	II	103%	Over Frequency Hysteresis: Source 2	101 – 129%
UND. F	II	095%	Under Frequency Threshold: Source 2	60 – 98%
UND. F HYS	II	097%	Under Frequency Hysteresis: Source 2	61 – 99%

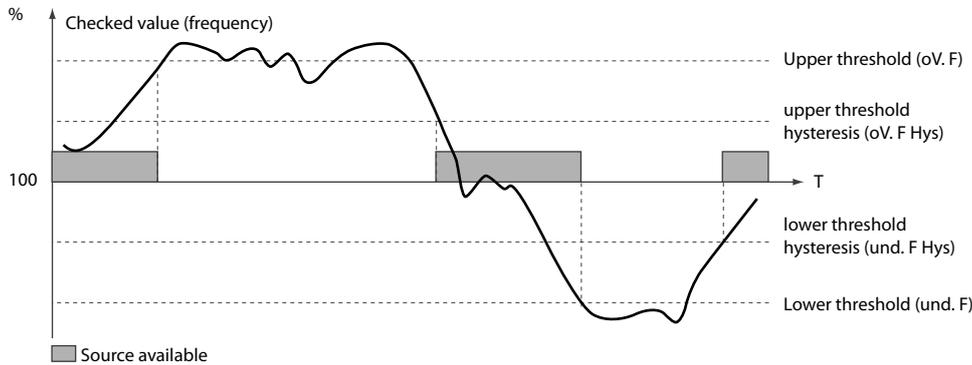
** Adjustment range given:

- As a % of nominal frequency

4.21.1. Under-frequency or over-frequency

The thresholds and hysteresis are defined as percentages of nominal frequency.

The hysteresis define return to normal levels following an under-frequency or over-frequency.



Annexe 4 - 22. Timers menu – keypad navigation

5 TIMERS VALUE			
		Definition	Adjustment Range
1FT	0003 SEC	Source 1 Failure Timer: When source 1 is considered lost, 1FT is started. If source 1 is considered restored before the end of 1FT, the changeover sequence will not be engaged.	0 – 60 seconds
1RT	0180 SEC	Source 1 Return Timer: When source 1 returns, 1RT is started. At the end of 1RT, source 1 is then considered to be present. Should source 1 disappear before the end of 1RT, the changeover will not be carried out. In case the alternate source disappears during 1RT, a dynamic 3 second delay will override the 1RT time setting value.	0 – 3600 seconds
2FT	0003 SEC	Source 2 Failure Timer: When source 2 is lost, 2FT is started. If source 2 is restored before the end of 2FT, the changeover sequence is not started.	0 – 60 seconds
2AT	0005 SEC	Source 2 Available Timer: Stabilisation time delay for voltage and frequency on Source 2 . 2AT starts as soon as the source voltage is above the hysteresis value. Transfer to Source 2 may be done at the end of this time delay.	0 – 3600 seconds
2CT	0180 SEC	Source 2 (Genset) Cool Down Timer: Following a return to source 1 sequence, the genset on source 2 is kept running for the 2CT timer duration. This is intended to cool down the genset (off load) before switching off.	0 – 600 Seconds
2ST	0030 SEC	Source 2 Genset start timeout delay: This time delay is started as soon as the genset start signal is given. Should source 2 not become available after timer 2ST has elapsed a "FAIL START" error message is displayed on the product LCD.	0 – 600 Seconds
ODT	0003 SEC	Zero Position, Dead Band Timer: This is the minimum electric dead time (blackout time) delay. This defines the minimum load supply down time in the 0 position so as to allow residual voltages that may be generated by the load (such as motors) to decay. <i>Note: This time delay setting value in the Zero position is applicable with SI and/or SII available. When a transfer is initiated after a loss of source, the time delay starts counting down from the loss of source.</i>	0 – 20 seconds
TOT	UNL	Test On Load Limited (LIM) / Unlimited (UNL) duration. LIM is to be selected when associating the test to a duration timer such as TOT. <i>Note 1: If the value is set at UNL, the TOT is stopped either when the input is opened, or via the validation key. Note 2: When set to UNL, the test on load duration timer is deactivated as the duration becomes unlimited. ATTN: Set to UNL when using the engine exerciser</i>	LIM (Limited) UNL (Unlimited)
TOT	0000 SEC	Test On Load Duration Timer: This timer defines the On Load Test time. It starts counting when the Test is initiated. <i>Note: TOT is visible in the timers menu when TOT (LIM/UNL) above is set to LIM.</i>	0 – 1800 seconds

5 TIMERS VALUE			
		Definition	Adjustment Range
TFT	UNL	Test Off Load Limited (LIM) / Unlimited (UNL) duration. LIM is to be selected when associating the test to a duration timer such as TFT below. <i>Note 1: If the value is set at UNL, the TFT is stopped either when the input is opened, or via the validation key.</i> <i>Note 2: When set to UNL, the test on load duration timer is deactivated as the duration becomes unlimited.</i> <i>ATTN: Set to UNL when using the engine exerciser</i>	LIM (Limited) UNL (Unlimited)

Annexe 4 - 23. I/O Menu – Keypad navigation

6 I-O				
			Definition	Adjustment Range
IN 1	---	NO	Internal: Programmable Input number 1	Normally Open / Normally Closed: Refer to the list below for Input type details.
IN 2	---	NO	Programmable Input number 2	Normally Open / Normally Closed: Refer to the list below for Input type details.
IN 3	---	NO	Programmable Input number 3	Normally Open / Normally Closed: Refer to the list below for Input type details.
IN 4	---	NO	Programmable Input number 4	Normally Open / Normally Closed: Refer to the list below for Input type details.
IN 5	---	NO	Programmable Input number 5	Normally Open / Normally Closed: Refer to the list below for Input type details.
IN 6	---	NO	Programmable Input number 6	Normally Open / Normally Closed: Refer to the list below for Input type details.
OUT 1	---	NO	Programmable Output number 1	Normally Open / Normally Closed: Refer to the list below for Input type details.
OUT 2	---	NO	Programmable Output number 2	Normally Open / Normally Closed: Refer to the list below for Input type details.
OUT 3	---	NO	Programmable Output number 3	Normally Open / Normally Closed: Refer to the list below for Input type details.
OUT 4	---	NO	Programmable Output number 4	Normally Open / Normally Closed: Refer to the list below for Input type details.
OUT 9	---	NO	Programmable Output number 9	Normally Open / Normally Closed: Refer to the list below for Input type details.

Annexe 4 - 23.1. Programmable inputs

There are 6 internal programmable inputs built into the ATS controller as standard. External programmable inputs (up to 8) are the optional add-on I/O modules that may be fixed to the ATS controller using slots 1 to slot 2.

The list of available inputs is selected from the following options below. Depending on user requirements, the same function may be applied to more than 1 input.

	INPUT Code Definition	Adjustment Range
INH	Inhibition of the Automatic Operation: All automatic commands relative to the transfer switch, but excluding the Genset Start signal, will be inhibited. <i>Note: With INH closed, the generator will start if the network is lost but the switch will not transfer position.</i>	NO / NC (Normally Open or Normally Closed)
TON	Test On-Load: Activates an on load test. Retransfer remains locked until the contact is opened.	NO / NC
TOF	Test Off-Load: Activates an off load test. This will start and stop the generator without transferring the load to S2.	NO / NC
RTC	Remote transfer back to the priority source: This is the same function as "RETRANS" cleared with the keypad. This variable in the SETUP menu must be "YES" to validate the operation through this input.	NO / NC
PRI	Priority to Source 2 : By default the priority source on the ATI is S1. Input PRI will set the priority to S2. This input takes priority over PRIO NET in the SETUP menu.	NO / NC
SS1 SS2	Voltage Stabilisation time delay relay bypass : These inputs allow to initiate the transfer from one source to the other before the end of the time delay 1RT/2RT/2AT.	NO / NC
AL1 AL2	External Alarm for Source 1 and Source 2: This input will flash the "Fault LED" on the front of the ATI ATS controller and will indicate F12 ALR - 1 / F22 ALR - 2 on the screen. This message will disappear when the external alarm is cleared by opening the input contact. <i>Note: These alarms do not trigger any position change in the switch but the product not available output will be activated.</i>	NO / NC
FT1 FT2	External Fault Source 1 or source 2 with zero return : This input will flash the "Fault LED" on the front of the ATI ATS controller and will indicate F11 FLT - 1 / F21 FLT - 2 on the LCD screen. This message will disappear after validation and RESET through input RST, by changing the selector switch from AUT to Manu and back to AUT or via communication after the fault has been cleared. <i>Note: Immediately upon activation of one of these inputs the ATI p will changeover to the 0 position. Time delays 10T or 20T time delay will not be considered.</i>	NO / NC
MSR	Hold on S2 (Genset) with priority to TON and EON : During a Test On Load (TON) or an external Test On Load (EON), validating MSR will force the ATI to remain on source 2 for as long as TON or EON are active. The switch will remain on S2 even if the Genset supply is lost.	NO / NC
OA1 OA2	Define Source 1 and/or Source 2 as available : This is an external input used to bypass the internal voltage sensing and timers. These inputs will define S1 and/or S2 available immaterial of the value and immaterial of timers 1RT, 2RT, 2AT.	NO / NC
RST	Fault Reset : This input may be used to reset a fault condition after the fault has been cleared. Faults may also be reset through communication or by shifting the front selector switch on the ATI p from AUT to Manu and back to the AUT position.	NO / NC
LSI	Pre transfer signal LSC time delay (load shedding 1) bypass : This input will bypass the LSC time delay, thereby confirming that the load is OK (Shed or within an acceptable range) and the changeover to source 2 may begin immediately. Only visible after activating at least one output as LSC.	NO / NC

4.23.2. Programmable outputs

	Output Code Definition	Adjustment Range	M-G
S1A	Source 1 available output: This output is activated when source 1 is available.	NO / NC	•
S2A	Source 2 available output: This output is activated when source 2 is available.	NO / NC	•
SCA	Source 1 or Source 2 available output : This output is activated when at least one source (S1 or S2) is available.	NO / NC	•
AC1	Switch Position I auxiliary contact : This output is activated when the switch is in position I.	NO / NC	•
AC2	Switch Position II auxiliary contact : This output is activated when the switch is in position II.	NO / NC	•
AC0	Switch Position 0 auxiliary contact : This output is activated when the switch is in position 0.	NO / NC	•
LO1	Load being supplied by source 1: Indicates which source is supplying the load. This output is activated when the switch is in Position I and Source 1 is available. (LO1 activated = AC1 and S1A activated).	NO / NC	•

	Output Code Definition	Adjustment Range	M-G
LO2	Load being supplied by source 2: Indicates which source is supplying the load. This output is activated when the switch is in Position II and Source 2 is available. (LO2 activated = AC2 and S2A activated).	NO / NC	•
LSC	Load shedding before transfer output command : This output will initiate load shedding prior to the transfer from source 1 to a backup (usually smaller) power source. After restoration this output may also be used to signal reloading. For further details refer to the diagrams below.	NO / NC	•
FLT	Fault condition output: This output is activated when at least one type of fault (internal or external) is activated.	NO / NC	•
POP	Product Available (No Fault): This output is activated when the ATI p (ATS Controller) is considered to be operational and ready to switch positions.	NO / NC	•
CO1 to CO14	Copy Input to the corresponding Output: The output adopts the same state as the corresponding input. This is the same function as relaying.	NO / NC	•
LCK	Product Locked output: Output linked to the padlocked state of the ATI p. (Product in manual mode with the padlocking mechanism pulled out.	NO / NC	•

4.24. Communication menu – keypad navigation

7 COMM			
		Definition	Adjustment Range
ADDRESS	005	ATI p Device network address:	1 to 255
BDRATE	9600	Baud rate :	9600, 19200 38400
STOP BIT	1	Stop Bit Setting	1, 2
PARITY	NONE	Parity Type: NO -> No parity bit ODD -> Odd parity bit EVEN -> Even parity bit	NO, ODD, EVE

Note: The COMM menu will only be visible and accessible when an optional communication module is installed on the product.

4.25. Date and Time – keypad navigation

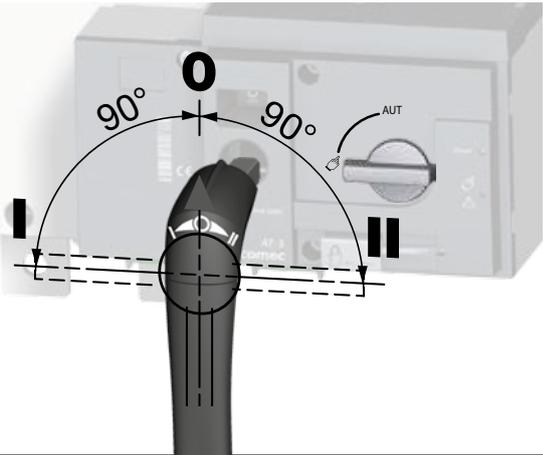
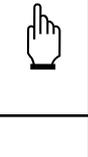
8 DATE/TIME			
		Definition	Adjustment Range
YEAR		Set the year:	00-99
MONTH		Set the month:	01-12
DAY		Set the day :	00-23
HOUR		Set the hour :	00-23
MINUTE		Set the minute :	00-59
SECOND		Set the seconds :	00-59

5. OPERATING MODES

The ATI includes 3 safe and distinct operating modes through a selector switch located on the front of the product. As standard the ATI is delivered with a selector switch however a key lock type selector switch is available on option. (To be specified at order by the addition of “-K” at the end of the standard reference).

The modes of operation are as follows:

- Auto Mode: “Auto / Remotely operated transfer switching”
- Manual Mode: “Local emergency manual operation”
- Locked Mode: “Secure locked padlocking facility”

<p>AUT MODE</p>		<p>AUT</p>  	<p>AUTO MODE:</p> <ul style="list-style-type: none"> • Activates the remote control inputs and the ATS controller automation. • Inhibits the padlocking facility • Inhibits the insertion of the manual operation handle when in AUT Mode <p>AUTO Mode position is inhibited when padlocked or when the handle for manual operation is inserted into the ATI.</p>
<p> MODE</p>		<p>AUT</p>  	<p>MANUAL MODE: (Not Padlocked)</p> <ul style="list-style-type: none"> • Inhibits the control inputs. • Allows to insert the handle for emergency manual operation. • Allows padlocking in O Position. (With the handle for manual operation removed) <p>Turning the selector switch to  from AUT and back to AUT resets a fault state.</p>
<p>  MODE</p>		<p>AUT</p>  	<p>MANUAL MODE: (Padlocked)</p> <ul style="list-style-type: none"> • Inhibits the control inputs. • Inhibits insertion of the emergency handle. • Allows padlocking when in O Position.  POS 0 <p>Padlocking in position I - O and II is possible when the optional function is included in the ATI (Refer to product catalogue)</p>

	<p>WARNING</p>	<p>Depending on the state of the ATI the ATS automation may change the switch position as soon as the mode selector is switched to AUT. This is a normal operation.</p>
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5.1. Manual operation

5.1.1. Emergency manual operation

The ATI can be manually operated as a “Manual Transfer Switch Equipment – MTSE” whilst retaining the electrical characteristics and performance of the power switching function. This function is usually used in case of emergencies or during maintenance.

To operate the ATI manually ensure that no live parts are accessible, turn the front selector switch into the manual position and insert the handle into the emergency handle shaft location hole provided.

Turn the handle 90° clockwise or anti-clockwise (depending on the position to be reached) for each consecutive change in position. I -> O -> II -> O -> I.



CAUTION

Ensure to verify the product position and direction of rotation before effecting manual operation.

Ensure to remove the handle from the product before changing the selector switch back to AUT position.

5.1.2. Padlocking

The ATI can be padlocked in the 0 position as standard whilst padlocking in positions I, O or II is available as a factory fitted option.

To padlock the ATI first ensure that the ATI mode selector switch is on Manual then ensure that the emergency manual operation handle is not inserted into the location hole. (Remove if inserted).

Pull the padlocking mechanism outwards to reveal the slot for inserting up to 3x dia. 4 - 8mm padlocks.

Padlock the device with approved quality padlocks of minimum diameter 4mm and maximum diameter of 8mm. A maximum of 3x 8mm padlocks may be padlocked onto the ATI to padlocking mechanism.



CAUTION

As standard, padlocking is only made possible in the “O position”, when in manual mode and with the emergency handle not inserted.

6. LOCAL / REMOTE CONTROL (POSITIONS I – 0 – II)

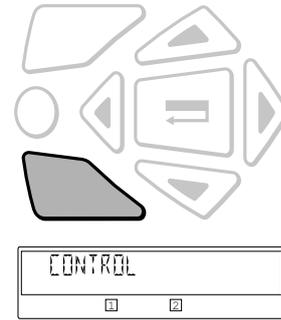
Local control will allow the user to change position locally without the need for the emergency manual handle. This function is available in AUT mode only.

Description:

- Changeover of the switch positions: PS1, PS0, PS2.

Activation:

- either on the ATI front panel (via the Mode key).
- or via the programmable input,
- or via communication. (MODBUS).



Steps:

- Select Local / Remote mode using the Mode key
- When Control is displayed press the validation key
- Enter the password when prompted with CODE (Default 0000)
- Press the validation key to validate the password and access the position menu
- To change from POS0 to POS1 to POS2 etc press the MODE key to select the desired position.
- YES and NO define the actual position that the switch will be in.

To change position: example

- POS2 NO (This states that the switch is not in position II)
- To go to position II press the validation key with POS2 NO on the display
- Once position II has been reached the display will change to POS2 YES

Deactivation:

- either via the Escape key,
- or by switching the selector switch on the front of the ATI from AUT to Manual and back to AUT.

Note: Local / Remote Control takes priority over all other operating functions.

7. AUTOMATIC MODE

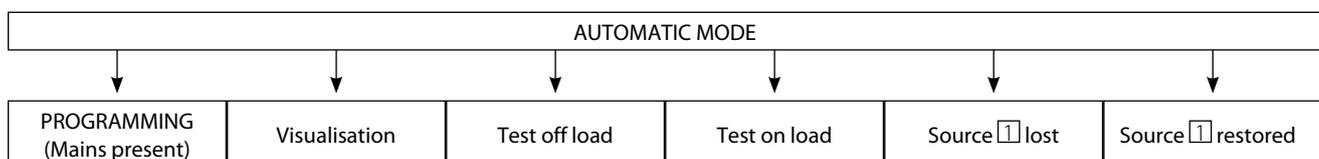
Set the selector switch on the front of the ATI onto AUT.
Make sure that the product is in automatic mode with the AUT LED lit green.

Possible action when in AUT MODE

Once in automatic mode, it is possible to:

- Run an on load or off load test.
- Run a source 1 / source 2 loss sequence.
- Start a source 1 / source 2 restoration sequence.

7.1. Manual & Automatic Mode / Mains restoration conditions



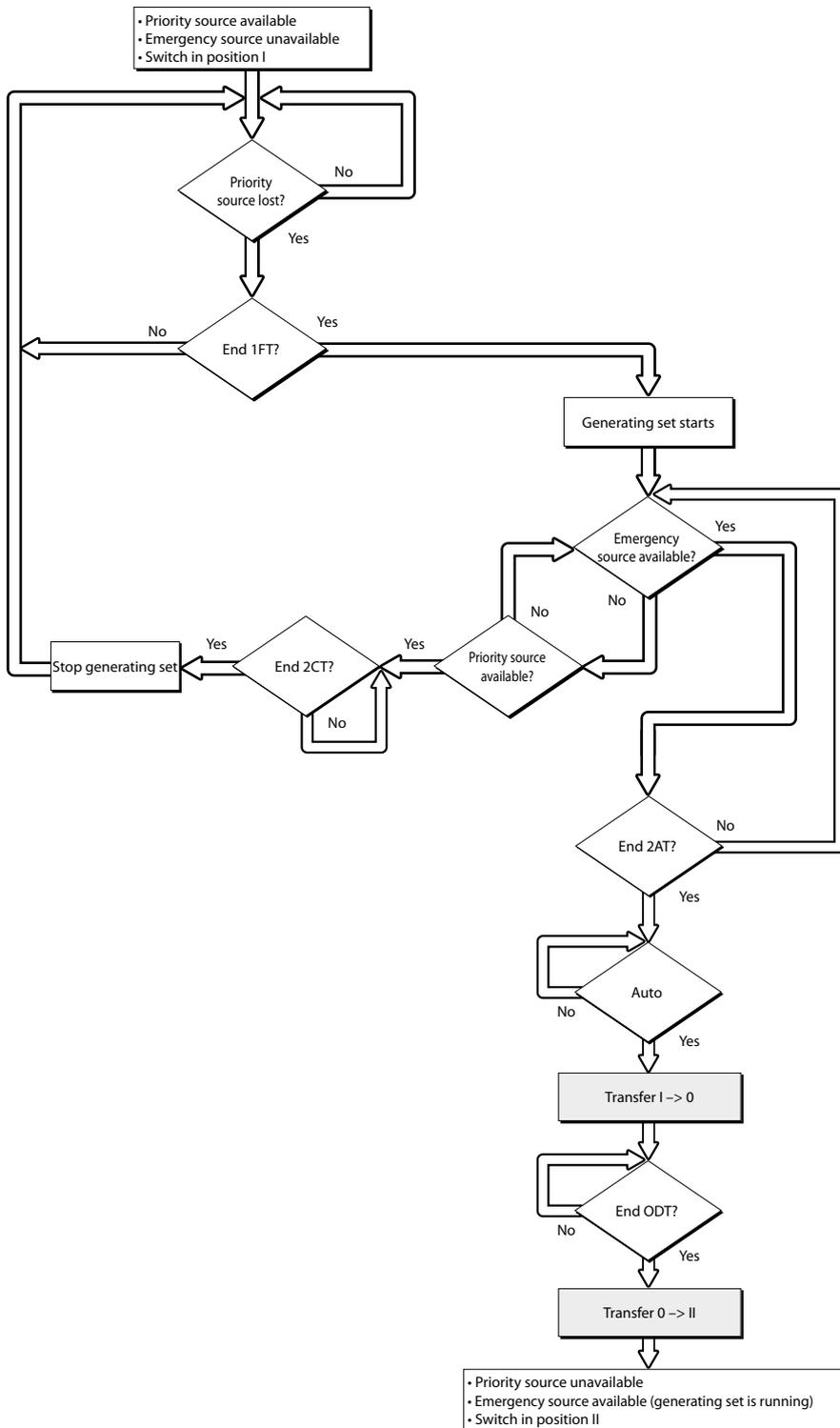
- Automatic mode returns active within 2 seconds after switching from manual to automatic mode.
- Source 1 and source 2 voltage and frequencies are checked to define a stable availability status.

7.2. Priority source loss sequence M-G

Stable position in M-G applications

Configuration:

- APP = M-G: Network - Generating set application



7.3. Priority source automatic restoration sequence

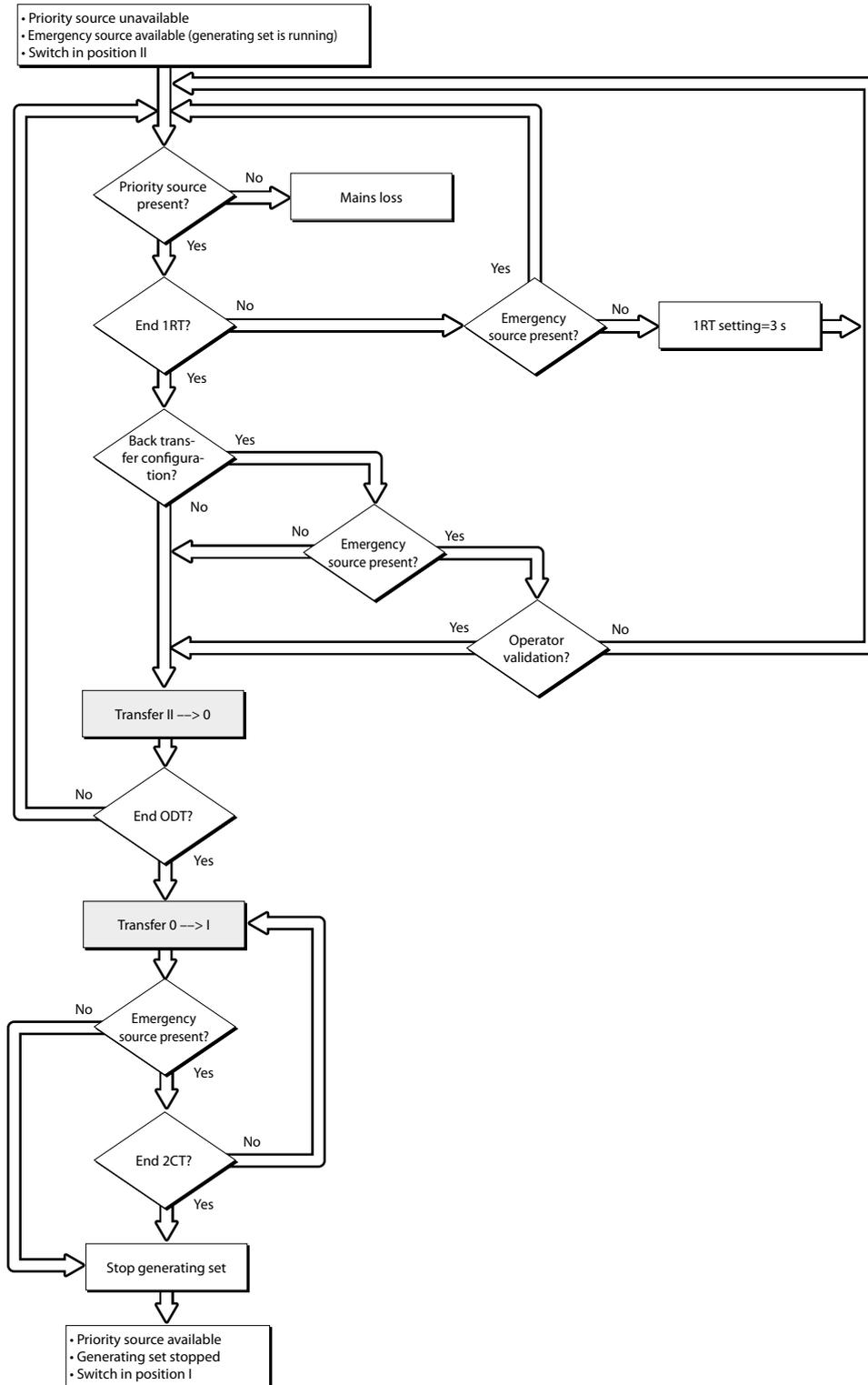
This sequence is started as soon as the system is in AUTO mode and in position II. Specific function Automatic retransfer inhibited: Once source 1 is restored, it may be preferable not to retransfer the load from source 2 to source 1 immediately. Once the retransfer from source 2 to source 1 is possible, the RETRANS function locks the retransfer, and the AUT LED flashes pending the operator's confirmation. The VALIDATION key must be pressed or an input must be programmed on RTC to authorise the retransfer.

7.4. Priority source restoration sequence M-G

Stable position in M-G applications

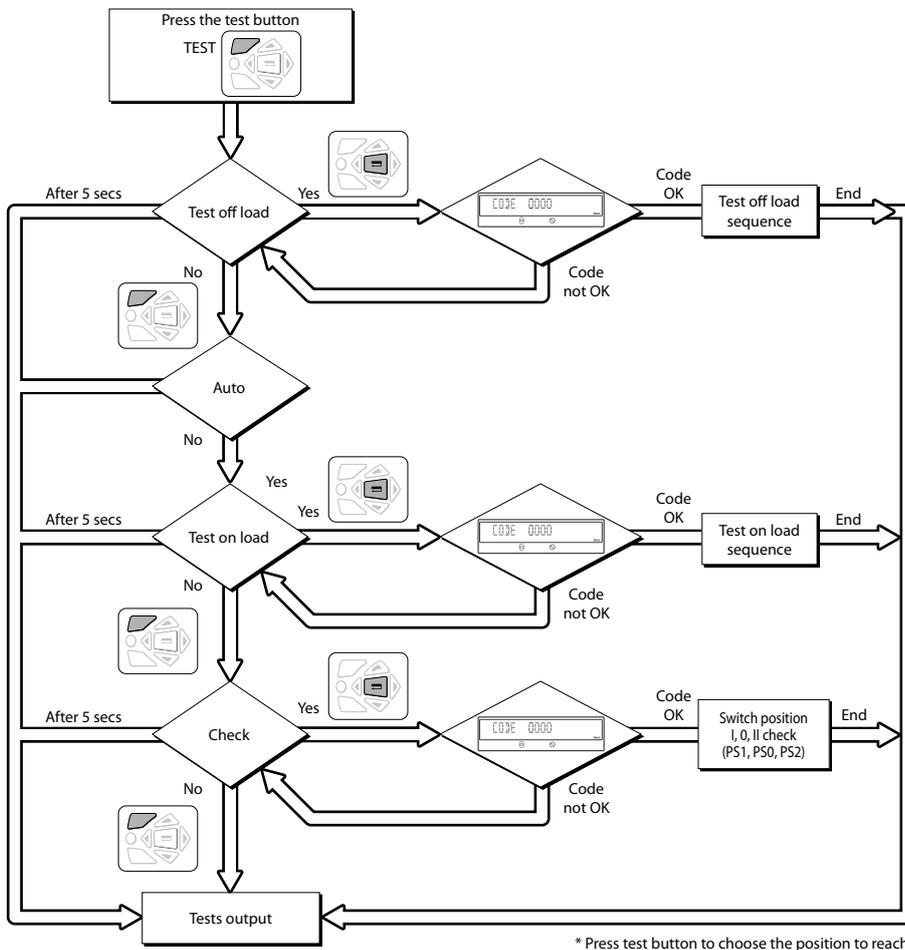
Configuration

- APP = M-G: Network - Generating set application



8. TEST MODES

The ATI includes for On-Load as well as Off Loads tests that are always associated with Mains – Gen applications. To operate the tests manually through the keypad the following flow diagram shows the different steps.



8.1. Test Off Load

This test is for Main – Gen applications only and possible to run in automatic as well as manual mode. It can be considered as a manual Genset start order without switching over the load from the main supply to the backup.

Description:

- This mode enables you to test run the Genset without initiating a load transfer
- The Genset is started and stopped as normal (via the «Gen set start» contact: output 72-71-74).
- This test is always possible to run, except during a main supply (S1) loss sequence. (This is a condition that would stop the test).

Activation:

- either on the ATI front panel, via the test modes,
- or via the programmable input,
- or via communication (MODBUS).

Deactivation:

- either by changing the status of the control input
- or by pressing the validation key on the ATI.
- or after a Genset start timeout.
- or at the end of the timer (if set),
- or if the main source supply (S1) is lost,
- or in case of generating set shuts down due to a fault.

8.2. Test On Load

This test is for Main – Gen applications and possible to run in automatic mode only. It enables you to start the Genset and simulate a complete transfer sequence, on load.

Description:

- The purpose of this sequence is to execute a load transfer from the main supply to the Genset. This is usually done to test the complete cycle, whilst adhering to the changeover conditions.
- The time delays for validating the transfer conditions (TOT, 2ST, 2AT and 2CT) are derived according to their configuration for normal operation.
- The “retransfer confirmation” function is always active throughout an on load test. This enables a retransfer back to the main source supply (S1) in case of an unlimited on load test, or interrupts a time delayed on load test.

Activation:

- either on the ATI front panel, via the test modes,
- or via the programmable input,
- or via communication. (MODBUS).

Deactivation:

- either by changing the status of the control input
- or by pressing the validation key on the ATI.
- or after a Genset start timeout.
- or at the end of the timer (if set),
- or in case of generating set shuts down due to a fault.

9. COMMUNICATION

One can benefit of all the ATI functionality when including one of the communication options available.

Options for communication include:

- MODBUS RTU over RS485 Module



9.1. General information

Communication via an RS485 connection (MODBUS® protocol) enables you to connect up to 31 ATI to a PC or programmable logic controller over a distance of 1200 metres.

To authorise a change in configuration: define adress HEXA E300 as 1000.

Recommendations:

Use a shielded twisted pair, type LIYCY.

If the distance of 1200 m and / or the number of 31 ATI be exceeded, it will be necessary to connect a repeater to allow an connection of ATI for over 1200 m.

9.2. MODBUS® protocol

The MODBUS® protocol used by the ATI requires a dialogue using a master/slave hierarchical structure. Two dialogues are possible:

- the master communicates with a slave (ATI) and waits for its response,
- the master communicates with all the slaves (ATI) without waiting for their response.

The communication mode is RTU (Remote Terminal Unit) which uses hexadecimal 8 bit characters.

In the communication protocol, a standard frame is made up of the following elements:



- Slave address: communicating device address
- Function codes:
 - 3: to read n words (maximum 125)
 - 6: to write one word.
 - 16: to write n words (maximum 125).
- Address: Register address (refer to following tables)
- Data: parameters linked to function (number of words, value).
When slave address 0 is selected, a message is sent to all devices present on the network (only for functions 6 and 16), this type of message is called general distribution, so it is not followed up with a response from the slaves. The maximum response time (timeout) is 250 ms between a question and a response.

10. REFERENCES LIST

Enclosed	250 A	400 A	630 A	800 A	1000 A
Connection Bottom-Bottom					
Connection Top-Top					
Connection Bottom-Bottom + measurement					
Connection Top-Top with measurement					
Accessories					
IP54 set					
Solid neutral					
Lightning protection					
2IN / 2OUT Module					
Modbus Module					

Enclosed	1250 A	1600 A	2000 A	2500 A	3200 A
Connection Bottom-Bottom					
Connection Top-Top					
Connection Bottom-Bottom + measurement					
Connection Top-Top with measurement					
Accessories					
IP54 set					
Solid neutral					
Lightning protection					
2IN / 2OUT Module					
Modbus Module					

11. PREVENTIVE MAINTENANCE

After one year of storage the product remaining in stock has to be powered at least once a year.

It is recommended to verify the tightening torque of all connections and to operate the product in a full operating cycle (I – 0 – II – 0 – I: Auto and Manual) at least once a year.

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.

12. FAULT FINDING GUIDE

Symptom	Step	Result
01 Automatic operations availability.	01 AUTO Led is on.	> NEGATIVE <ul style="list-style-type: none"> • Check that the switch has not been padlocked. • Check that the manual operating handle has been removed from housing. • Check that the selector has been put in AUT position. • Then consult your local dealer.
		> POSITIVE <ul style="list-style-type: none"> • Go to the next step.
	02 Fault synthesis Led is off.	> NEGATIVE <ul style="list-style-type: none"> • Led is blinking Check the lightning protection option and replace the fuse if damaged. Replace the fuses or the lightning protection module if damaged. Then consult your local dealer.
		<ul style="list-style-type: none"> • Led is on Try to reset the product (see the instructions below). Then consult your local dealer.
		<ul style="list-style-type: none"> • Reset Level 1 
		<ul style="list-style-type: none"> • Level 2 Switch off the power supply during 3 minutes by removing the power supply. Open site mains breaker and generating set breaker (position 0).
	> POSITIVE <ul style="list-style-type: none"> • Go to the next step. 	
	03 Power supply Led is blinking.	> NEGATIVE <ul style="list-style-type: none"> • Led is on: Try to reset the product (see the instructions above). Then consult your local dealer.
		> POSITIVE <ul style="list-style-type: none"> • Go to the next symptoms.
02 The mains availability.	01 Mains availability Led is on.	> NEGATIVE <ul style="list-style-type: none"> • Check lamp test. • Check that the mains return timer (1RT) is still not counting down. • Check that the mains protection system (breaker) is on (Position 1). • Then consult your local dealer.
		> POSITIVE <ul style="list-style-type: none"> • Go to the next steps or symptoms.
03 The genset availability (genset supposed started).	01 Genset availability Led is on.	> NEGATIVE <ul style="list-style-type: none"> • Check lamp test. • Check that the genset stabilisation timer (2AT) is still not counting down. • Check that the genset protection system (breaker) is on (Position 1). • Then consult your local dealer.
		> POSITIVE <ul style="list-style-type: none"> • Go to the next steps or symptoms.

Symptom	Step	Result
04 The product doesn't transfer to the genset in case of mains failure or test on load.	01 AUT Led is on & Fault synthesis Led is off & Power supply Led is blinking.	> NEGATIVE • Go to symptom 01.
		> POSITIVE • Go to the next step.
	02 Genset is started.	> NEGATIVE • Check that the mains failure timer (1FT) is still not counting down. • Check the genset control panel is set to the auto position. • Then consult your local dealer.
		> POSITIVE • Go to the next step.
	03 Genset availability Led is on.	> NEGATIVE • Go to symptom 03.
		> POSITIVE • Consult your local dealer.
05 The product doesn't transfer to the mains in case of mains return or test on load end.	01 AUT Led is on & Fault synthesis Led is off & Power supply Led is blinking.	> NEGATIVE • Go to symptom 01.
		> POSITIVE • Go to the next step.
	02 Mains availability Led is on.	> NEGATIVE • Go to symptom 02.
		> POSITIVE • Go to the next step.
	03 Retransfer inhibit (RTI) function is off.	> NEGATIVE • Push the ESC push button
		> POSITIVE • Consult your local dealer.
06 Genset keeps on running after mains restores and switch retransfers to the mains position.	01 AUT Led is on & Fault synthesis Led is off & Power supply Led is blinking.	> NEGATIVE • Go to symptom 01.
		> POSITIVE • Go to the next step.
	02 The run on time timer (2CT) is still counting down (visible on the display).	> NEGATIVE • Check the genset control panel is set to the auto position. • Then consult your local dealer.
		> POSITIVE • Wait for the 2CT end.

Symptom	Step	Result
07 Switch manual operations are not possible.	01 Manual Led is on.	> NEGATIVE • Turn the selector to the manual position.
		> POSITIVE • Go to the next step.
	02 The manual handle introduction is possible.	> NEGATIVE • Check that the switch has not been padlocked.
		> POSITIVE • Go to the next step.
	03 The manual operation is possible.	> NEGATIVE • Check the required rotation of the switch. • Check that the sufficient torque has been applied. • Then consult your local dealer.
		> POSITIVE • Goal reached.
08 Switch padlocking operations are not possible.	01 Manual Led is on.	> NEGATIVE • Turn the selector to the manual position.
		> POSITIVE • Go to the next step.
	02 Possible to pull the padlocking mechanism.	> NEGATIVE • Check that the product is in the 0 position for standard product. • Check that the manual operating handle has been removed from housing. • Then consult your local dealer.
		> POSITIVE • Goal reached.

13. SPARE PARTS

Enclosed	250 A	400 A	630 A	800 A	1000 A
Motor parts					
Control relay parts					
Enclosed	1250 A	1600 A	2000 A	2500 A	3200 A
Motor parts					
Control relay parts					

