ATyS M 6e

Operating instructions GB

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GENERAL SAFETY INSTRUCTIONS

- This manual provides instructions on safety, connections and operation of the ATYS source switchgear system.
- This system must always be installed and commissioned by qualified and approved personnel.
- This manual must be kept in a place so as to be available to anyone likely to need it.
- Maintenance and servicing operations must be performed by trained and authorised personnel.
- This system meets the European Directives governing this type of product. It has the CE marking.
- The information provided in this manual is subject to change, and is non-contractual.
- This product complies with the following standards:
  - IEC 60947-3
  - EN 60947-3
  - NBN EN 60947-3
  - BS EN 60947-3
  - IEC 60947-6-1
  - GB 14048
  - EN 60947-6-1
  - NBN EN 60947-6-1
  - BS EN 60947-6-1
  - VDE 0660-107

INDEX

1. INTRODUCTION

1.1. General introduction

The ATyS M 6e is a quick-acting source inverter based on 4-pole switches controlled by an electronic device, which makes it an IEC 60947-6-1 compliant product.

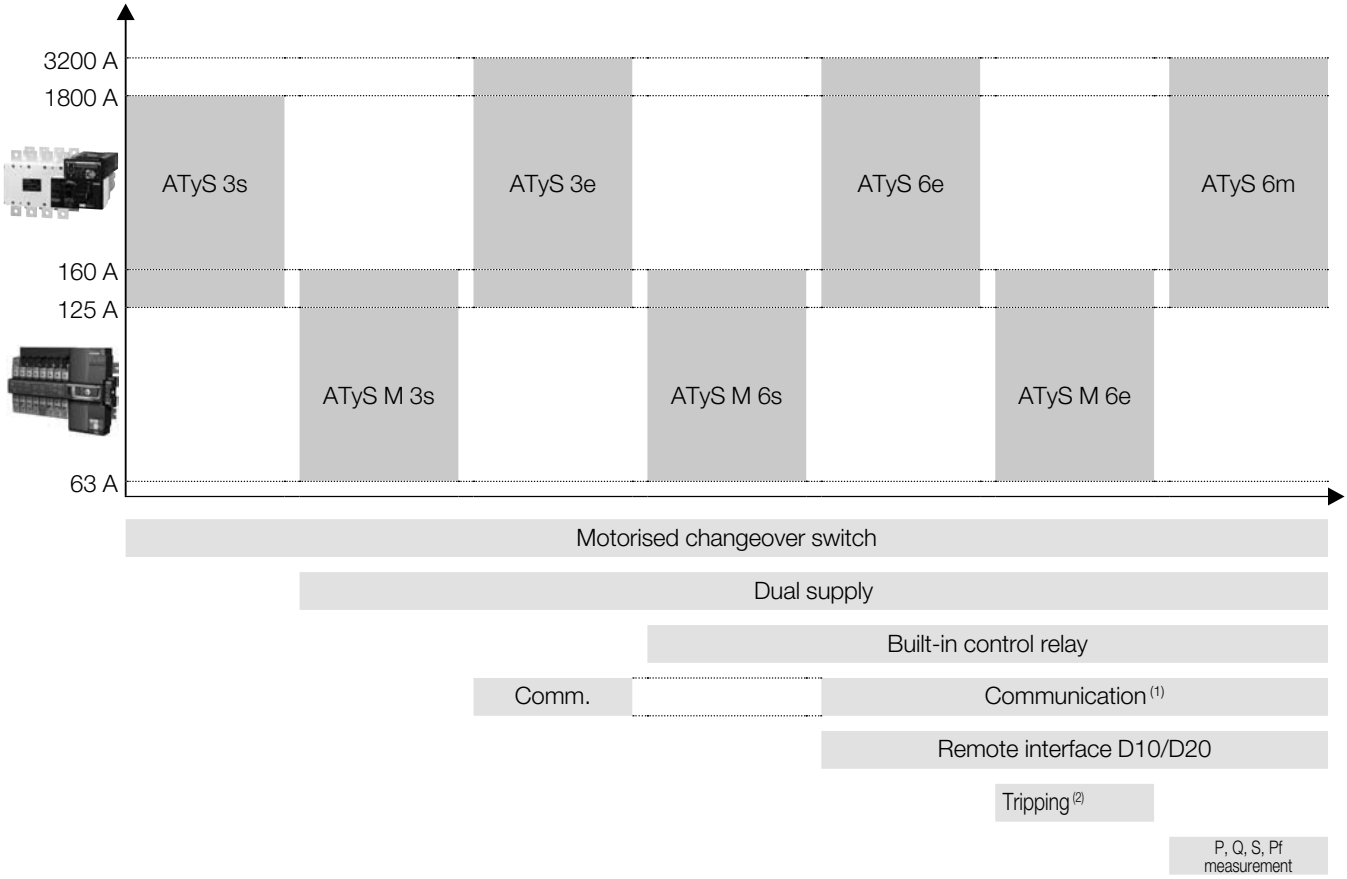
Thanks to the switch technology, manual operations are always possible so as to ensure source switchover regardless of the circumstances.

The electronic module includes:

- Power sources status display.
- Voltage and frequency measurement display.
- Keypad programming of test and operating sequences.

Manual control, locking and programming are directly accessible from the front panel of the device.

1.2. The complete ATyS range



(1) For ATyS M 6e, only on the version with communication.
(2) Return to zero without external energy source.

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1.3. ATyS M 6e and its versions

The ATyS M 6e is available in two supply versions: 127/230 V AC and 230/400 V AC.
It comes with and without RS485 communication.

1.4. Product presentation

This quick-acting source inversion solution incorporates:

① 2 mechanically interlocked switches including an electronic control-command module.

② A quick-acting electric control unit enabling automatic or manual system operation.

③ Bridging bars (accessory).

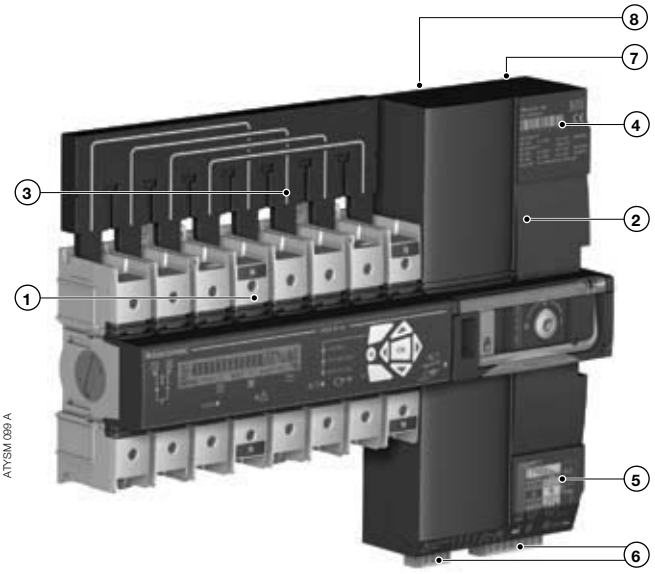
④ Electrical specifications compliant with product standards, and a version identification.

⑤ Changeover switch wiring identification.

⑥ Control connections.

⑦ An RJ45 connection for a remote interface D10 / D20.

⑧ A connector for RS485 communication (MODBUS), for the version with communication.



1.4.1. Specifications and advantages:

1 - Breaking:
A source inversion system, completely built-in and interlocked, with high electrical performance and offering microprocessor control and monitoring.

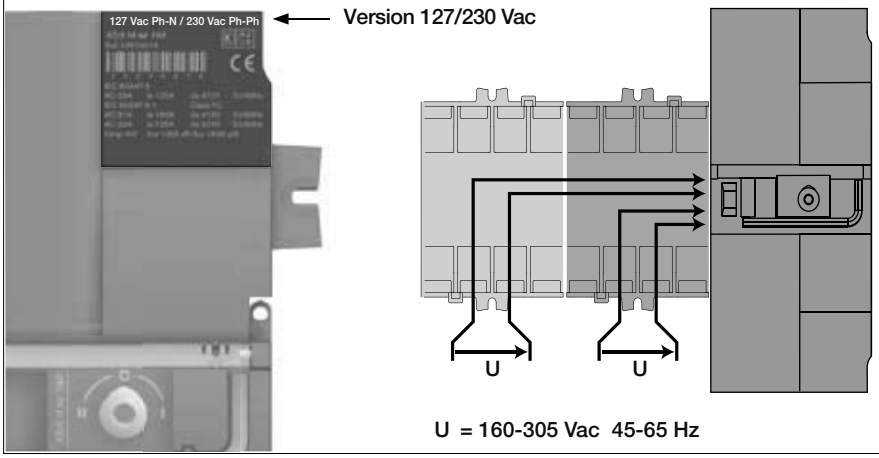
2 - Operation:
A flexible operating mechanism allowing quick manoeuvres in automatic mode or locally in manual mode for emergency operations. Features a locking device.

1.5. Supply types

The power supply of ATyS M 6e is required to be 230Vac +/- 30% at a frequency of 50 Hz or 60 Hz. Two models of the ATyS M 6e, 127/230 V AC and 230/400 V AC, have been developed, so as to meet all possible network configurations.

1.5.1. Product version identification method

1.5.1-1



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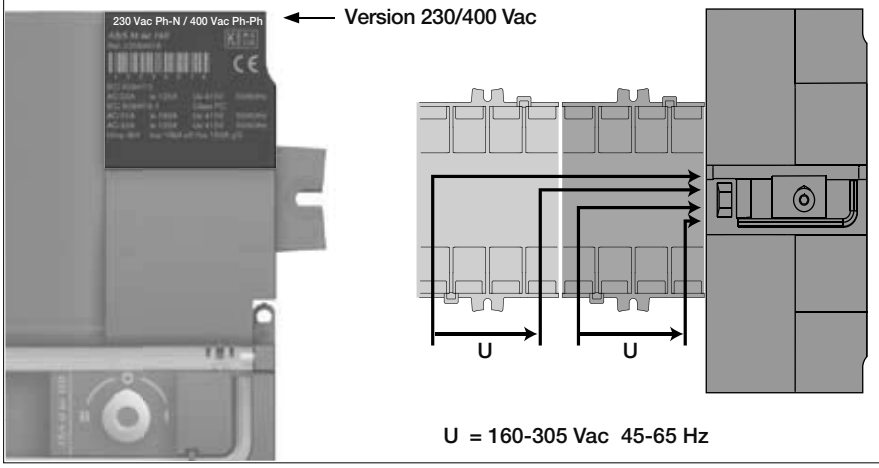
1.5.1-2



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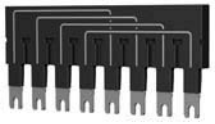
1.6. Optional accessories

Auxiliary contact	Each product can take up to 2 auxiliary contact blocks. A block comprises 1 NOC auxiliary contact (positions I, O and II). Specifications: 250 V AC / 5 A maximum.	ATYSM 028 A 	*Ref.: 1309 0001*
Bridging bars	To provide common point on outgoing terminals.	ATYSM 025 A 	*2 Refs are available: Rating ≤125A: 1309 4006 and rating 160A: 1309 4016*
Remote interface D10/D20	- Use Dedicated to applications requiring the changeover switch to be fitted inside a cabinet. Product self-supplied via the connection lead with ATyS M. Maximum connection distance: 3m. - ATyS D10 For transferring source and changeover switch statuses to the cabinet front panel. Protection rating: IP21. - ATyS D20 In addition to the ATyS D10 interface functions, enables configuration, checking, tests and measurements display from a cabinet front panel. Protection rating: IP21. - Door mounted 2 holes, ø 22.5. Connected to ATyS M via a non-insulated RJ45 plug and straight lead.	ATYS 564 C  ATYS 565 C 	*Ref. ATyS D10: 1599 2010* *Ref. ATyS D20: 1599 2020*
Connection cable for remote interface	For connecting between a remote interface and the ATyS. RJ45 lead, 3m.	ACCES 209 A 	*Ref.: 1599 2009*
Voltage and power socket terminal	This provides 2 connection terminals for conductor cross-sections ≤ 1.5 mm². The unipolar terminal can be fitted in cages without reducing their connection capacity. Not for use on terminals with bridging bars fitted.	ATYSM 026 A 	*Ref.: 1399 4006* *2 parts/ref.*
Terminal shrouds	Protection against direct contact with terminals or connecting parts. Advantages of terminal shroud: perforations enabling remote thermographic verification without dismantling. Possibility of sealing.	ATYSM 027 A 	*Ref.: 2294 4016* *2 parts/ref.*
Enclosure	Fully dedicated to using an ATyS M, it provides easy access to a compact, enclosed source switchover solution.	ATYSM 036 A 	*Ref.: 1309 9006*
Extension unit	Combined with the polycarbonate enclosure, the extension unit enables you to allocate additional space to the enclosure if you want to connect cables with cross-section 70 mm² to the ATyS M.	ATYSM 044 A 	*Ref.: 1309 9007*

2. TECHNICAL SPECIFICATIONS

Ratings		63 A	80 A	100 A	125 A	160 A
Frequencies		50 & 60 Hz	50 & 60 Hz	50 & 60 Hz	50 & 60 Hz	50 & 60 Hz
Thermal current Ith at 40°C (A)		63	80	100	125	160
Thermal current Ith at 50°C (A)		63	80	100	110*	125
Assigned insulation voltage Ui (V) (Power circuit)		600	600	600	600	600
Assigned transient voltage Uimp (kV) (Power circuit)		6	6	6	6	6
Assigned insulation voltage Ui (V) (Auxiliary circuit)		300	300	300	300	300
Assigned transient voltage Uimp (kV) (Auxiliary circuit)		4	4	4	4	4
Other specifications at 40°C: Currents assigned (A) IEC 60947-3 specifications at 415V AC.	AC 21A / 21 B	63/63	80/80	100/100	125/125	160/160
	AC 22A / 22 B	63/63	80/80	100/100	125/125	125/160
	AC 23A / 23 B	63/63	80/80	100/100	125/125	125/160
IEC 60947-6-1 specifications at 415V AC.	AC 33B / AC32B / AC31B	63/63/63	80/80/80	80/100/100	80/125/125	80/160/160
Operating class	Equipment class (According to IEC 60947-6-1)	PC	PC	PC	PC	PC
Maximum short-circuit current if using gG DIN fuses.	Maximum short-circuit current (act. kA)	50	50	50	50	50
	Associated fuses (gG)	63	80	100	125	160
	Current peak value: Maintaining and closing operation (peak kA)	7.5	7.5	11	13.5	16.5
Short-circuit operation	Permissible short-term assigned current (act. kA) / 30 ms	5	5	5	10	10
Switchover time	I-II or II-I (ms)	180	180	180	180	180
	Switchover dead time at Un (ms)	120	120	120	120	120
	I-O / O-I / II-O / O-II (ms)	50	50	50	50	50
Consumption	Peak current during switchover (A)	20	20	20	20	20
	Consumption in stabilised state (VA)	6	6	6	6	6
Mechanical specifications	Number of switchovers	10000	10000	10000	10000	10000
Connection cross-section	Minimum size (Cu mm^2), flexible	25	35	35	50	50
	Maximum size (Cu mm^2), flexible	50	50	50	50	50
	Maximum size (Cu mm^2), rigid	70	70	70	70	70

* Possibility of reaching 125 with bigger connection cross-sections.

2.1. Parallel pole set-up 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 strength in three-phase (A)	Nominal current strength in single-phase (2 poles in //) (A)
63	100
80	125
100	160
125	200
160	250

2.2. Environmental conditions

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

Temperature:
- -10 +40°C without de-rating
- -20 +70°C with de-rating

Altitude:
- Max 2000 m without de-rating

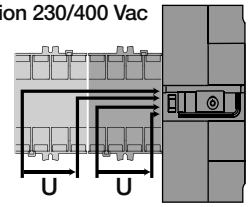
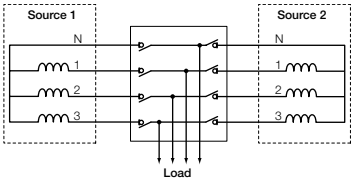
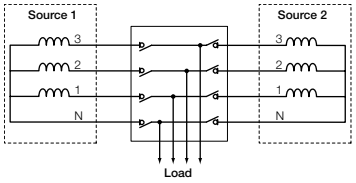
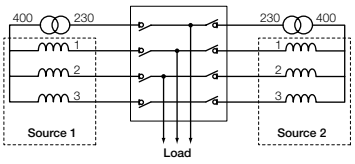
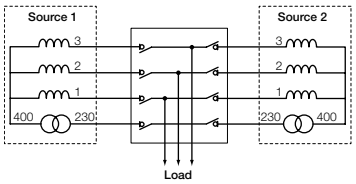
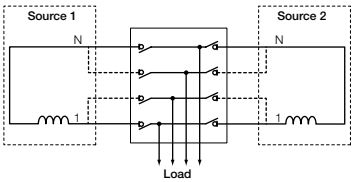
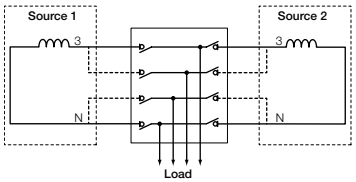
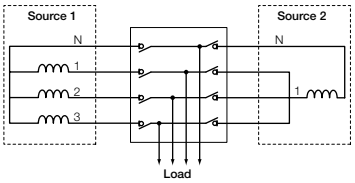
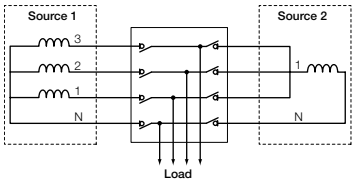
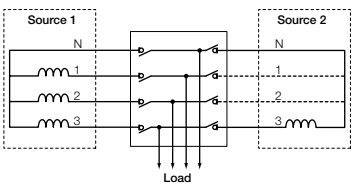
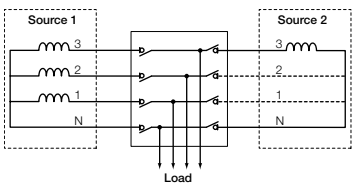
Storage:
- 1 year maximum

IP rating:
- IP41 in the SOCOMEC polycarbonate modular enclosure (see chapter 3.8)
- IP2x for non-enclosed modular product

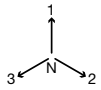
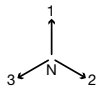
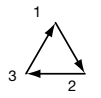
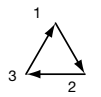
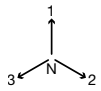
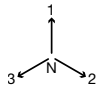
3. INSTALLATION

3.1. 230/400 V AC network configurations

3.1.1. Voltage configurations

Type			Wiring							
Version 230/400 Vac  U = 160-305 Vac 45-65 Hz	Name	Position of Neutral (1)	Network 1				Network 2			
Neutral on the left		Neutral on the right								
	4NBL	Left (setup: auto)	N	L1	L2	L3	N	L1	L2	L3
		Right (setup: auto)	L3	L2	L1	N	L3	L2	L1	N
	3NBL	Left (setup: auto)		L1	L2	L3		L1	L2	L3
		Right (setup: auto)	L3	L2	L1		L3	L2	L1	
	1BL	Left (setup: auto)	N	(N)	(L1)	L1	N	(N)	(L1)	L1
		Right (setup: auto)	L1	(L1)	(N)	N	L1	(L1)	(N)	N
	41 NBL	Left (setup: auto)	N	L1	L2	L3	N	L1	L1	L1
		Right (setup: auto)	L3	L2	L1	N	L1	L1	L1	N
	42 NBL	Left (setup: auto)	N	L1	L2	L3	N	(L1)	(L2)	L3
		Right (setup: auto)	L3	L2	L1	N	L3	L2	(L1)	N

(1) Position of neutral on the product
The neutral position should be configured in the setup menu:
- auto: neutral is detected upon initialisation
- Neutral on left: neutral forced left
- Neutral on right: neutral forced right

Detections							Monitoring/Display (4)				Tripod
Neutral (2)			Rotation (3)		Balancing						
Ntwk 1	Ntwk 2	Ntwk 1 ≠ Ntwk 2	Ntwk 1	Ntwk 2	Ntwk 1	Ntwk 2	Network 1		Network 2		
							V Ph-Ph	V Ph-N	V Ph-Ph	V Ph-N	
Left	Left	YES	ABC ACB	ABC ACB	YES	YES	3 readings	3 readings	3 readings	3 readings	
Right	Right	YES	ABC ACB	ABC ACB	YES	YES					
Left	Left	YES	ABC ACB	ABC ACB	YES	YES	3 readings	0 measure-ments	3 readings	0 measure-ments	
Right	Right	YES	ABC ACB	ABC ACB	YES	YES					
EITHER	EITHER	No	EITHER	EITHER	No	No	0 measure-ments	1 measure-ment	0 measure-ments	1 measure-ment	
EITHER	EITHER	No	EITHER	EITHER	No	No					
Left	Left	YES	ABC ACB	EITHER	YES	No	3 readings	3 readings	0 measure-ments	1 measure-ment	
Right	Right	YES	ABC ACB	EITHER	YES	No					
Left	Left	YES	ABC ACB	EITHER	YES	No	3 readings	3 readings	1 measure-ment	0 measure-ments	
Right	Right	YES	ABC ACB	EITHER	YES	No					

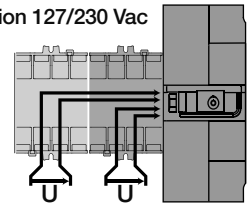
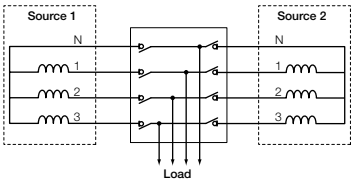
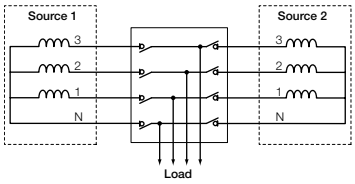
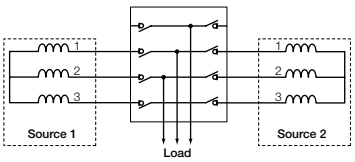
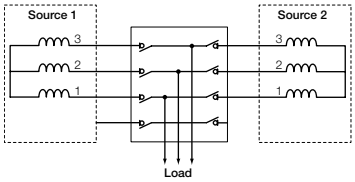
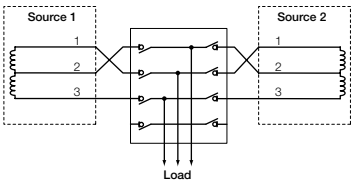
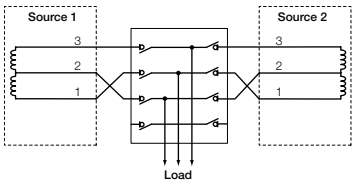
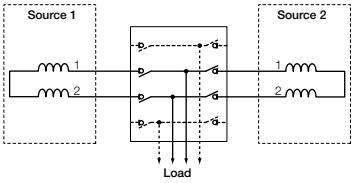
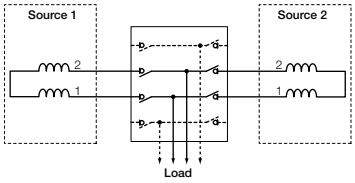
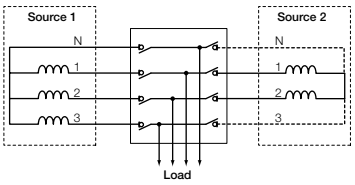
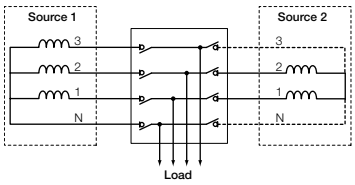
(2) **yes:** the product recognises whether the network 1 neutral position is not the same as for network 2: an error message is then displayed FO3 - NEUTRAL
no: the product does not recognise whether the network 1 neutral position is different from network 2: the measurements may be incorrect
EITHER: position undetermined

(3) It is possible to configure the direction of phase rotation in the Setup menu: clockwise or anti-clockwise
EITHER: the phase rotation is not controlled.

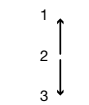
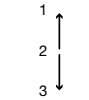
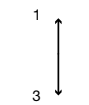
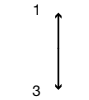
(4) : voltage monitored

3.2. 127/230 V AC network configurations

3.2.1. Voltage configurations

Type		Name	Neutral (1)	Wiring							
				Network 1				Network 2			
Version 127/230 Vac  U = 160-305 Vac 45-65 Hz											
Neutral on the left	Neutral on the right										
		4 NBL	Left (setup: auto)	N	L1	L2	L3	N	L1	L2	L3
			Right (setup: auto)	L3	L2	L1	N	L3	L2	L1	N
		3 NBL	Left (setup: auto)		L1	L2	L3		L1	L2	L3
			Right (setup: auto)	L3	L2	L1		L3	L2	L1	
		2NBL	Fixed left (setup: left)	M	L1	L3		M	L1	L3	
			Fixed right (setup: right)		L3	L1	M		L3	L1	M
		2BL	Left (setup: auto)	(L1)	L1	L2	(L2)	(L1)	L1	L2	(L2)
			Right (setup: auto)	(L2)	L2	L1	(L1)	(L2)	L2	L1	(L1)
		42 NBL	Left (setup: auto)	N	L1	L2	L3	(N)	L1	L2	(L3)
			Right (setup: auto)	L3	L2	L1	N	(L3)	L2	L1	(N)

(1) Position of neutral on the product
The neutral position should be configured in the setup menu:
- auto: neutral is detected upon initialisation
- Neutral on left: neutral forced left
- Neutral on right: neutral forced right

Detections							Monitoring/Display (4)				Tripod
Neutral (2)			Rotation (3)		Balancing						
Ntwk 1	Ntwk 2	Ntwk 1 ≠ Ntwk 2	Ntwk 1	Ntwk 2	Ntwk 1	Ntwk 2	Network 1		Network 2		
							V Ph-Ph	V Ph-N	V Ph-Ph	V Ph-N	
Left	Left	YES	ABC ACB	ABC ACB	YES	YES	3 readings	3 readings	3 readings	3 readings	
Right	Right	YES	ABC ACB	ABC ACB	YES	YES					
Left	Left	YES	ABC ACB	ABC ACB	YES	YES	3 readings	0 measurements	3 readings	0 measurements	
Right	Right	YES	ABC ACB	ABC ACB	YES	YES					
Left	Left	No	EITHER	EITHER	No	No	3 readings	0 measurements	3 readings	0 measurements	
Right	Right	No	EITHER	EITHER	No	No					
EITHER	EITHER	No	EITHER	EITHER	No	No	1 measurement	0 measurements	1 measurement	0 measurements	
EITHER	EITHER	No	EITHER	EITHER	No	No					
Left	Left	YES	ABC ACB	EITHER	YES	No	3 readings	3 readings	1 measurement	0 measurements	
Right	Right	YES	ABC ACB	EITHER	YES	No					

(2) **yes:** the product recognises whether the network 1 neutral position is not the same as for network 2: an error message is then displayed FO3 - NEUTRAL
no: the product does not recognise whether the network 1 neutral position is different from network 2: the measurements may be incorrect
EITHER: position undetermined

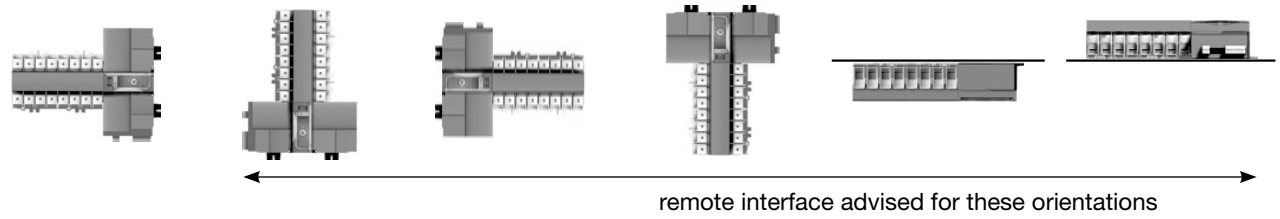
(3) It is possible to configure the direction of phase rotation in the Setup menu: clockwise or anti-clockwise
EITHER: the phase rotation is not controlled.

(4) : voltage monitored

3.3. Product fitting

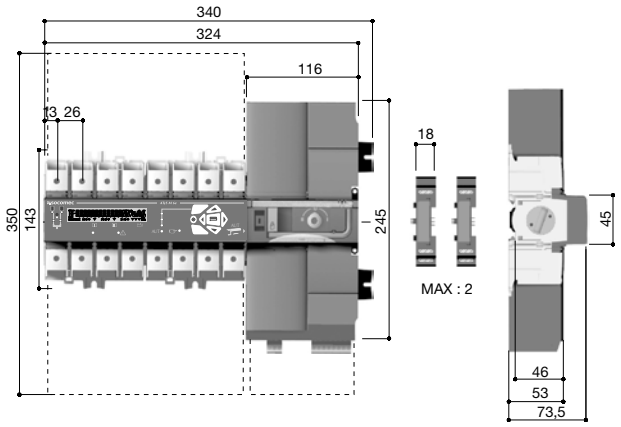
Before fitting think about changing the locking configuration, if necessary.
For locking in Positions I, II and 0, refer to section 3.6.5. Locking

3.3-1 Accepted product orientations



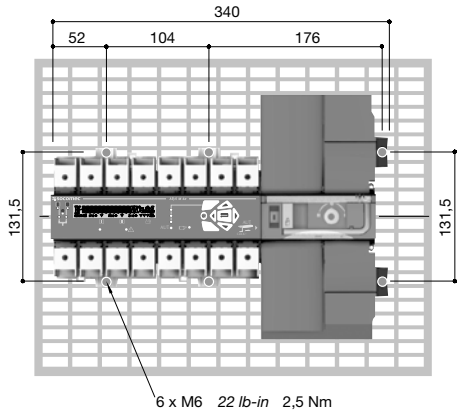
ATYSM 046 A

3.3-2 Dimensions



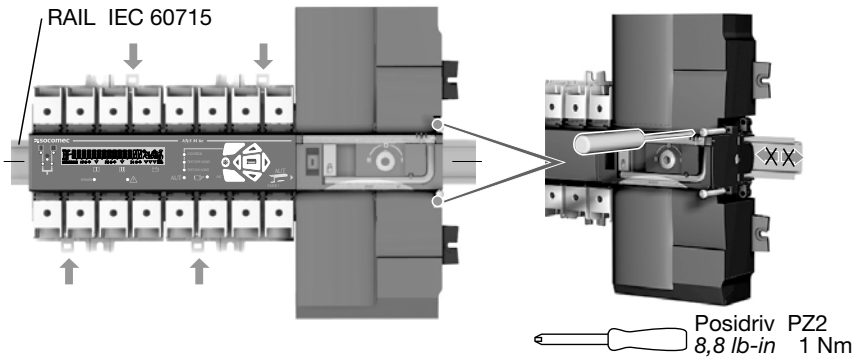
ATYSM 047 B

3.3-3 Board-mounted



ATYSM 047 B

3.3-4 DIN rail mounted



ATYS M 049 B

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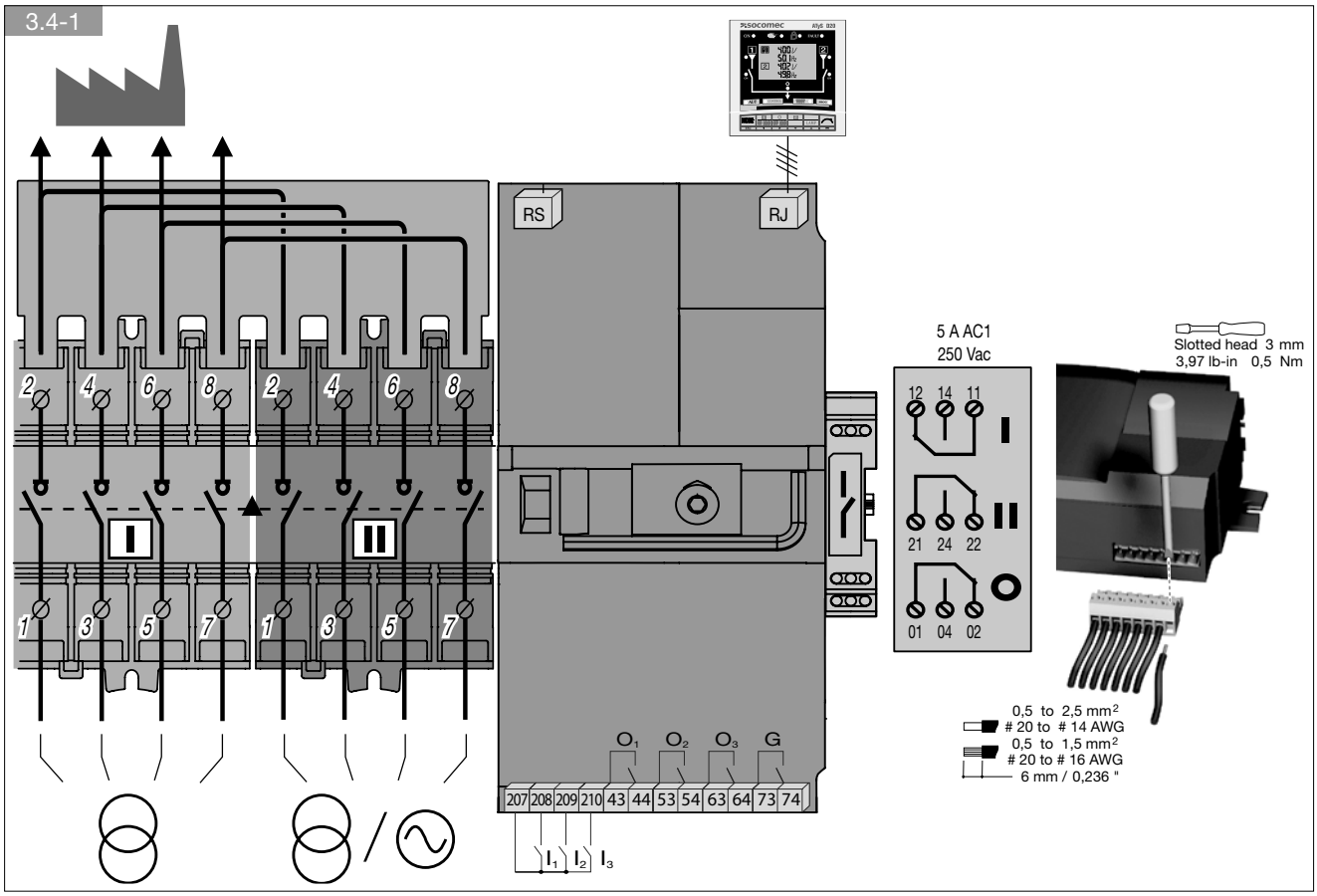
3.4. Connection of control/command circuits

Switch to manual mode before connecting the product.
The product is delivered in position 0 and in auto mode, with the generator start signal contact closed.

3.4-1

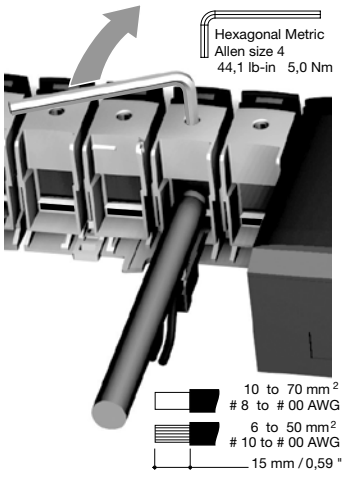


Type	Terminal no.	Description	Characteristics	Recommended connection cross-section
Inputs	207	Common point for inputs	Dry contact Potential free	0.5 to 2.5 mm²
	208	I1: configurable input		
	209	I2: configurable input		
	210	I3: configurable input		
Output	43/44	O1: configurable output	Resistive load 2A 30V DC 5A 230V AC Pmax: 60W or 125VA Umax: 30V DC or 230V AC	0.5 to 2.5 mm²
	53/54	O2: configurable output		
	63/64	O3: configurable output		
	73/74	G: generator start order*		
Remote interface connection	RJ	Remote interface ATyS D10/D20	Maximum separation 3 m	RJ45 8/8
Serial link	RS	RS485 connection 0: interconnection of cable shielding upstream and downstream of RS485 bus – : negative terminal of RS485 bus + : positive terminal of RS485 bus	RS485 bus insulated. Only on version with communication	0.5 to 2.5 mm²
Auxiliary contact block (accessory)	11/12/14	Changeover switch in position I	250V AC 5A AC1	0.5 to 2.5 mm²
	21/22/24	Changeover switch in position II		
	01/02/04	Changeover switch in position 0		

* Order also issued in manual mode.

3.5. Connection of power circuits

3.5-1



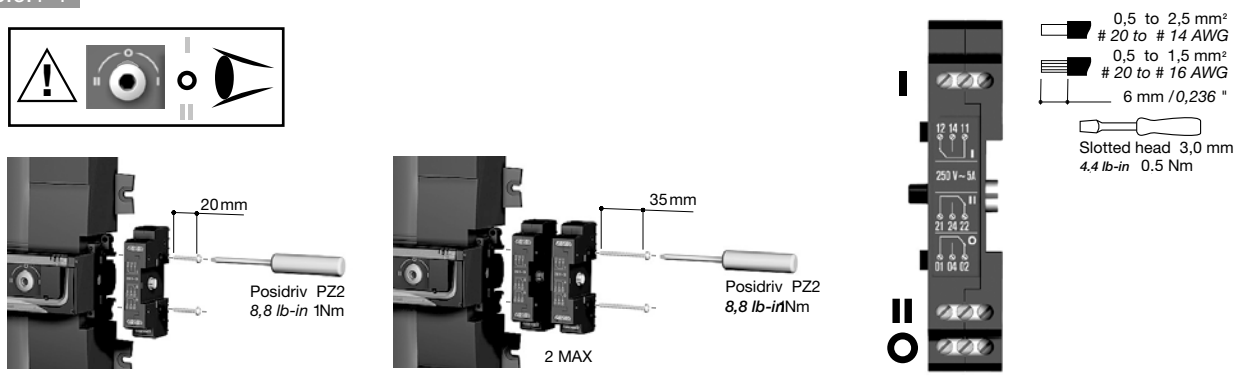
ATYS M 145 A

It is essential to tighten all the 16 terminals (even those that are empty).

3.6. Fitting of accessories

3.6.1. Auxiliary contacts.

3.6.1-1



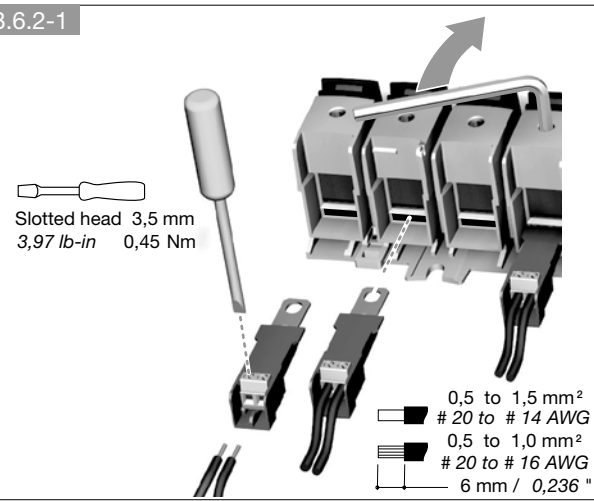
ATYS M 053 A

An auxiliary contact module comprises: one NO/NC changeover contact for each position (I-0-II). Use the screws supplied with the accessory.

1 part/ref.

3.6.2. Voltage socket

3.6.2-1



ATYS M 146 A

This provides 2 connection terminals for conductors with cross-section ≤ 1.5 mm².

The unipolar terminals can be fitted in any of the cages without reducing the cage connection capacity.

2 parts/ref.

Not for use on terminals with bridging bars fitted.

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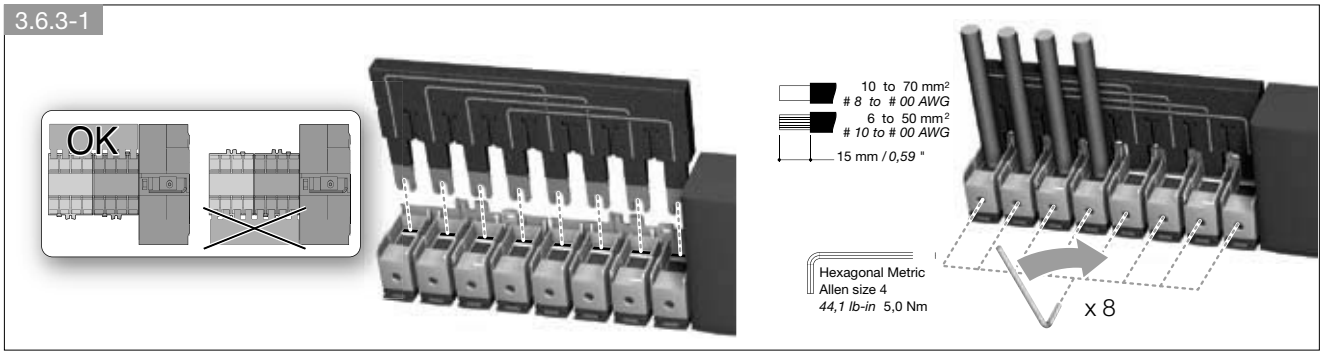
3.6. Fitting of accessories (continued)

3.6.3. Bridging bars

3.6.3-1



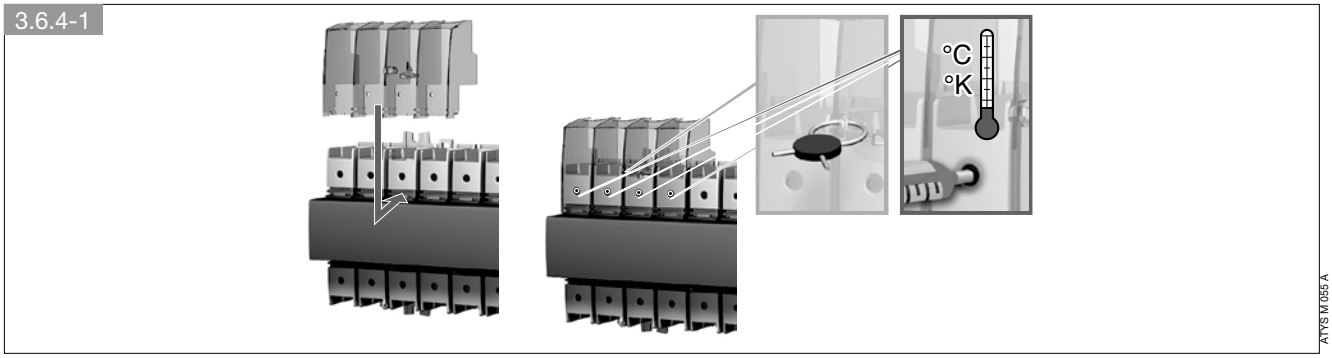
Make sure that the bridging bars is fitted the right way round.

There are two references available: one for ratings less than or equal to 125 A, and another for rating 160 A.

1 part/ref.

3.6.4. Terminal shrouds

3.6.4-1



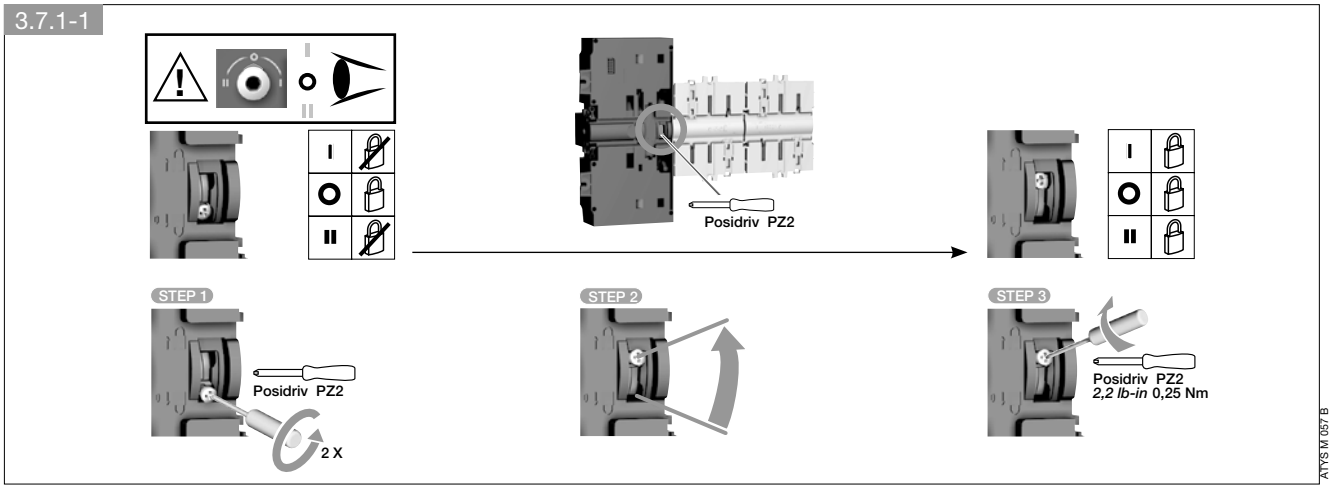
2 parts/ref.

3.7. Other functions

3.7.1. Locking: configuration on standard product

Enables locking in position 0 (factory configuration) or in position I, 0, II. It is necessary to make this adjustment before fitting the product in the cabinet or enclosure.

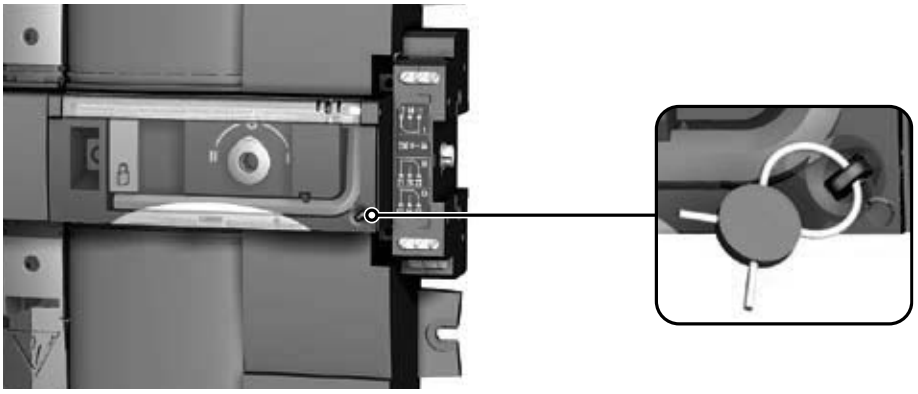
3.7.1-1



3.7. Other functions (continued)

3.7.2. Sealable Auto-Man cover

3.7.2-1



ATYS M 097 A

3.8. Fitting in the SOCOMEC modular enclosure

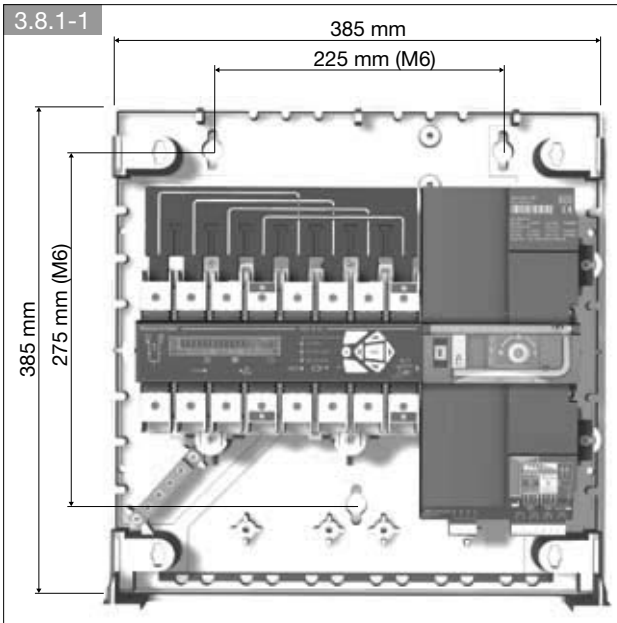
ATYS M 170 A

3.8.1. Dimensions and mounting

The enclosure must be wall-mounted using screws (not supplied).

Recommended size: M6 50 mm (minimum). Weight: between 8 and 10 kg, depending on the accessories.

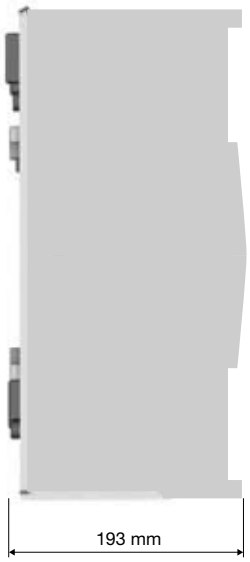
3.8.1-1



Drilling plans for the cable-routing plate provided in appendix.

ATYS M 164 A

3.8.1-2



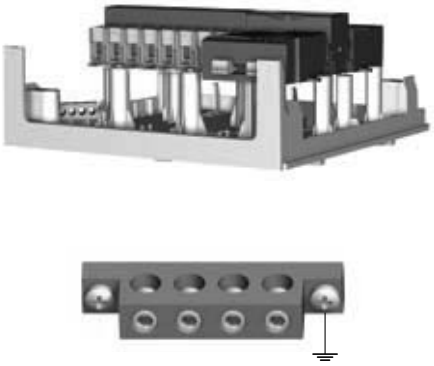
ATYS M 165 A

Only 1 auxiliary contact block mountable

3.8. Fitting in the SOCOMEC modular enclosure (continued)

3.8.2. Connection

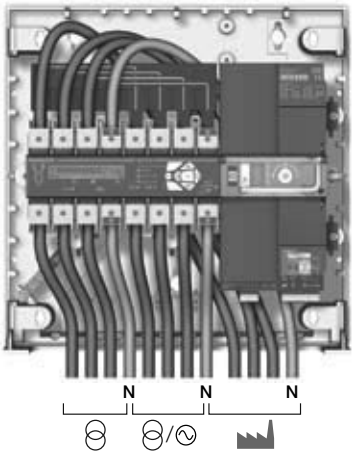
3.8.2-1



Maximum cable size: 25 mm²

ATYS M 160 A

3.8.2-2 Example: neutral on right



ATYS M 161 A

3.8.3. Ratings / cable cross-section table

	63 A	100 A	125 A	160 A
Min cable size	25	35	50	50
Max cable size	50	50	70*	70*

*With extension unit.

3.8.4. Extension unit

3.8.4-1

ATYS M 044 A

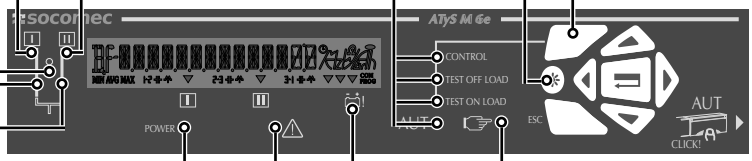
Enables you to allocate additional space to the enclosure.

4. OPERATION

4.1. Presentation of electronic module

Presentation of front panel:

The LED signalling is only active when the product supply is on (supply LED lit)



Operating and test modes

- AUT: 1 green LED lit for AUTO mode active.
- 2 yellow LEDs for the test on load and test off load which are linked to the test mode selection button so as to facilitate selection.
- 1 yellow LED for the control function. The user may force the position of the switch.

Lights test button

- Lights test button in display mode.

Availability of sources

- 2 green LEDs to indicate whether source 1 and/or source 2 are available (checking voltages and frequencies).
  - LED lit = source available.
  - LED off = source unavailable.

Mode button

- Test mode selection button.

Position of the switch

- 2 green LEDs
  - LED I lit = switch in position I
  - LED II lit = switch in position II
- 1 yellow LED
  - LED lit = switch in position 0

Manual mode

- ☞ : 1 yellow LED for MANU mode active.

Power supply LED

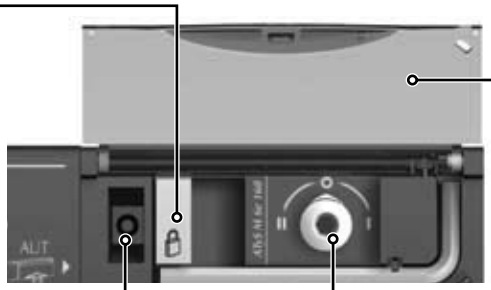
- 1 green LED
  - Always off: power supply off or software error if the other indicators are operational (LED and Screen).
  - Always lit: product power supply on.

Fault summary LED

- 1 red LED to indicate the status of the product control fault. Open and close the AUT/MAN cover to reset the fault.

Capacitor load indicator

- Loading the return to zero capacity. If the indicator flashes, the RETURN to 0 function is unavailable.



Locking

- Option to isolate (1 x 8mm max).

Manual switching

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

AUT/MAN cover

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

Switch position indicators

- Display of position I, 0, II.

ATYS M 156 A GB

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4.2. PROGRAMMING

4.2.1. General Information

Software version

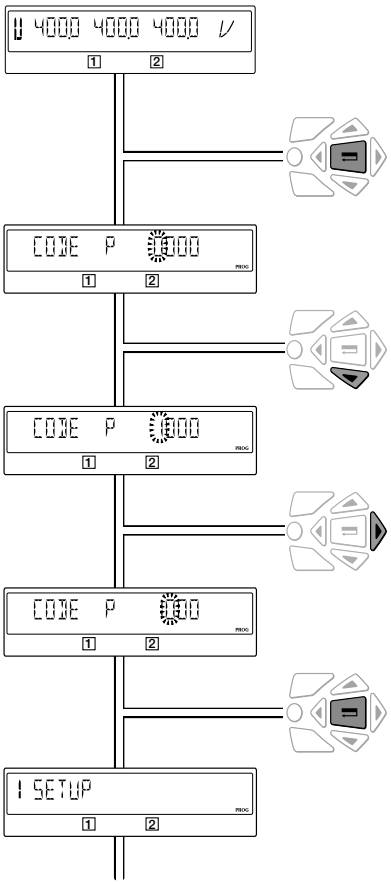
The software version is displayed after the product has been switched on and only directly after it has been off for several minutes (enabling its capacitors to fully discharge).

Product programming

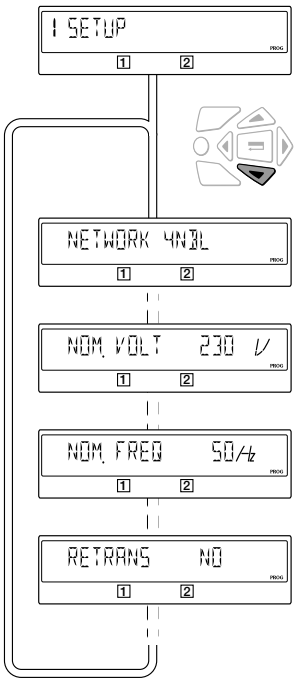
Programming mode can be entered from any operating mode (Auto/Man).

Accessing programming

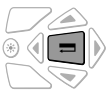
Default code: 1000



Browsing



Exit programming

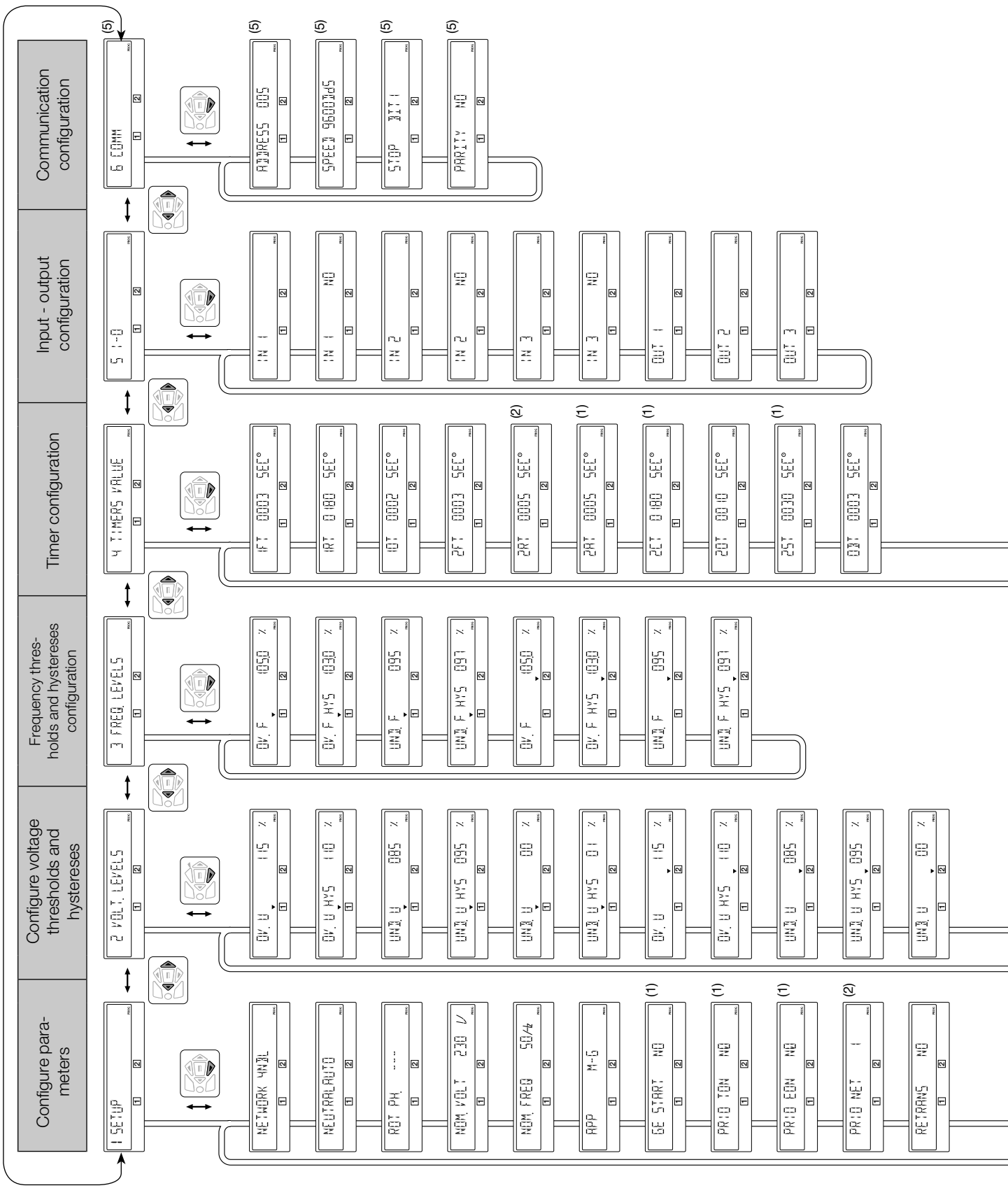


Press the validate button for 3 seconds.

4.2. Programming (continued)

4.2.2. Programming mode

Depending on the type of application managed (Network-Network or Network-genset), certain parameters in the SETUP menu may not be displayed.



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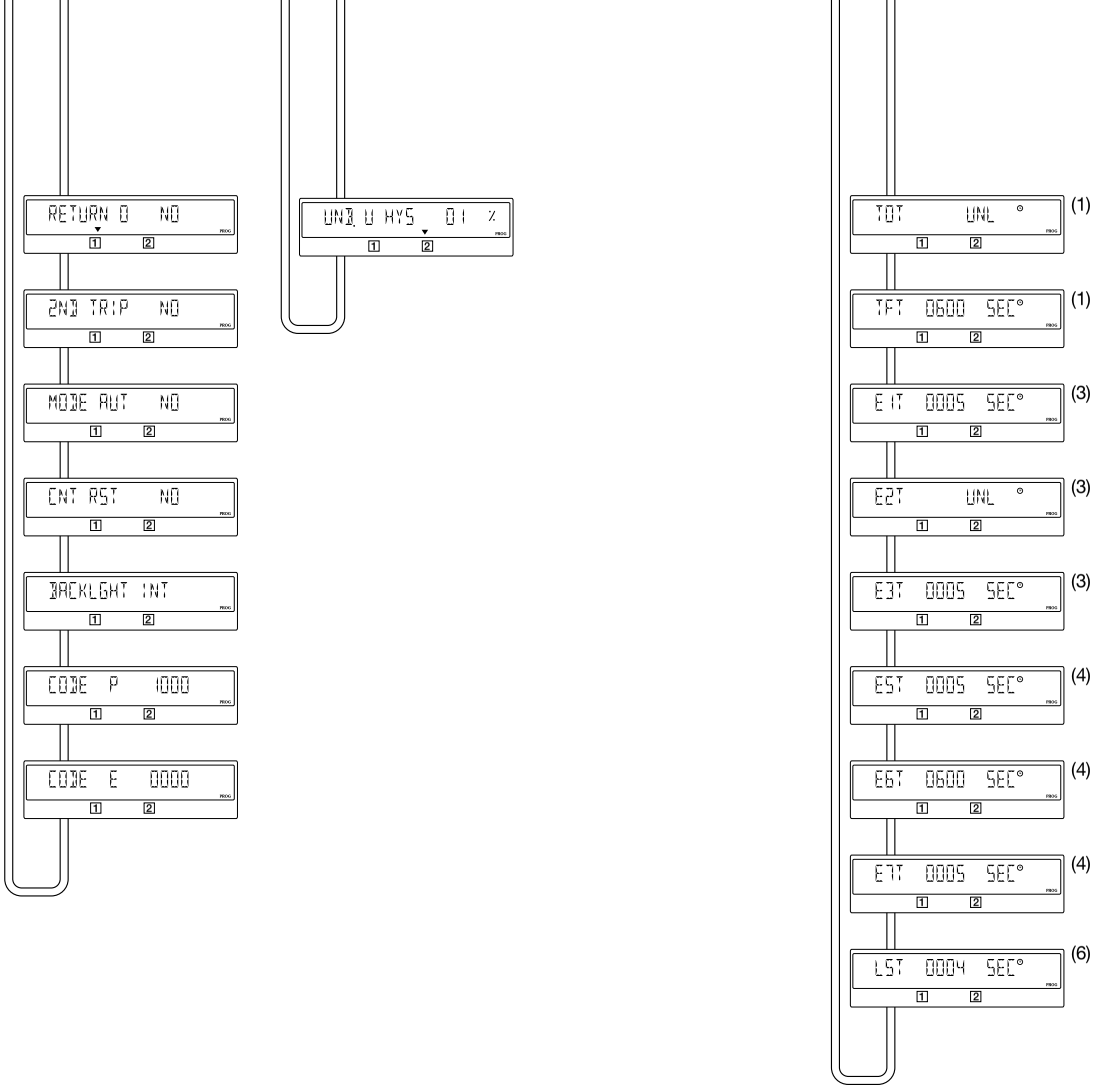
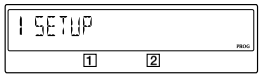


(1) Only accessible if the Setup menu variable "APP" is at "M-G", see Setup Menu
(2) Only accessible if the Setup menu variable "APP" is at "M-M", see Setup Menu
(3) Only accessible if one of the inputs is EON, see I/O Menu
(4) Only accessible if one of the inputs is EOF, see I/O Menu
(5) Only on the COMM version, see description in the option section
(6) Only accessible if one of the outputs is LSC, see I/O Menu
** UNL = Unlimited*

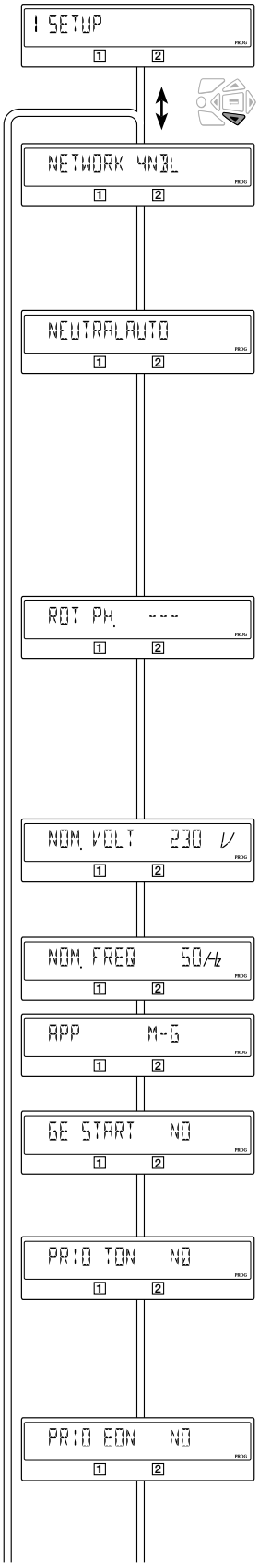
The entry point for programming mode is the SETUP menu.



Parameters must always be adjusted and verified for compliance with the application.
The default values are loaded as standard.

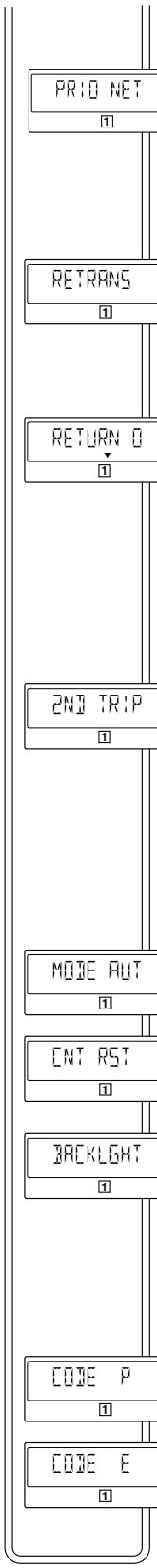
4.2. Programming (continued)

4.2.3. SETUP Menu



Definition		Adjustment range	Default values	M-G*	M-M*
NETWORK	Network type	4NBL/41NBL/ 42NBL/1BL/3NBL (230/400V version) 4NBL/3NBL/2NBL/ 2BL/42NBL (127/230V version)	4NBL	●	●
NEUTRAL	Position of neutral - **AUTO**: neutral position is set automatically upon every power-up - **LEFT**: neutral must be connected on the left, i.e. to terminal 7 of each switch - **RIGHT**: neutral must be connected on the right, i.e. to terminal 1 of each switch	AUTO LEFT RIGHT	AUTO	●	●
ROT PH. (see next page)	The phase rotation can be selected as clockwise (ACB) or anti-clockwise (ABC). It is also possible to just check for consistency of direction of rotation between 2 sources (----).To do so the 2 sources must be simultaneously present, for example during the initial wiring.	ABC ACB ---	- - -	●	●
NOM. VOLT	Nominal phase-phase voltage. Except for 1BL and 41NBL networks, where it is nominal phase-neutral voltage.	from 180 to 480 V AC (230/400V version) from 180 to 280V AC (127/230V version)	400V AC (230/400V version) 230V AC (127/230V version)	●	●
NOM. FREQ	Rated frequency	50 or 60 Hz	50 Hz	●	●
APP	Application type: - **M-G**: between a network and genset - **M-M**: between two networks	M-G M-M	M-G	●	●
GS START	Generator start signal output status at rest - **NO**: Normally Open - **NC**: Normally Closed	NO NC	NO	●	
PRIO TON	In case of an On Load Test, if the source 2 is no longer available you can - **NO**: exit the test and switch to source 1 - **YES**: stay in position II. The MSR input has priority over this parameter	NO YES	NO	●	
PRIO EON	The same as in External On Load, - **NO**: exit the test and switch to source 1 - **YES**: stay in position II. The MSR input has priority over this parameter	NO YES	NO	●	

* M-G: network - genset application - M-M: network - network application
• = time delay present in M-G and/or M-M application



Definition		Adjustment range	Default values	M-G*	M-M*
PRIO NET	This is for defining the priority network: - **1**: network 1 has priority - **2**: network 2 has priority - **0**: no network has priority: one is backing up the other. The PRI input has priority over this parameter	1 2 0	1		●
RETRANS	Automatic retransfer inhibited - **NO**: automatic retransfer to the priority source - **YES**: "valid" must be pressed to execute the return	NO YES	NO	●	●
RETURN 0 (1)	In case of source failure, the product automatically switches over to 0 (after a 10T or 20T time delay) - **NO**: the product remains in position if the source is lost - **YES**: this function is activated If there are 2 sources down, the power reserve must be available to execute this function (see indicator on front panel)	NO YES	NO	●	●
2ND TRIP (2)	This function makes it possible to wait for the power reserve to become available before exiting position 0 to adopt a source again. - **NO**: Return to the source without waiting for the reserve to be fully charged - **YES**: Wait for the reserve to be fully charged before returning to the source. A second trip will therefore be immediately available	NO YES	NO	●	●
MOD AUT	AUTO mode forced, in spite of cover not being closed.	NO YES	NO	●	●
CNT RST	Switchover counter reset (number of manoeuvres) Returns to NO after reset	NO YES	NO	●	●
BACKLGHT	The screen backlighting can be set to: - **OFF**: always off - **ON**: always lit - **INT**: lit during operating sequences and then turned off after 30 seconds' inactivity on the keypad	OFF ON INT	INT	●	●
CODE P	Modifying input code in Programming mode	0000 to 9999	1000	●	●
CODE E	Modifying input code in Operating mode	0000 to 9999	0000	●	●

* M-G: network - genset application - M-M: network - network application
• = time delay present in M-G and/or M-M application

(1) The RETURN to 0 function, upon the source voltage 1 or source being lost 2, opens the switch (II=>0 or I=>0) of the source in question after a time delay (10T or 20T). For instance, this solution provides the possibility of opening the switch after a short-circuit. This also makes it possible to restart the genset after a fault, without being connected to the load.

(2) The 2nd TRIP parameter is associated with the RETURN to 0 function, as the latter requires a power reserve for the changeover. So to execute a second trip, you need to wait for this power reserve to recharge.

4.2. Programming (continued)

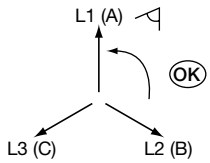
4.2.3. SETUP Menu (continued)

Phase rotation check: this functionality verifies the consistency of phase rotation i.e. of the wiring prior to commissioning.

Example

If the parameter ROT PH = ABC:

4.2.3-1



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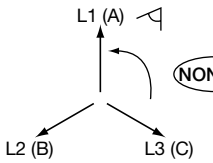
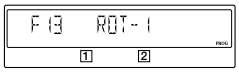
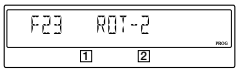
4.2.3-2



ATYS 220 B GB

Display 

or 

depending on the non-compliant source.

Rotation check on sources 1 and 2.

Function active on both sources with a 4NBL or 3NBL type network, and only on source 1 with a 41NBL or 42NBL network (see network configurations).

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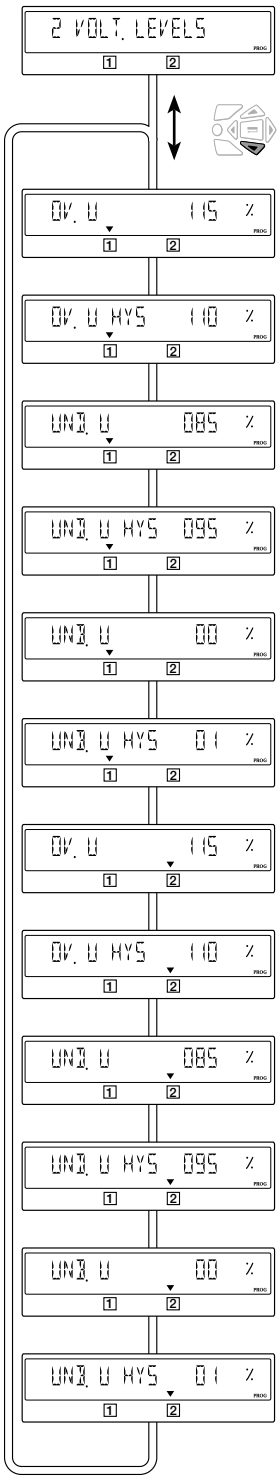
4.2. Programming (continued)

4.2.4. VOLT. LEVELS Menu



Definition		Adjustment range	Default values
OV U	Source [1] over-voltage detection (In percentage of the NOM. VOLT, Setup menu)	102 - 120%	115%
OV U HYS	Source [1] over-voltage hysteresis (In percentage of the NOM. VOLT, Setup menu)	101 - 119%	110%
UND.U	Source [1] under-voltage detection (In percentage of the NOM. VOLT, Setup menu)	60 - 98%	85%
UND.U HYS	Source [1] under-voltage hysteresis (In percentage of the NOM. VOLT, Setup menu)	61 - 99%	95%
UNB. U	Source unbalance detection [1] (see next paragraph)	00 - 30%	00%
UNB. U HYS	Hysteresis unbalance detection [1] (see next paragraph)	01 - 29%	01%
OV U	Source [2] over-voltage detection (In percentage of the NOM. VOLT, Setup menu)	102 - 120%	115%
OV U HYS	Source [2] over-voltage hysteresis (In percentage of the NOM. VOLT, Setup menu)	101 - 119%	110%
UND.U	Source [2] under-voltage detection (As percentage of NOM. VOLT, Setup menu)	60 - 98%	85%
UND.U HYS	Source [2] under-voltage hysteresis (In percentage of the NOM. VOLT, Setup menu)	61 - 99%	95%
UNB.U	Source unbalance detection [2] (see next paragraph)	00 - 30%	00%
UNB.U HYS	Hysteresis unbalance detection [2] (see next paragraph)	01 - 29%	01%

4.2. Programming (continued)

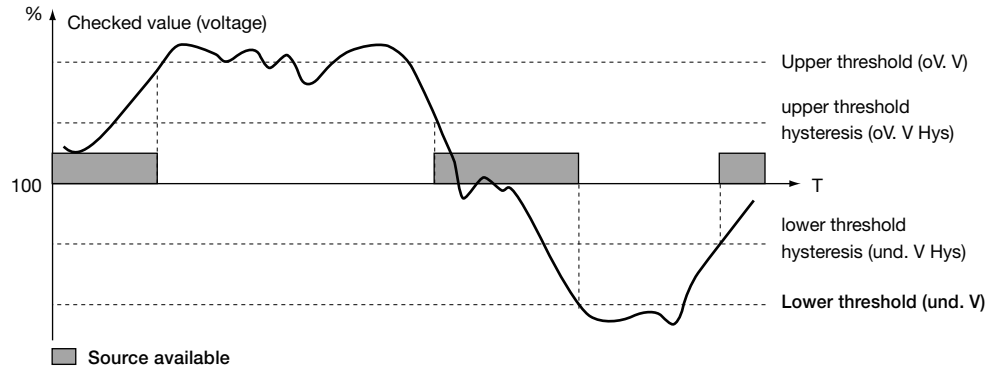
4.2.4. VOLT. LEVELS Menu (continued)

• 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.

4.2.4-1



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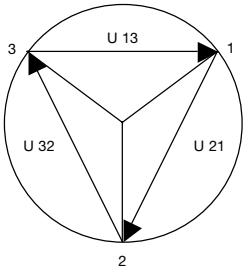
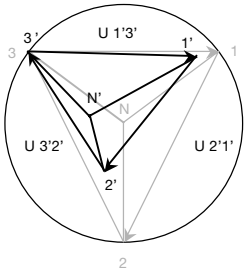
• Voltage unbalance measurement



Network balanced



Network unbalanced

The unbalance reading is derived from the formula below

$$U_{nba} = \frac{\max\left(\left|U_{12} - U_{avg}\right|, \left|U_{23} - U_{avg}\right|, \left|U_{31} - U_{avg}\right|\right)}{U_{avg}} \quad \text{where} \quad U_{avg} = \frac{U_{12} + U_{23} + U_{31}}{3}$$

Example of an unbalanced network: U_{12} = 352 V AC U_{23} = 400 V AC U_{31} = 370 V AC

U_{avg} = (352+400+370)/3 = 374 V AC

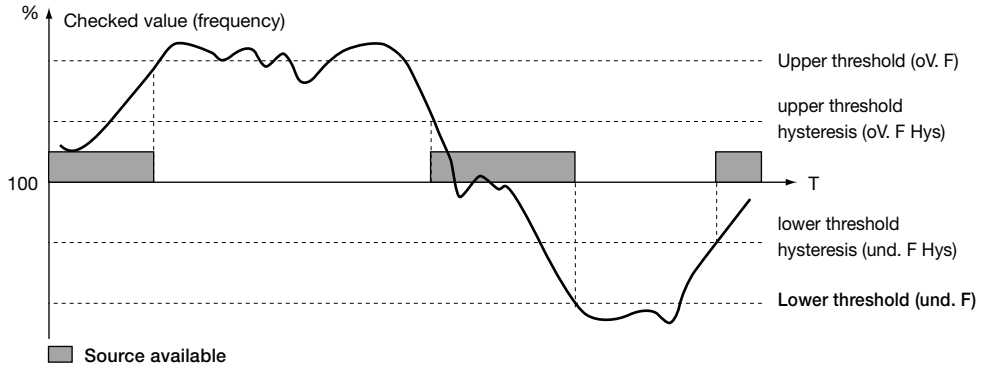
U_{nba} = 26/374 = 0.069 => Unbalance threshold rate 7%

4.2. Programming (continued)

4.2.5. FREQ. LEVELS Menu

The thresholds and hystereses are defined as percentages of nominal frequency.
The hystereses define return to normal levels following an under-frequency or over-frequency.

4.2.5-1



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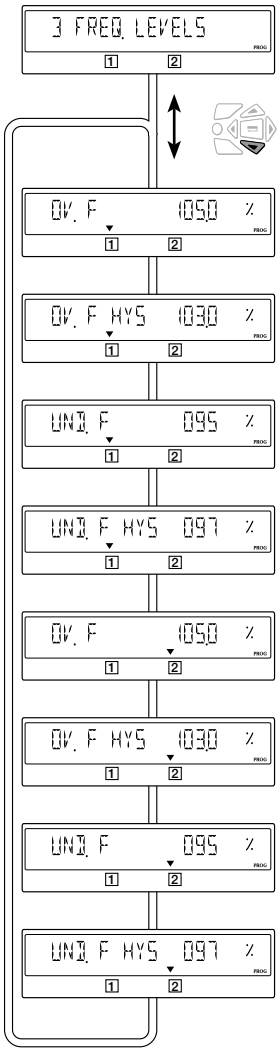
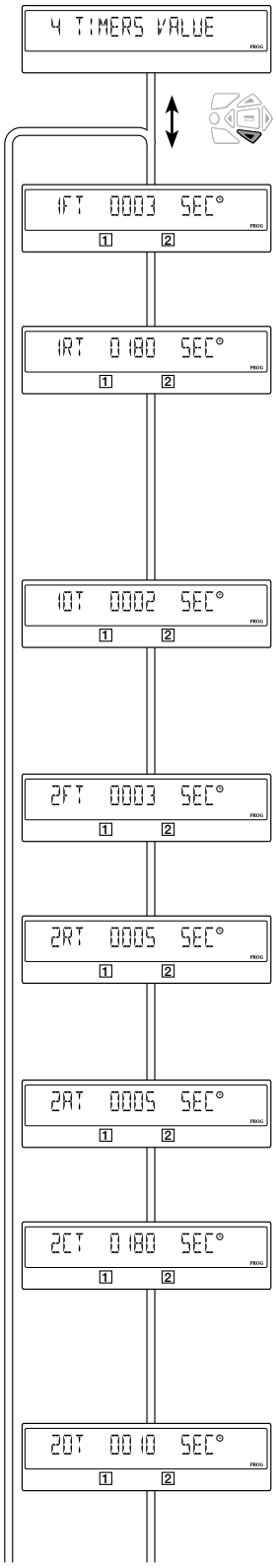


Definition		Adjustment range	Default values
OV F	Source [1] over-frequency detection (In percentage of the NOM. FREQ menu Setup)	101 - 120%	105%
OV F HYS	Source [1] over-frequency hysteresis (In percentage of the NOM. FREQ menu Setup)	100.5 - 119.5%	103%
UND.F	Source [1] under-frequency detection (In percentage of the NOM. FREQ menu Setup)	60 - 99%	95%
UND.F HYS	Source [1] under-frequency hysteresis (In percentage of the NOM. FREQ menu Setup)	60.5 - 99.5%	97%
OV. F	Source [2] over-frequency detection (In percentage of the NOM. FREQ menu Setup)	101% - 120%	105%
OV. F HYS	Source [2] over-frequency hysteresis (In percentage of the NOM. FREQ menu Setup)	100.5 - 119.5%	103%
UND.F	Source [2] under-frequency detection (In percentage of the NOM. FREQ menu Setup)	60 - 99%	95%
UND.F HYS	Source [2] under-frequency hysteresis (In percentage of the NOM. FREQ menu Setup)	60.5 - 99.5%	97%

4.2. Programming (continued)

4.2.6. TIMERS Menu



	Definition	Adjustment range	Default values	M-G*	M-M*
1FT	Source 1 loss time delay (**1 F**ailure **T**imer) When source 1 disappears, 1FT is started. If source 1 is restored before the end of 1FT, the switchover cycle is not engaged.	from 0 to 60 secs	3 second	●	●
1RT	Source 1 restoration time delay (**1 R**eturn **T**imer) When source 1 reappears, 1RT is started. At the end of 1RT, source 1 is considered as present. If source 1 disappears before the end of 1RT, the switchover is not executed. If the replacement source disappears during 1RT, the latter dynamically adopts the 3 s setting value temporarily.	from 0 to 3600 secs	180 second	●	●
10T	Return to zero time delay from source 1 (**1** to **0 T**imer) Only accessible if the parameter RETURN 0 is activated. Waiting time delay following source 1 failure, before switchover to position 0. This time delay avoids opening directly to short-circuit.	from 0 to 10 secs	2 second	●	●
2FT	Source 2 loss time delay (**2 F**ailure **T**imer) If source 2 disappears, 2FT is started. If source 2 is restored before the end of 2FT, the switchover cycle is not engaged.	from 0 to 60 secs	3 second	●	●
2RT	Source 2 restoration time delay (**2 R**eturn **T**imer) When source 2 reappears, 2RT is started. At the end of 2RT, source 2 is considered as present. If source 2 disappears before the end of 2RT, the switchover is not executed.	from 0 to 60 secs	5 second		●
2AT	Stabilisation time delay (**2 A**vailable **T**imer) Stabilisation time delay for voltage and frequency on Source 2. This time delay must be completed to enable transfer to Source 2	from 0 to 60 secs	5 second	●	
2CT	Genset cooling time delay (source 2) (**2 C**ool **T**imer) Following a switchover sequence, and after returning to source 1, source 2 (genset) is kept running for 2CT to enable it to cool down.	from 0 to 600 secs	180 second	●	
20T	Return to zero time delay from source 2 (**2** to **0 T**imer) Only accessible if the Setup menu parameter RETURN 0 is activated. Waiting time delay following source 2 failure, before switchover to position 0. This time delay avoids opening directly to short-circuit.	from 0 to 10 secs	10 second	●	●

* M-G: network - genset application - M-M: network-network application

• = timer present on M-G and/or M-M applications

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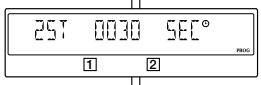
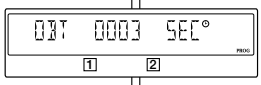
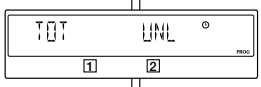
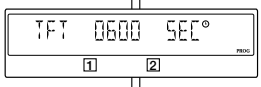
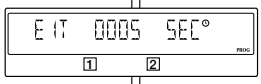
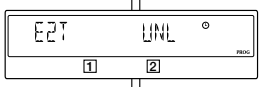
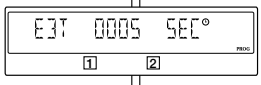
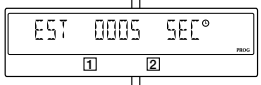
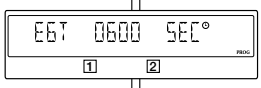
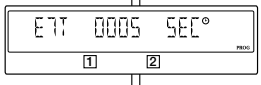
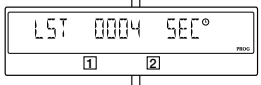
					M-G*	M-M*
	2ST	Genset starting timeout delay (source 2) (**2 S**tart **T**imer) Time delay started at the same time as the starting request. If after 2ST source 2 (genset) has not started, an error message is displayed: "FAIL START".	from 0 to 600 secs	30 second	●	
	0DT	Minimum electric dead time delay (**0 D**ead **T**imer) This is the minimum load supply down time, possibly set to zero, so as to enable residual voltages generated by the load (engine type) to disappear.	from 0 to 20 secs	3 second	●	●
	TOT	"On Load Test" duration time delay (**T**est **O**n Load **T**imer) This time delay defines the On Load Test time. It starts when the Test is initiated. The return to the network takes place at the end of TOT.	UNL (unlimited)/LMT (from 10 to 1800 secs)	UNL	●	
	TFT	"Off Load test" time delay (**T**est off **L**oad **T**imer) This time delay defines the Off Load Test duration.	UNL (unlimited) / LMT (from 10 to 1800 secs)	UNL	●	
	E1T (1)	"On Load external operation" request time delay (start) This time delay starts at the same time as the EON order. At the end of this time delay, switchover to source 2 is executed.	from 0 to 1800 secs	5 second	●	
	E2T (1)	"On Load external operation" request time delay (duration) This time delay defines the EON order time.	UNL (unlimited)/LMT (from 10 to 1800 secs)	UNL	●	
	E3T (1)	"On Load external operation" request time delay (End) This time delay is counted from the end of the EON order, and only after this time delay is the switchover to source 1 executed.	from 0 to 1800 secs	5 second	●	
	E5T (2)	"Off load external operation" request time delay (start) This time delay starts at the same time as the EOF order. At the end of this time delay, the genset starting order is sent.	from 0 to 1800 secs	5 second	●	
	E6T (2)	"Off load external operation" request time delay (duration) This time delay defines the EOF order time.	from 0 to 1800 secs	600 second	●	
	E7T (2)	"Off load external operation" request time delay (end) This time delay is counted from the end of the EOF order, and only after this time delay will time delay 2CT start, before the genset is stopped.	from 0 to 1800 secs	5 second	●	
	LST	Load shedding time delay **L**oad **S**hedding **T**imer This time delay corresponds to the time available to perform the load shedding operation.	from 0 to 60 secs	4 second	●	●

* M-G: network - genset application - M-M: network-network application

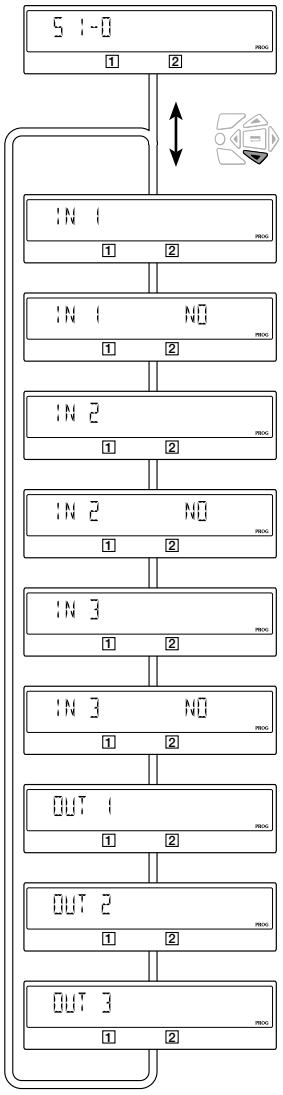
• = timer present on M-G and/or M-M applications

(1): these time delays are only accessible and configurable if at least one programmable input is configured with the variable EON (see I/0 menu)

(2): these time delays are only accessible and configurable if at least one programmable input is configured with the variable EOF (see I/0 menu)

4.2. Programming (continued)

4.2.7. I-O menu



Variable	Definition	Adjustment range	Default value
IN I	Input 1	see table on next page	/
IN I	Input 1 status	NO or NC	NO
IN 2	Input 2	see table on next page	/
IN 2	Input 2 status	NO or NC	NO
IN 3	Input 3	see table on next page	/
IN 3	Input 3 status	NO or NC	NO
Out 1	Output 1	see table on next page	/
Out 2	Output 2	see table on next page	/
Out 3	Output 3	see table on next page	/

4.2. Programming (continued)

4.2.7. I-O menu

• Inputs / Outputs

	M-G Network/Genset		M-M Network/Network	
	M	G	M	M
Input functions				
Automatic operation inhibited	INH			
On load test	TON		/	
Off load test	TOF		/	
Delayable external on load operation request	EON		/	
Delayable external off load operation request	EOF		/	
Forcing to source 2 (genset) in TON and EON mode	MSR		/	
Source priority	/		PRI	
Confirms mains restoration	RTC			
Fault reset	RST			
Source 1 / source 2 alarm	AL1	AL2	AL1	AL2
Source 1 / source 2 fault	FT1	FT2	FT1	FT2
Source 1 / source 2 external availability signal	OA1	OA2	OA1	OA2
Stabilisation time delay bypass	SS1	SS2	SS1	SS2
Position I / position II command	PS1	PS2	PS1	PS2
Position 0 command	PS0			
Load shedding time delay bypass	LSI			
Output functions				
Source 1 / source 2 available	S1A	S2A	S1A	S2A
One source available	SCA			
Position I / position II auxiliary contact	AC1	AC2	AC1	AC2
Position 0 auxiliary contact	AC0			
Load supplied by source 1 / by source 2	LO1	LO2	LO1	LO2
Load shedding command	LSC			
Fault summary	FLT			
Product operational (no fault + product in Auto mode)	POP			
Input 1 copy	CP1			
Input 2 copy	CP2			
Input 3 copy	CP3			

4.2. Programming (continued)

4.2.7. I-O menu (continued)

• Inputs

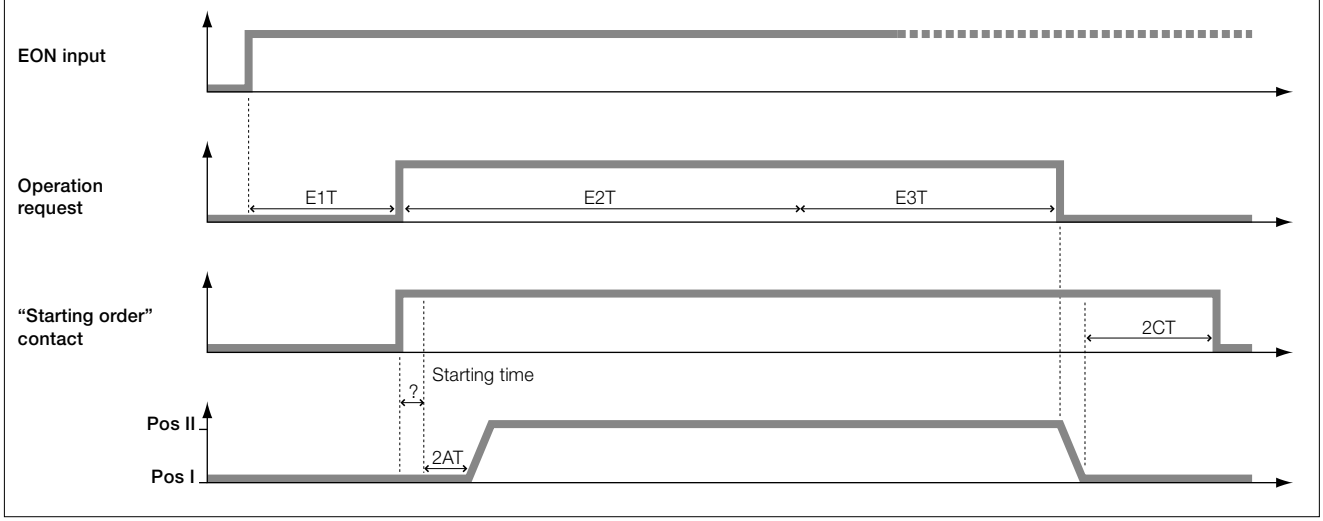
Automatic operation inhibited	
INH	Automatic operation inhibited, operation the same as manual mode. All automatic commands will be inhibited. The gen start contact status does not change upon activation.
On load test	
TON	Activates on load test. Retransfer remains locked until contact is deactivated.
Off load test	
TOF	Activates off load test (genset started and stopped).
External on load operation request, delayable	
EON	Activates an operating cycle depending on time delays E1T, E2T, E3T. These time delays have to be set in the TIMERS menu (operation: see graphs below).
External off load operation request, delayable	
EOF	Activates "Start Gen" contact (genset starting) (source 2) according to time delays E5T, E6T, E7T. These time delays have to be set in the TIMERS menu (operation: the same as the input EON, without load switchover).
Forcing to source 2 (Genset) in TON and EON mode	
MSR	During an on load test or a delayable external on load operation request, validating the input enables you to remain in back-up position in all circumstances (loss of this source), as long as the test is active. This input has priority over parameters PRIO TON and PRIO EON.
Confirms return to priority source	
RTC	Remote manual transfer. Transfer back to source 1 initiated upon the contact closing (one second front). Same function as the variable "RETRANS" cleared with the keypad. This SETUP menu variable must also be at YES to validate operation by the input.
Source priority	
PRI	Defines the priority source. It is equivalent to, but with priority over, the SETUP menu parameter PRIO NET.
Stabilisation time delay bypass (Time delay 2AT)	
SS1 / SS2	Remote transfer check. It is possible to initiate the transfer from source 1 to source 2 (and vice versa) before the end of the time delay 1RT/2RT/2AT countdown, depending on the application type. If the latter is set to its maximum value, it is possible to transfer by activating the contact (for a minimum of one second).
Positions I, II and 0 command	
PS1/PS2/PS0	Position I / position II / position 0 command. When the command disappears the product returns to automatic mode. The last command received has priority. Command 0 has priority over commands I and II. NB, switching to Pos I (Pos II) is only possible if source 1 (source 2) is present.
Source 1 / source 2 alarm	
AL1 / AL2	Informs the user by flashing the fault LED and indicating F12 ALR - 1 / F22 ALR - 2 on the screen. This message disappears along with the alarm
Source 1 / source 2 fault	
FT1 / FT2	Informs the user by flashing the fault LED and indicating F11 FLT - 1 / F21 FLT - 2 on the screen. Disappears after validation and reset (by activating RST input, opening and then closing the cover or via RS485). Immediately shifts the changeover switch to position 0, without 10T or 20T time delay. NB, only works if the 2nd TRIP parameter is activated.
Source 1 / source 2 external availability signal	
0A1 / 0A2	Availability signal for source 1 (source 2). This input is used instead of the voltage and frequency measurement taken
Fault reset	
RST	Clears a fault
Load shedding bypass	
LSI	This input bypasses the LST time delay, (signal indicating correct load shedding).

4.2. Programming (continued)

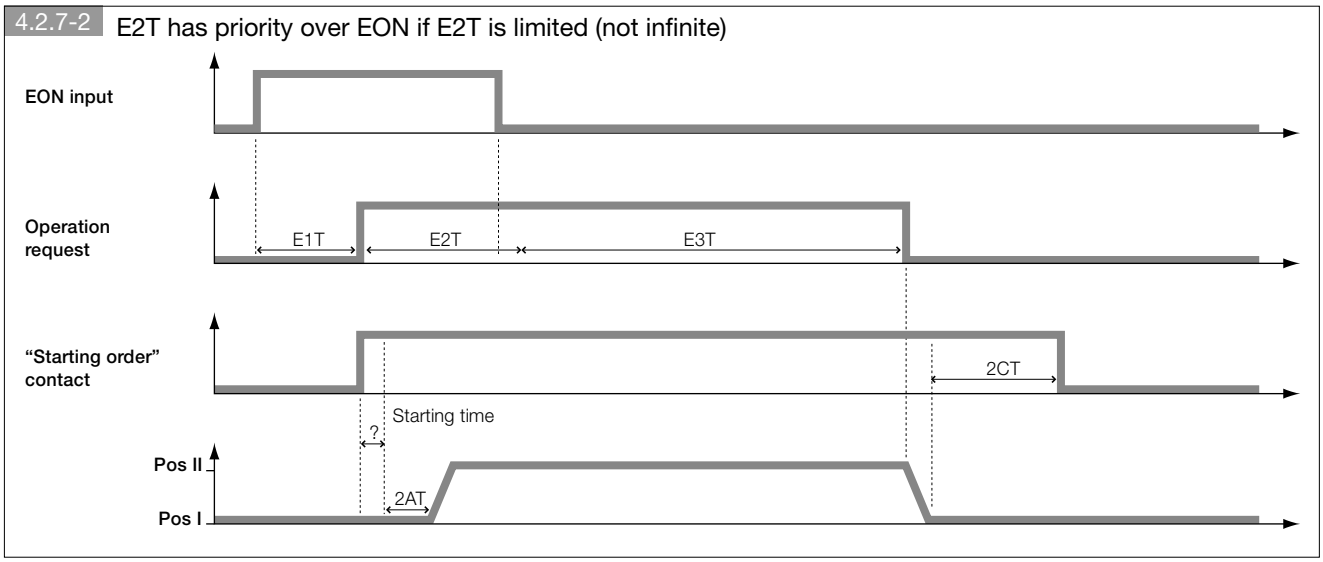
4.2.7. I-O menu (continued)

• **Explanation of how EON works**

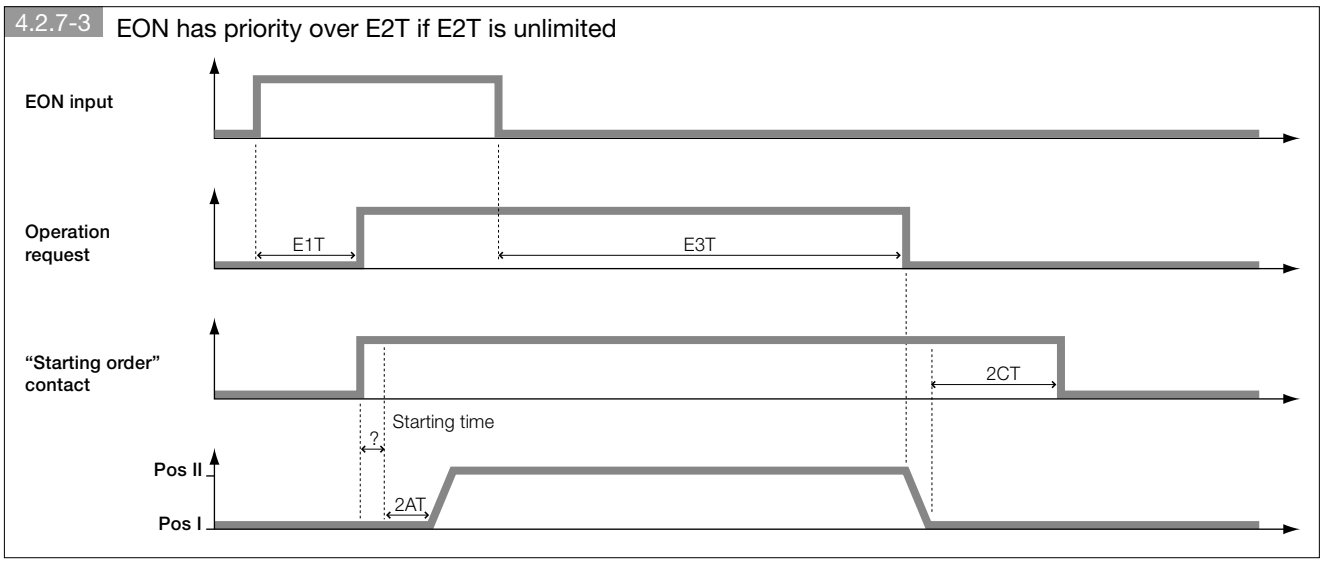
4.2.7-1 E2T limited



4.2.7-2 E2T has priority over EON if E2T is limited (not infinite)



4.2.7-3 EON has priority over E2T if E2T is unlimited



4.2. Programming (continued)

4.2.7. I-O menu (continued)

• **Outputs**

Source available	
S1A /S2A	Source 1 / Source 2 available. Output activated (closed) if source 1 / source 2 is within the defined setting ranges (operation same as LED on front panel).
At least one source available	
SCA	Source 1 or 2 available. Output activated (closed) if at least one of the 2 sources is within the defined settings ranges.
Position auxiliary contact	
AC1/AC2/AC0	Outputs activated respectively when product is in position I / position II / position 0.
Load supplied by source 1 / by source 2	
LO1 / LO2	Indicates which source is supplying the load. Output LO1 / LO2 activated if the 2 following conditions are simultaneously validated: position I / position II is closed and source 1 / source 2 is available (LO1 = AC1 and S1A / LO2 = AC2 and S2A)
Load shedding command	
LSC	Load shedding relay. Initiates a load shedding action before transfer to back-up source, and then reloading after restoration. Operation described below.
Fault summary	
FLT	Output activated (closed) if at least one fault (internal or transferred external) is activated.
Product operational (no fault + product in Auto mode)	
POP	Output activated (closed) if the product is deemed "operational" i.e. it is in AUT mode, the supply is present and no fault is detected.
Input copy	
CP1/CP2/CP3	The output adopts the same status as input 1 / input 2 / input 3. Function same as relaying.

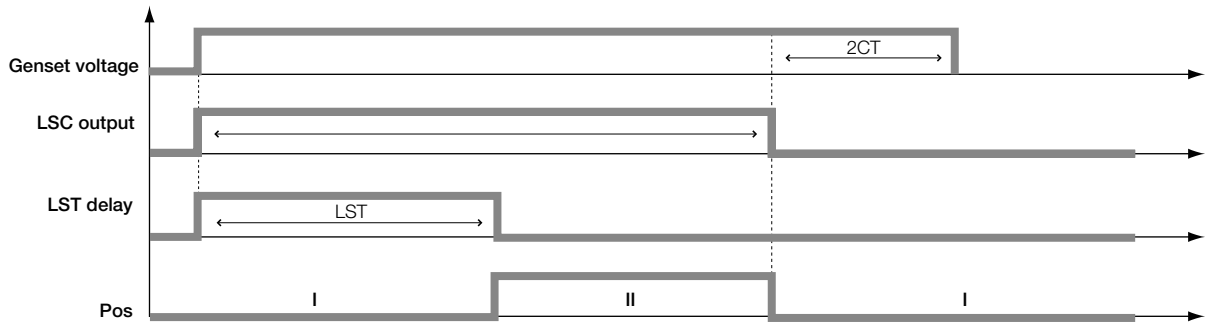
4.2. Programming (continued)

4.2.7. I-O menu (continued)

• Explanation of how LSC works

If the output LSC is selected, the associated time delay LST should be programmed (see Timers Menu).

4.2.7-4 Scenario 1: LSI input inactive



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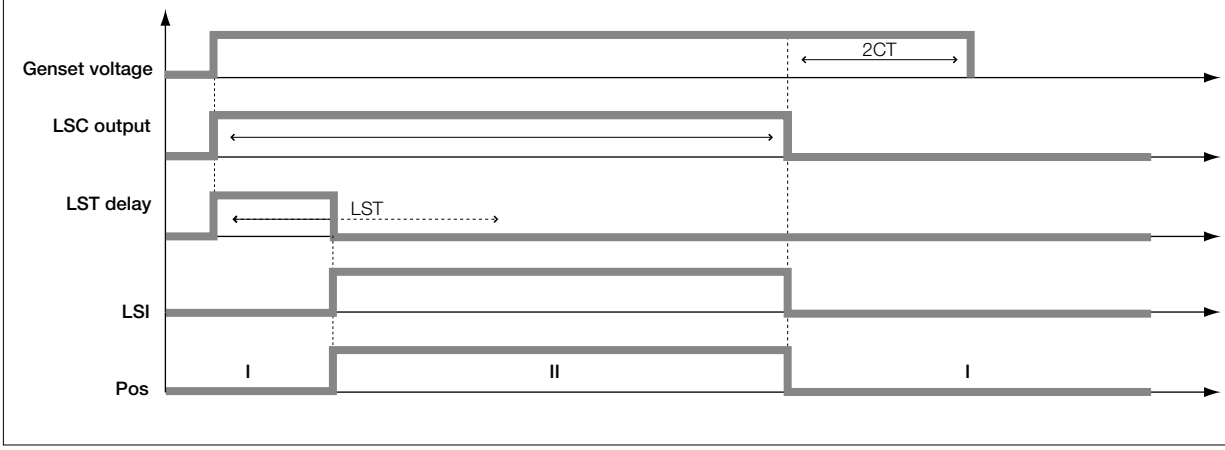
4.2.7-5 Scenario 2: LSI input active



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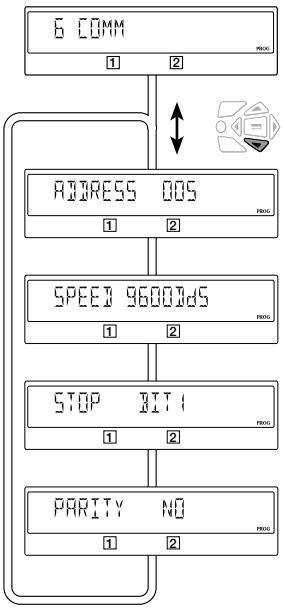
4.2. Programming (continued)

4.2.8. COMM Menu



Variable	Definition	Adjustment range	Default value
Address	Address of communicating device	1 to 255	5
Speed	Communication speed	2400, 4800 9600, 19200 38400	9600
Stop bit		1, 2	1
Parity bit		NO, ODD, EVE	NO

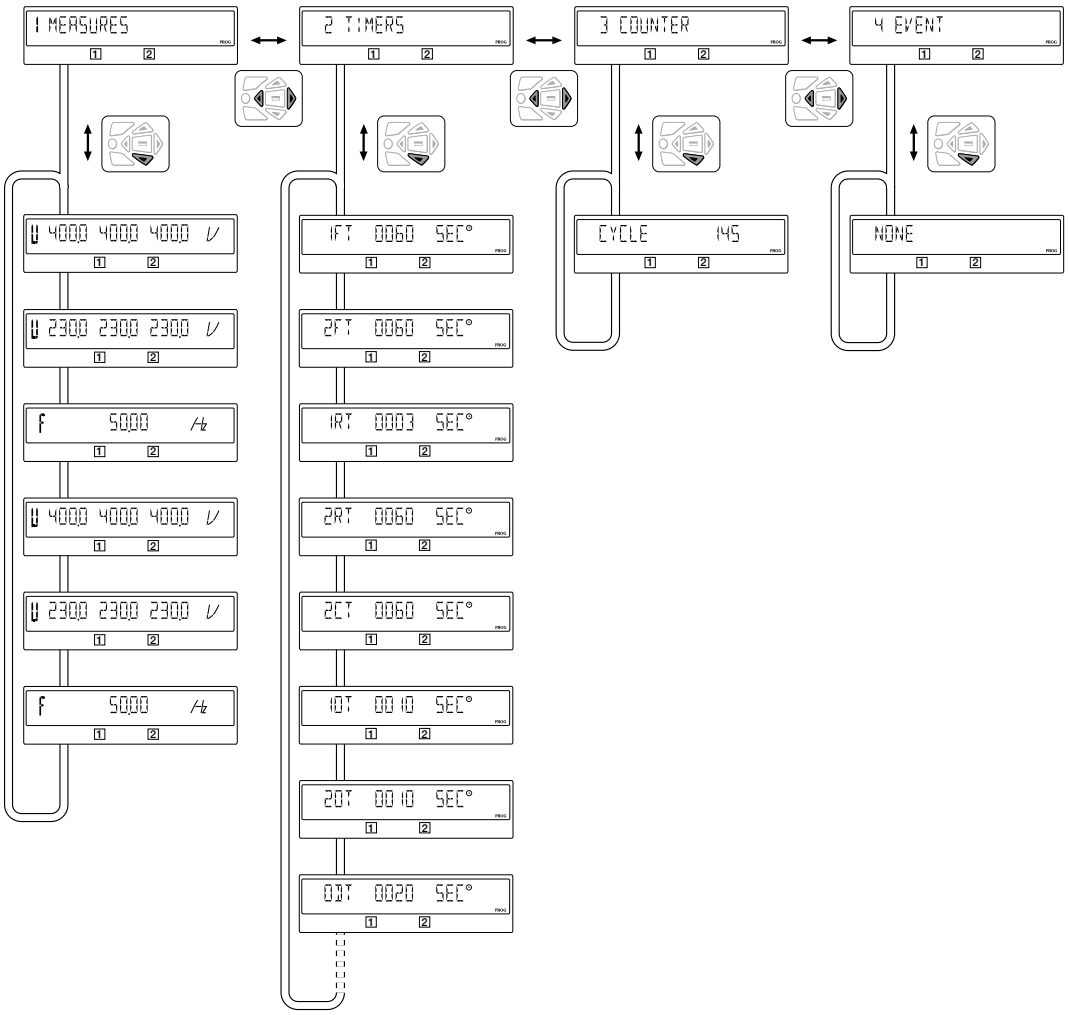
Only available on version with Comm.

Detailed explanation in chapter 4.9. Common

4.3. Display

4.3.1. Presentation

- Display mode is activated as soon as the device is switched on. It enables you to view the various parameters, regardless of the cover position or the activated mode.
- The switchover cycles have priority over display mode, and display the time delay countdowns as soon as they are activated. Any value available in this mode is kept on the screen once displayed for 5 secs. After this time, or following a switchover cycle, the screen returns to the source phase-phase voltages display 1 (1st screen in this mode).



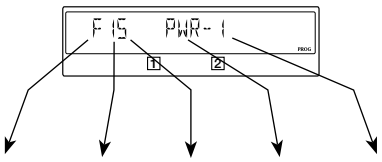
Dynamic display of derived time delays has priority.

The alarms status display also has priority.

4.3. Display (continued)

4.3.2. Encoding principle

Example



Fault Source1 No. 5 Password Source 1

No.	Status message	Fault message
0	Manual switching	Duty cycle
1	Under-voltage	Fault
2	Over-voltage	Alarm
3	Under-frequency	Neutral wiring / Phase rotation mismatch
4	Over-frequency	Capacitor back to 0
5	Phase unbalance	Insufficient switchover power
6	Phase rotation	Position not reached

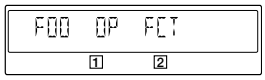
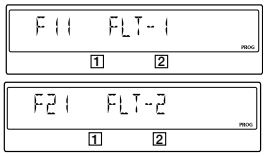
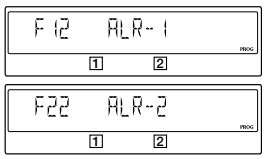
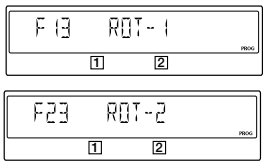
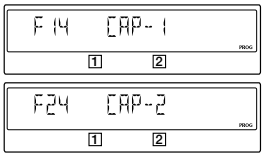
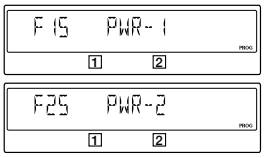
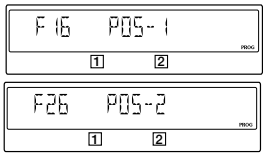
4.3.3. Events list

Message	Definition
M00 MANUAL	Manual switching
M11 UV1	Under-voltage on source 1
M21 UV2	Under-voltage on source 2
M12 OV1	Over-voltage on source 1
M22 OV2	Over-voltage on source 2
M13 UF1	Under-frequency on source 1
M23 UF2	Under-frequency on source 2

Message	Definition
M14 OF1	Over-frequency on source 1
M24 OF2	Over-frequency on source 2
M15 UNB1	Phase unbalance on source 1
M25 UNB2	Phase unbalance on source 2
M16 ROT1	Incorrect direction of rotation on source 1
M26 ROT2	Incorrect direction of rotation on source 2

4.3. Display (continued)

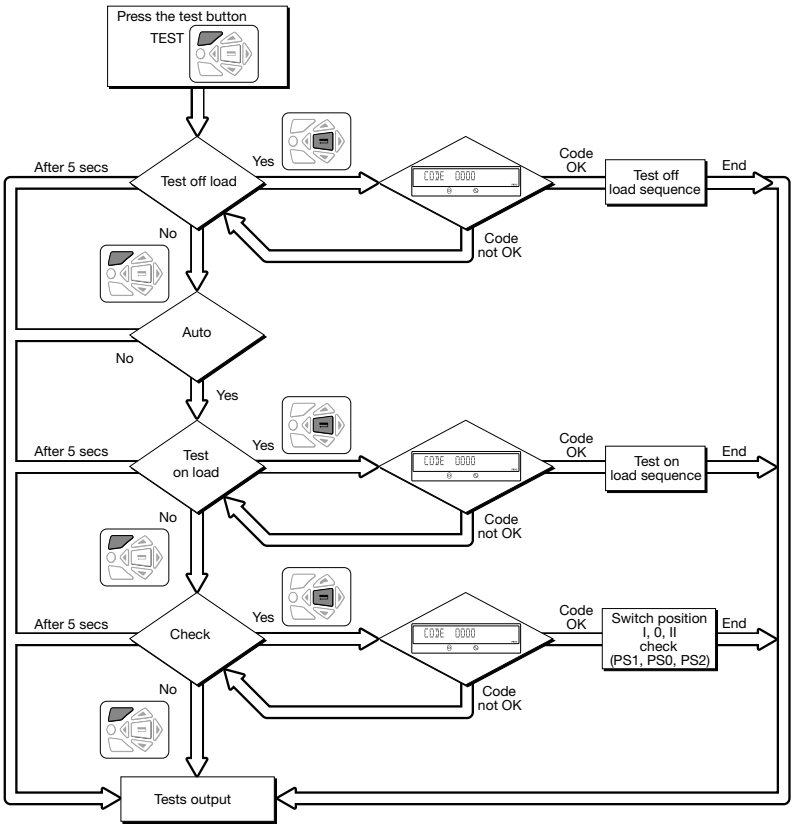
4.3.4. Error messages list

Error message	Definition	Action	Reset
	**Duty cycle**		
	Limited number of manoeuvres in a defined period.	Wait 1 min. for the error message to disappear.	Automatic
	**Source 1 / source 2 neutral wiring mismatch**		
	The neutral on source 1 is not wired on the same side as the neutral on source 2.	Rewire one of the two sources. E.g.: both neutrals on the left, or both neutrals on the right.	Open and then close the cover
	**Source 1 / source 2 fault**		
	This fault only appears if input FT1/ FT2 (see I-O Menu) and the parameter 2ND TRIP (see Setup Menu) are activated. Activation of this fault shifts the changeover switch to position 0.	Resolve the external problem that caused activation of input FT1/FT2	Open and then close the cover or activate the RST input, if configured (see I-O Menu) or via RS485.
	**Alarm 1 / Alarm 2**		
	This fault only appears if input AL1/ AL2 is activated (see I-O Menu).	Resolve the external problem that caused activation of input AL1/AL2. Once this is done, the error message will disappear automatically.	Automatic
	**Phase rotation fault on source 1 / source 2**		
	The phase rotation does not correspond to the ROT PH. variable in the Setup menu.	Either invert two phases on source 1 / source 2, or change the status of the ROT PH. variable in the Setup menu, if both sources are faulty.	Automatic
	**Return to zero capacitor charging fault on source 1 / source 2**		
	Recharging malfunction of capacitor associated with source 1 / source 2.	Provisional action: deactivate the RETURN 0 function in the Setup menu (Set to NO), or open the cover and manoeuvre manually. Then: contact your retailer.	Open then close the enclosure
	**Insufficient switchover power on source 1 / source 2**		
	The power is insufficient to leave position II/I.	Lend the power (U,I) from source 1 or 2 for at least 20 secs, or open the cover and manoeuvre manually.	Open then close the enclosure
	**Source 1 / source 2 position fault**		
	Following an electric or automatic order, position I / II is not reached.	Provisional action: open the cover and manoeuvre manually. Then: contact your retailer.	Change source status. Manual manoeuvre.
	**Source starting timeout 2**		
	If the genset does not start after the 2ST delay, the message will be sent.	Press the validation key.	Check the genset.

4.4. Operating

In operation the operator has the option of controlling switchover manually or electrically. Test modes are also available.

4.4.1. Test modes



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Off load test (M-G application only)

This test is possible in automatic or manual mode. It can be considered as a manual genset starting order without switching over the load to the genset.

• Description

- This mode enables you to test the genset without load transfer to the latter.
- The genset is started and stopped as normal (via the "Start Gen" contact).
- This test is always possible, except during a source 1 loss sequence.
- This test may be time-delayed (TOF).

• Activation

- either via the operating menu,
- or via communication (for version with COM),
- or via the ATyS D20 interface,
- or via the programmable input.

• Deactivation

- either by changing the status of the control input
- or by pressing the validation key on the keypad
- or after a genset starting timeout
- or at the end of the timer (if set)
- or in case of genset shutdown upon fault

4.4. Operating (continued)

On load test (M-G application only)

This test is only possible in automatic mode, it enables you to start the genset and simulate a complete transfer sequence.

• Description

- The purpose of this sequence is to execute a load transfer to the genset to test it, while adhering to switchover conditions.
- The time delays for validating the transfer conditions (TOT, 2ST, 2AT, 0DT, 2CT) are derived according to their configuration.
- The “mains restoration confirmation” function is always active throughout an on load test (from the keypad). It enables transfer back to source 1 in case of an unlimited on load test, or interrupts a time delayed on load test.

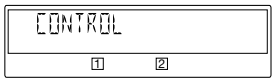
• Activation

- either via the operating menu,
- or via communication,
- or via the ATyS D20 interface,
- or via the programmable input.

• Deactivation

- either by changing the status of the control input
- or by pressing the validation key on the keypad
- or after a genset starting timeout
- or at the end of the timer (if set)
- or in case of genset shutdown upon fault

Changeover switch position I, 0 and II check (accessible in AUT mode)



• Description

Changeover switch electrical position check: PS1, PS0, PS2.

• Activation

- either via the operating menu. It will then be possible to force one of the positions I, O, II via the keypad,
- or by via communication (for version with COM),
- or via the ATyS D20 interface,
- or via the programmable input.

• Deactivation

- either via the Escape key
- or by switching from Auto mode to Man. mode.

The check takes priority over all functions.

4.5. Manual mode

To access manual mode, open the cover or use the input INH.

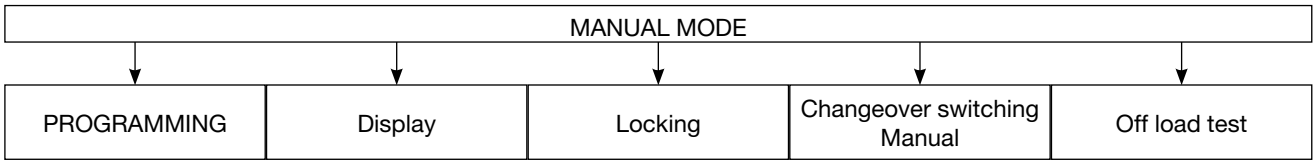
Once manual mode is active (cover open) it is possible:

- To access the programming and display menus.
- To lock the changeover switch.
- To manoeuvre the changeover switch using the handle.
- To start the genset via the off load test.

As soon as manual mode is activated, all automatic actions are inhibited (except the starting order in case of mains loss).

The same result is obtained if the INH input is active.

The automatic cycle is relaunched 2 seconds after the switch from MAN. to AUTO mode. During this time nothing happens, and the AUTO LED will be flashing.



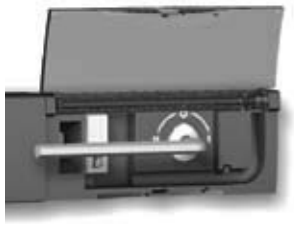
4.5.1. Manual switching

Use the handle situated on the front panel under the cover to manoeuvre the changeover switch.

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

- 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

4.5.1-1



ATYSM 093 A

Do not force the product (Max 8 Nm).
Do not leave the handle in automatic mode, if the AUT MODE variable is forced.

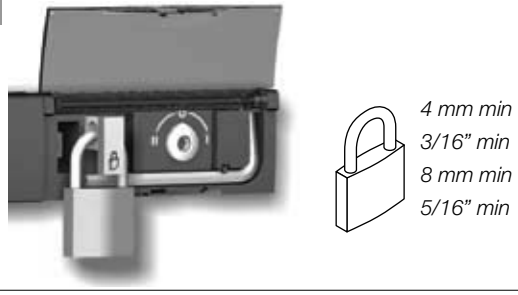
4.5.2. Locking

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

Locking is configurable in position 0 only (standard) or in all 3 positions (I-0-II), prior to product fitting.

Pull on the locking handle to enable isolation. Isolate by inserting a lock into the orifice provided for this purpose.

4.5.2-1



ATYSM 094 A

4.5.3. Reset

Operating fault reset	Hardware Reset
Open and re-close the AUT/MAN cover	Insert a pointed tip into the orifice on the upper part of the product.
 ATYSM 092 A	 ATYSM 148 A

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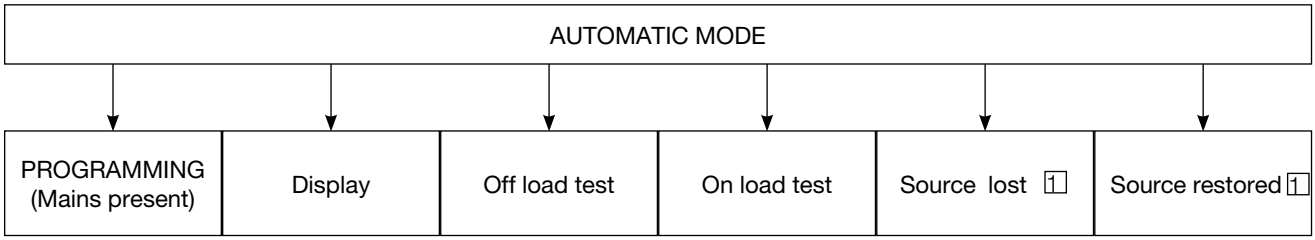
4.6. Automatic mode

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

4.6.1. Possible actions

Once in automatic mode, it is possible to:

- Access the programming and display menus (mains present).
- Run an on load or off load test.
- Run a source 1 / source 2 loss sequence.
- Start a source 1 / source 2 restoration sequence.



4.6.2. Manual & Automatic Mode / Mains restoration conditions

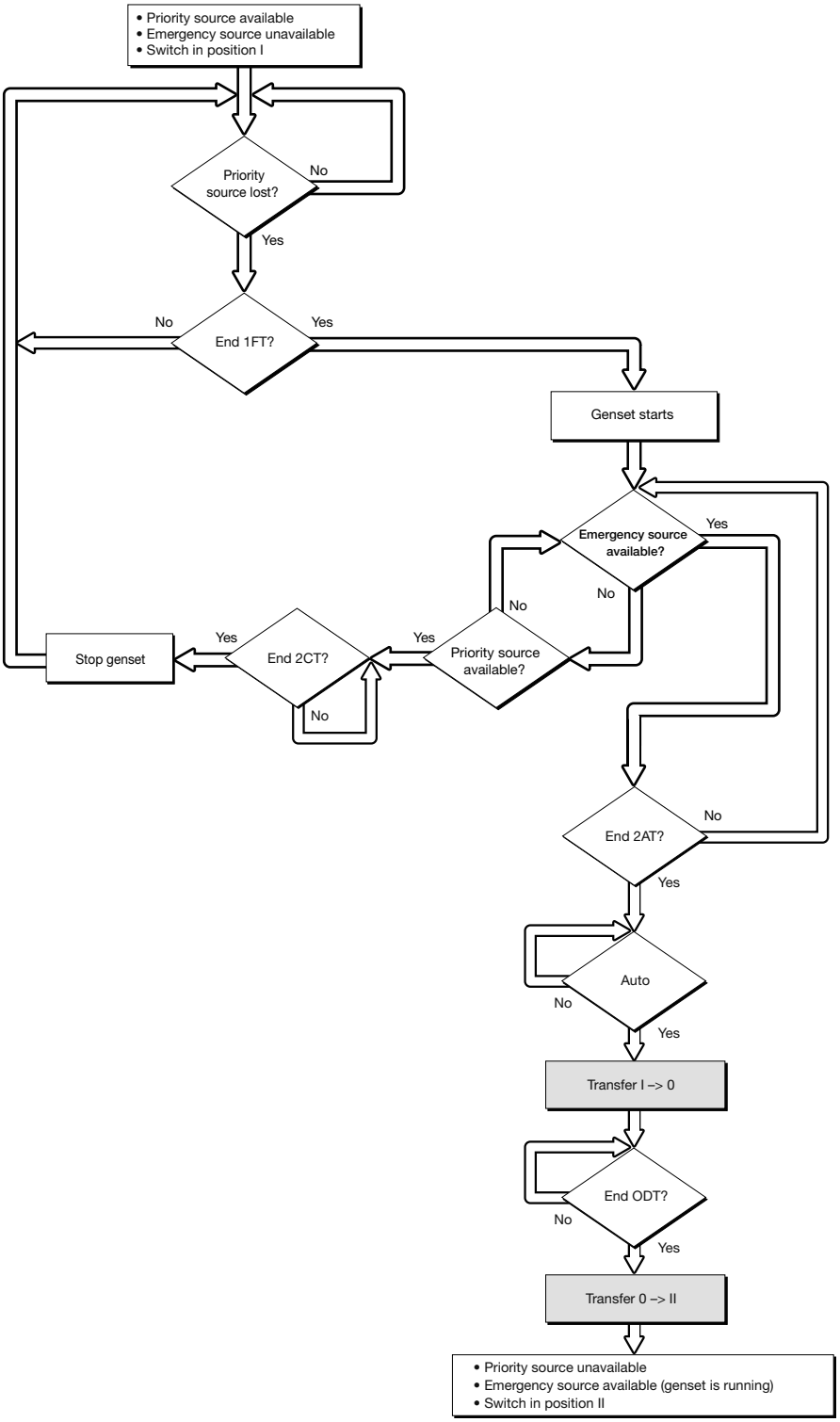
- Automatic mode returns to active 2 seconds after switching from manual to automatic mode.
- Source 1 source 2 voltages and frequencies are checked to define the changeover switch's new stable status.
- The same automatic mode recognition sequence must be executed following power-off and complete discharge of the power reserves.

4.6. Automatic mode (continued)

4.6.3. Priority source loss sequence (stable position) in M-G application

Configuration:

- APP = M-G: Network - Genset application
- RETURN 0 = NO: changeover switch **remains in closed position** upon loss of the source



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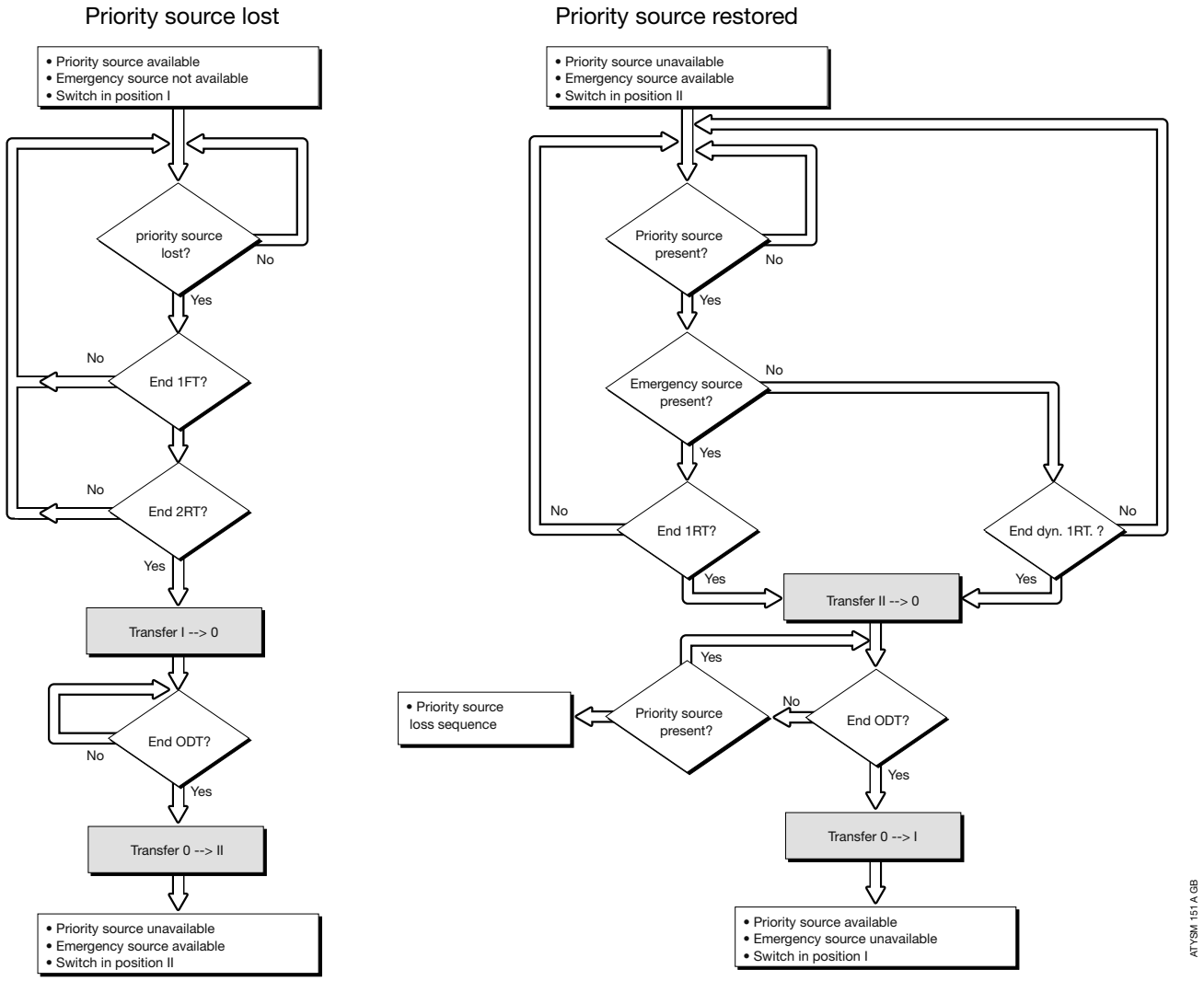
4.6. Automatic mode (continued)

4.6.4. Priority source loss and restoration sequence (stable position) in M-M application

Configuration

- APP = M-M: network-to-network application
- RETURN 0 = NO: the switch remains in the closed position during loss of the source

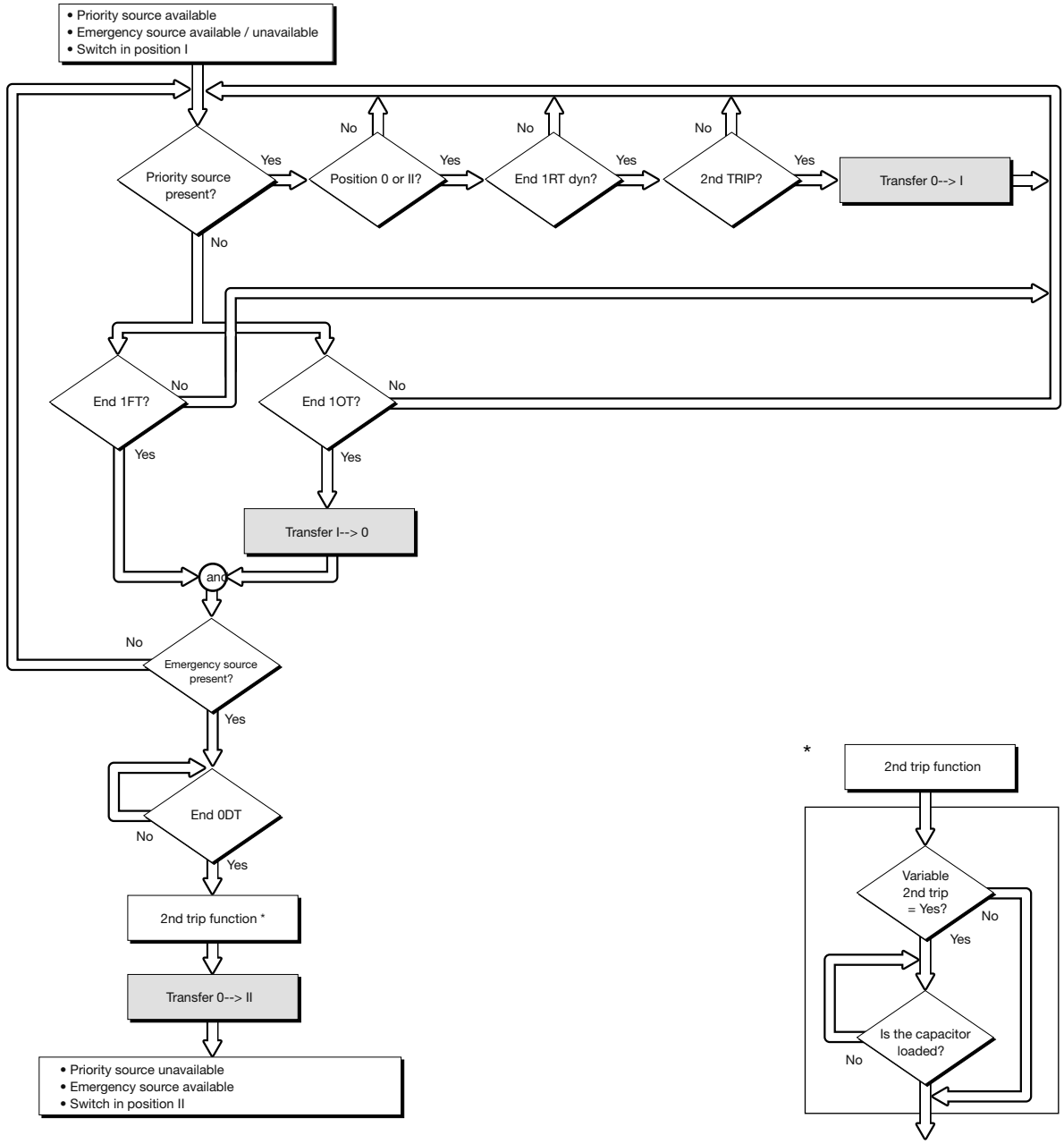


4.6. Automatic mode (continued)

4.6.5. Priority source loss sequence (with trip) in M-M application

Configuration

- APP = M-M: network-to-network application
- RETURN 0 = YES: the switch switches to position 0 (open) during loss of the source

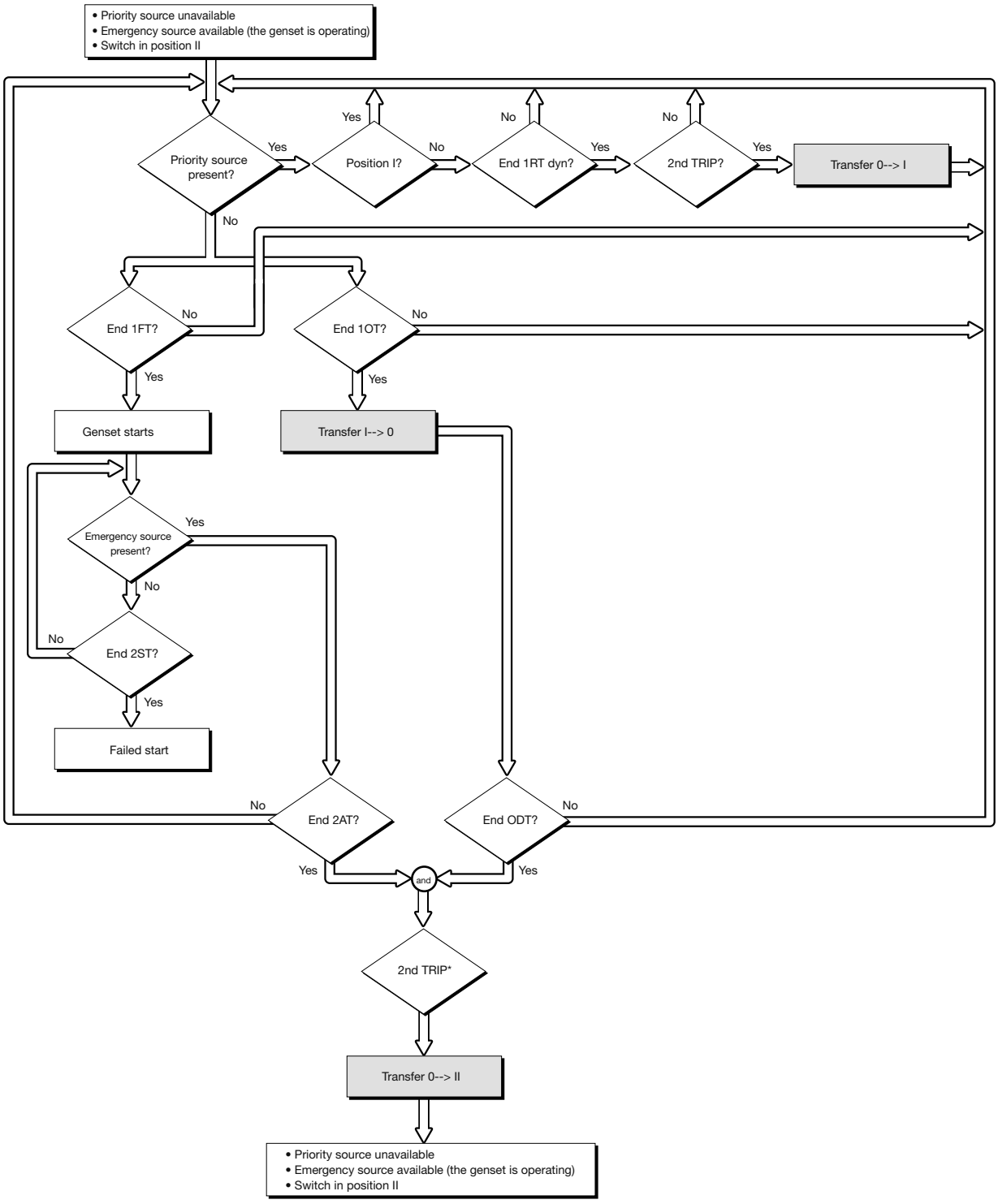


4.6. Automatic mode (continued)

4.6.6. Priority source loss sequence (with trip) in M-G application

Configuration

- APP = M-G: network-to-genset application
- RETURN 0 = NO: the changeover switch switches to position 0 (open) upon loss of the source



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4.6. Automatic mode (continued)

4.6.7. Priority source automatic restoration sequence

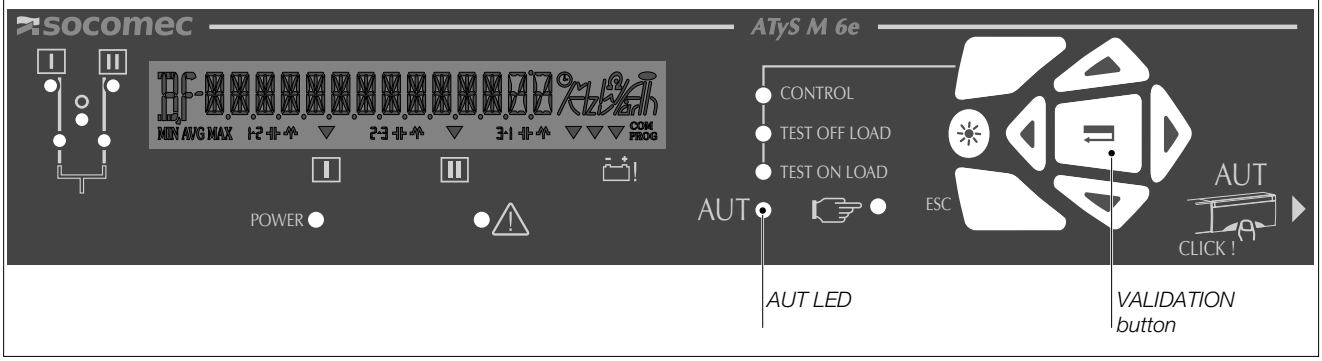
This sequence is started as soon as the system is in AUTO mode and in position II.

• 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 button must be pressed or an input programmed on RTC to authorise the retransfer.

4.6.7-1

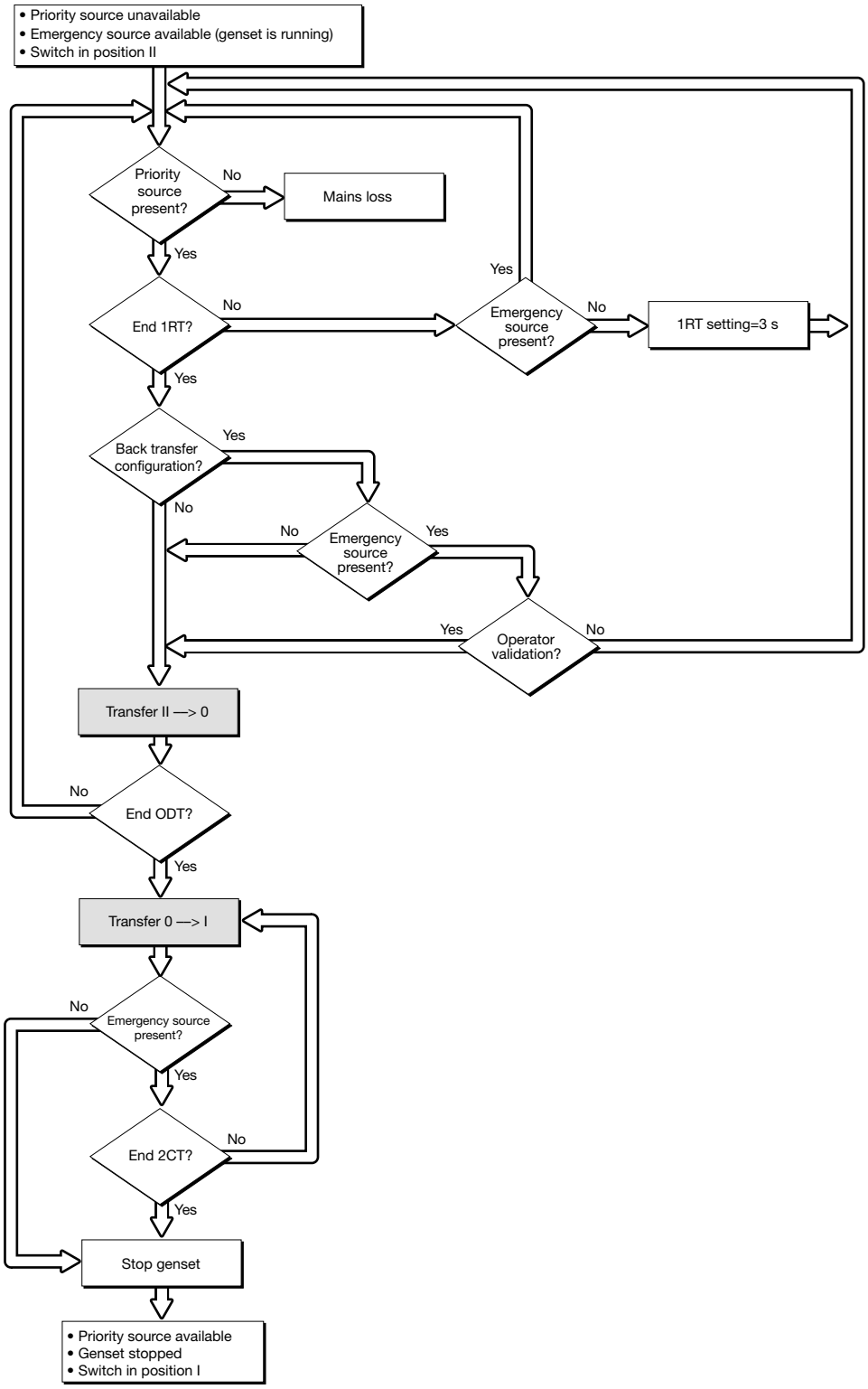


4.6. Automatic mode (continued)

4.6.8. Priority source restoration sequence (stable position) in M-G application

Configuration

- APP = M-G: network-to-genset application
- RETURN 0 = NO: the switch remains in the closed position during loss of the source



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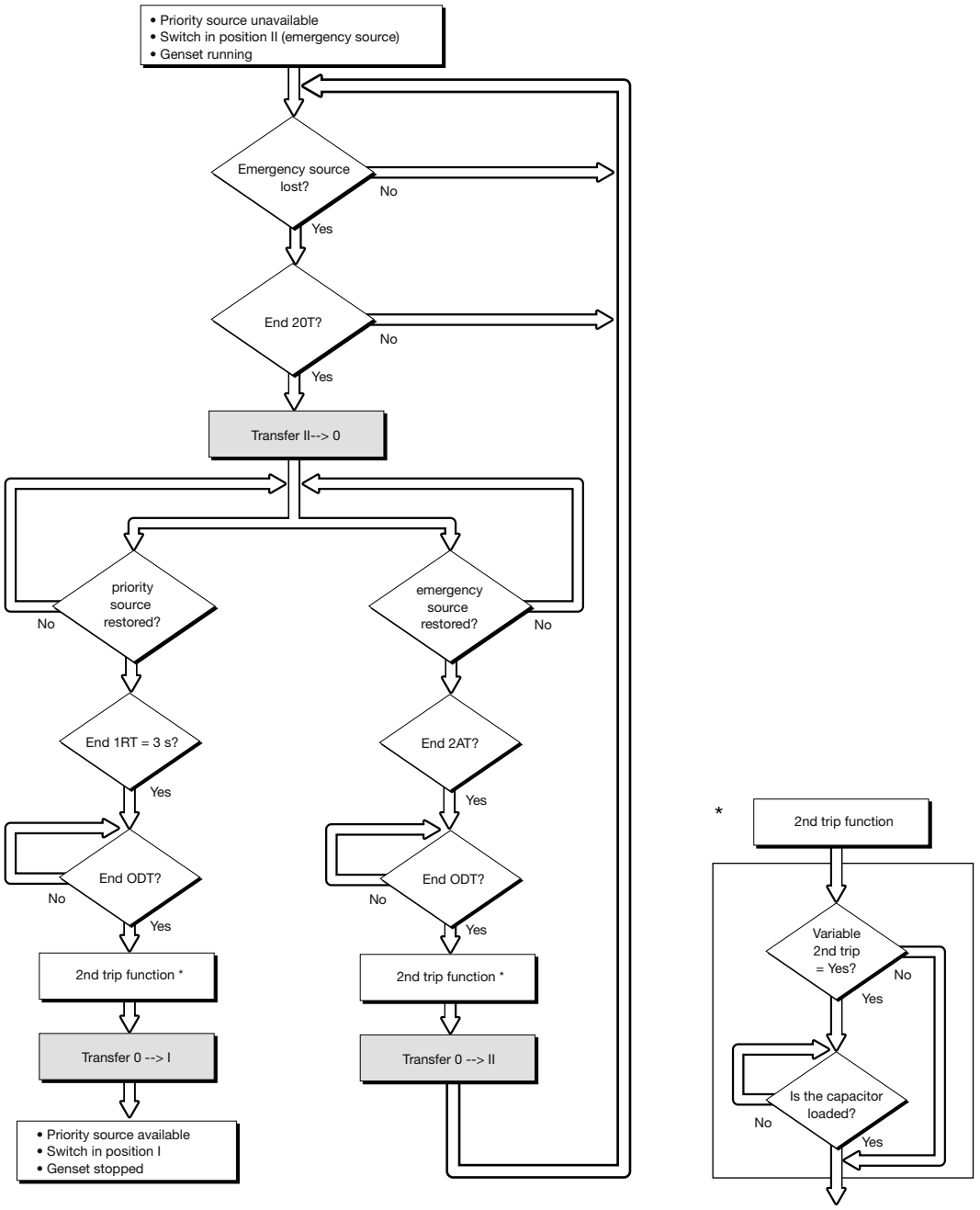
4.6. Automatic mode (continued)

4.6.9. Back-up source loss sequence (with trip) in M-G application

Configuration

- APP = M-G: network-to-Genset application
- RETURN 0 = YES: the switch switches to position 0 (open) during loss of the source



ATYSM 154 B GB

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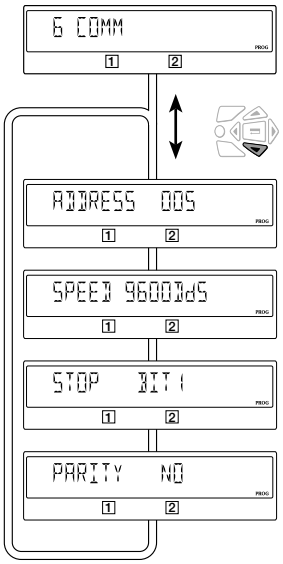
4.7. Communication module

4.7.1. 6 COMM



Variable	Definition	Adjustment range	Default value
Address	Address of communicating device	1 to 255	5
Speed	Communication speed	2400, 4800 9600, 19200 38400	9600
Stop bit		1, 2	1
Parity		NO, ODD, EVE	NO

Only available on version with Comm.

RS485	2 or 3 wire half-duplex
Protocol	JBUS / MODBUS® protocol in RTU Mode
Speed	2400, 4800, 9600, 19,200, 38,400 Bauds
Galvanic isolation	2.5 kV (1 min 50 Hz)

4.7.2. General Information

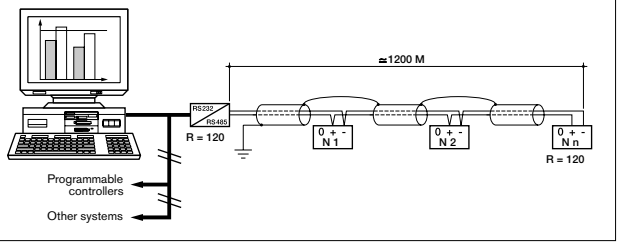
Communication via an RS485 connection (JBUS / MODBUS® protocol) enables you to connect up to 31 ATyS to a PC or a programmable logic controller over a distance of 1200 metres.

• Recommendations

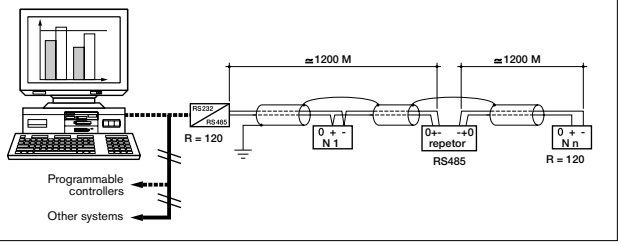
You need to use a shielded twisted pair, type LIYCY.

If the distance of 1200 m and / or the number of 31 ATyS is exceeded, it is necessary to connect a repeater (1 track) or a spark-gap (4 tracks) to enable an additional connection of ATyS over more than 1200 m. For further information on the connection methodology, please consult us.

4.7.2-1



4.7.2-2



120 Ohm resistors must be installed at both ends of the network; a selectable 120 Ohm resistor is integrated into the product's RS485 module (only supplied on version with COM).

4.7. Communication module (continued)

4.7.3. JBUS/MODBUS® protocol

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

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

The communication mode is the 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: address of the communicating device (Add parameter, Comm menu)
- Function code: the codes which can be used are as follows:

Slave address	Function code	Address	Data	CRC 16

3: to read n words (maximum 125)

6: to write one word

16: to write n words (maximum 125).

- Address: address of the variable concerned (see the following tables)
- Data: parameters linked to the function (no. of words, value)

When the slave 0 address is selected, a message is sent to all the 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.

4.7. Communication module (continued)

4.7.4. Function 3

Dec. address	Hex. address	No. of words	Designation	Unit
Status				
20480	5000	1	Network type 1: 127 - 230 V 2: 230 - 400 V	
20481	5001	1	Operating mode 0x0000: Manual mode 0x0010: Automatic mode 0x0020: Checking mode 0x0040: Inhibited mode	
20482	5002	1	Position 1: Position 0 2: Position I 3: Position II	
20484	5004	1	Genset starting order status, source [2] 0: Inactive 1: Active	
20485	5005	1	Priority 0: Network 1: Source [1] 2: Source [2]	
20486	5006	1	Source [1] status 0: Below the threshold 1: Present 2: Available	
20487	5007	1	Source [2] status 0: Below the threshold 1: Present 2: Available	
20488	5008	1	Test in progress 0x0000: None 0x0001: TOF 0x0002: EOF 0x0004: TON 0x0008: EON	
20489	5009	1	Cycle counter	
20490	500A	1	Manoeuvres to position I counter	
20491	500B	1	Manoeuvres to position II counter	
20492	500C	1	Fault signal 0: None 1: Alarm 2: Fault	
20493	500D	1	Alarm / fault code 0: None 1: F00 Op Fct 2: F03 Neutral 3: F11 FLT - 1 4: F21 FLT - 2 5: F12 ALR - 1 6: F22 ALR - 2 7: F13 ROT - 1 8: F23 ROT - 2 9: F14 CAP - 1 10: F24 CAP - 2 11: F15 PWR - 1 12: F25 PWR - 2 13: F16 POS - 1 14: F26 POS - 2	
20494	500E	1	Cause of last switchover 0: None 1: Manual 2: Source [1] under-voltage 3: Source [2] under-voltage 4: Source [1] over-voltage 5: Source [2] over-voltage 6: Source [1] under-frequency 7: Source [2] under-frequency 8: Source [1] over-frequency 9: Source [2] over-frequency 10: Source [1] phases unbalanced 11: Phases unbalanced on source [2] 12: Direction of rotation inverted on source [1] 13: Direction of rotation inverted on source [2]	

4.7. Communication module (continued)

4.7.4. Function 3 (continued)

Dec. address	Hex. address	No. of words	Designation	Unit
Load				
20736	5100	1	Phase-phase voltage U12	V/100
20737	5101	1	Phase-phase voltage U23	V/100
20738	5102	1	Phase-phase voltage U31	V/100
20739	5103	1	Phase 1 phase-neutral voltage, V1	V/100
20740	5104	1	Phase 2 phase-neutral voltage, V2	V/100
20741	5105	1	Phase 3 phase-neutral voltage, V3	V/100
20742	5106	1	Frequency Fr	Hz/100
Sources				
20743	5107	1	Source 1: phase-phase voltage U12	V/100
20744	5108	1	Source 1: phase-phase voltage U23	V/100
20745	5109	1	Source 1: phase-phase voltage U31	V/100
20746	510A	1	Source 1: phase 1 phase-neutral voltage (V1)	V/100
20747	510B	1	Source 1: phase 2 phase-neutral voltage (V2)	V/100
20748	510C	1	Source 1: phase 3 phase-neutral voltage (V3)	V/100
20749	510D	1	Source 1: frequency	Hz/100
20750	510E	1	Source 2: phase-phase voltage U12	V/100
20751	510F	1	Source 2: phase-phase voltage U23	V/100
20752	5110	1	Source 2: phase-phase voltage U31	V/100
20753	5111	1	Source 2: phase 1 phase-neutral voltage (V1)	V/100
20754	5112	1	Source 2: phase 2 phase-neutral voltage (V2)	V/100
20755	5113	1	Source 2: phase 3 phase-neutral voltage (V3)	V/100
20756	5114	1	Source 2: frequency	Hz/100
Time delays				
20992	5200	1	Source 1 loss: 1FT	S
20993	5201	1	Source 1 restoration: 1RT	S
20995	5203	1	Source 1 return to 0: 1OT	S
20997	5205	1	Source 2 loss: 2FT	S
20998	5206	1	Source 2 restoration: 2RT (M-M appl.) or source 2 stabilisation: 2AT (M-G appl.)	S
20999	5207	1	Source 2 request maintained: 2CT	S
21000	5208	1	Return to 0 from source 2: 2OT	S
21001	5209	1	Source 2 starting timeout: 2ST	S
21002	520A	1	Time without electricity: 0DT	S
21003	520B	1	Load shedding timer: LST	S
21004	520C	1	Test On Load duration timer: TOT	S
21005	520D	1	Test Off Load duration timer: TFT	S
21006	520E	1	On Load external operation request timer (start): E1T	S
21007	520F	1	On Load external operation request timer (end): E3T	S
21008	5210	1	On Load external operation request timer (duration): E2T	S
21009	5211	1	Off Load external operation request timer (start): E5T	S
21010	5212	1	Off Load external operation request timer (end): E7T	S
21011	5213	1	Off Load external operation request timer (duration): E6T	S

4.7. Communication module (continued)

4.7.5. Function 6

Dec. address	Hex. address	No. of words	Designation	Unit
Command				
21584	5450	1	Command configuration 0x01: Configure RTE (Back transfer) 0x02: Cancel TOF (Off Load Test) 0x03: Configure TOF (Off Load Test) 0x04: Configure TON (On Load Test) 0x05: Configure EOF (External Off Load) 0x06: Configure EON (External On Load) 0x07: Cancel EOF (External Off Load) 0x08: Cancel EON (External On Load) 0x10: Cancel alarms and faults 0x11: Configure FT1 (source 1 fault) 0x12: Configure FT2 (source 2 fault) 0x13: Configure AL1 (source 1 alarm) 0x14: Configure AL2 (source 2 alarm)	
21585	5451	1	Operating mode configuration 3: Auto 4: Inhibit 5: Checking Other: Unchanged	
21586	5452	1	Priority configuration 0: Network 1: Source 1 2: Source 2	
21587	5453	1	Position configuration Only available in electric mode	

4.7. Communication module (continued)

4.7.6. Functions 3, 6 and 16

Dec. address	Hex. address	No. of words	Designation	Unit
Time delay configuration				
21760	5500	1	Source 1 loss: 1FT	S
21761	5501	1	Source 1 restoration: 1RT	S
21763	5503	1	Source 1 return to 0: 1OT	S
21765	5505	1	Source 2 loss: 2FT	S
21766	5506	1	Source 2 restoration: 2RT (M-M Appl.) or Source 2 Stabilisation: 2AT (M-G Appl.)	S
21767	5507	1	Source 2 request maintained: 2CT	S
21768	5508	1	Return to 0 from source 2: 2OT	S
21769	5509	1	Source 2 starting timeout: 2ST	S
21770	550A	1	Time without electricity: 0DT	S
21771	550B	1	1: TOT unlimited 2: TOT limited	S
21772	550C	1	Test On Load duration timer: TOT	S
21773	550D	1	Test Off Load duration timer: TFT	S
21774	550E	1	1: E2T unlimited 2: E2T limited	S
21775	550F	1	On Load external operation request timer (start): E1T	S
21776	5510	1	On Load external operation request timer (end): E3T	S
21777	5511	1	On Load external operation request timer (duration): E2T	S
21778	5512	1	Off Load external operation request timer (start): E5T	S
21779	5513	1	Off Load external operation request timer (end): E7T	S
21780	5514	1	Off Load external operation request timer (duration): E6T	S
21781	5515	1	Load shedding timer: LST	S
Threshold configurations				
21840	5550	1	Source 1: Voltage upper threshold	
21841	5551	1	Source 1: Voltage upper threshold hysteresis	
21842	5552	1	Source 1: Voltage lower threshold	
21843	5553	1	Source 1: Voltage lower threshold hysteresis	
21844	5554	1	Source 2: Voltage upper threshold	
21845	5555	1	Source 2: Voltage upper threshold hysteresis	
21846	5556	1	Source 2: Voltage lower threshold	
21847	5557	1	Source 2: Voltage lower threshold hysteresis	
21848	5558	1	Source 1: Phase unbalance threshold	
21849	5559	1	Source 1: Phase unbalance threshold hysteresis	
21850	555A	1	Source 2: Phase unbalance threshold	
21851	555B	1	Source 2: Phase unbalance threshold hysteresis	
21852	555C	1	Source 1: Frequency upper threshold	
21853	555D	1	Source 1: Frequency upper threshold hysteresis	
21854	555E	1	Source 1: Frequency lower threshold	
21855	555F	1	Source 1: Frequency lower threshold hysteresis	
21856	5560	1	Source 2: Frequency upper threshold	
21857	5561	1	Source 2: Frequency upper threshold hysteresis	
21858	5562	1	Source 2: Frequency lower threshold	
21859	5563	1	Source 2: Frequency lower threshold hysteresis	

4.7. Communication module (continued)

4.7.6. Functions 3, 6 and 16 (continued)

Dec. address	Hex. address	No. of words	Designation	Unit
Network configuration				
22096	5650	1	Network type 0: 4NBL (230/400V) 1: 1BL (230/400V) 2: 41NBL (230/400V) 3: 42NBL (230/400V) 4: 3NBL (230/400V) 5: 4NBL (127/230V) 6: 3NBL (127/230V) 7: 2NBL (127/230V) 8: 2BL (127/230V) 9: 42NBL (127/230V)	
22097	5651	1	Neutral 0: AUTO 1: neutral on left 2: neutral on right	
22098	5652	1	Direction of phase rotation 0: Undefined 1: ABC 2: ACB	
22099	5653	1	Nominal voltage 180 <= Unom <= 480	
22100	5654	1	Rated frequency 0: 50 Hz 1: 60 Hz	
22101	5655	1	Application type 0: Network - Network (M-M) 1: Network - Genset (M-G)	
22103	5657	1	GS START relay 0: NO 1: NC	
22104	5658	1	PRIO NET 0: None 1: Source 1 2: Source 2	
22105	5659	1	PRIO TON 0: NO 1: YES	
22106	565A	1	PRIO EON 0: NO 1: YES	
22107	565B	1	RETRANS 0: NO 1: YES	
22108	565C	1	RETURN O 0: NO 1: YES	
22110	565E	1	2ND TRIP 0: NO 1: YES	
22111	565F	1	MOD AUT 0: NO 1: YES	
22112	5660	1	BACKLIGHT 0: OFF 1: ON 2: INT	

4.7. Communication module (continued)

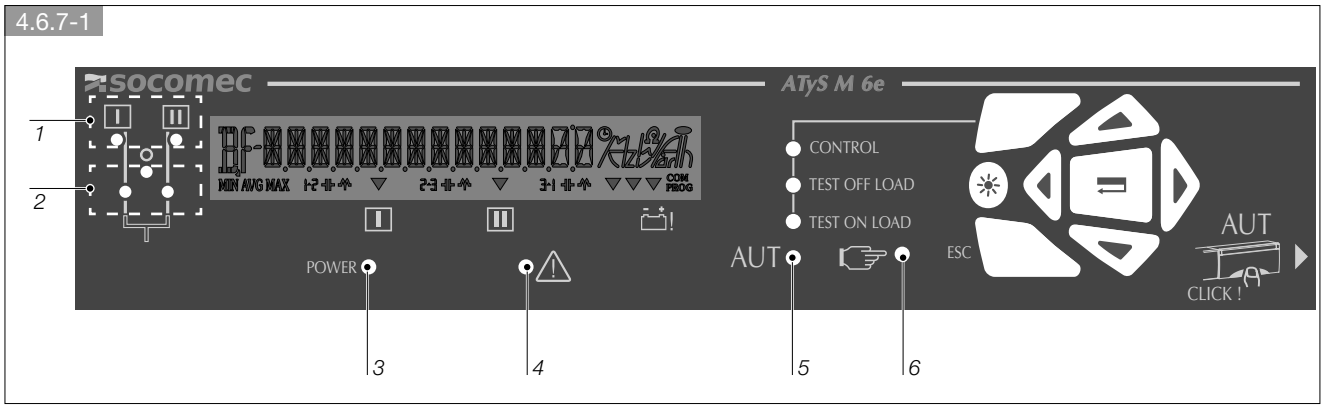
4.7.6. Functions 3, 6 and 16 (continued)

Dec. address	Hex. address	No. of words	Designation	Unit
Inputs / outputs configuration				
22352	5750	1	IN 1 function 0: /	
22353	5751	1	IN 2 function 0: /	
22354	5752	1	IN 3 function 0: /	
22355	5753	1	IN 1 status 0: NO 1: NC	
22356	5754	1	IN 2 status 0: NO 1: NC	
22357	5755	1	IN 3 status 0: NO 1: NC	
22358	5756	1	OUT 1 function 0: /	
22359	5757	1	OUT 2 function 0: /	
22360	5758	1	OUT 3 function 0: /	

Inputs	Outputs
1: INH	1: S1A
2: TOL	2: S2A
3: TOF	3: SCA
4: EON	4: AC1
5: EOF	5: AC2
6: MSR	6: AC0
7: RTC	7: LO1
8: PRI	8: LO2
9: SS1	9: LSC
10: SS2	10: FLT
11: PS1	11: POP
12: PS2	12: CP1
13: PS0	13: CP2
14: AL1	14: CP3
15: AL2	
16: FT1	
17: FT2	
18: OA1	
19: OA2	
20: RST	
21: LSI	

5. REPAIR GUIDE

5.1. Repair check-list



1. Source 1 and Source 2 light
2. STATUS light for positions I-0-II
3. Power LED
4. Fault LED
5. Auto LED
6. Man. LED

5.2. Repairs

Symptoms	Actions to be carried out	Expected results
The product does not work electrically	Check for a 230 +/-30% voltage on power terminals 1 and 7 (230/400V AC version), or on power terminals 3 and 5 (127/230V AC version)	The SOURCE light (1 and/or 2) and POWER light are lit
	Check that the cover is closed (product in AUTO mode).	The AUT and POWER lights are lit
The SOURCE light is never lit when it is available	Press the lights Test key	All the lights will be lit
	Check in programming mode the nominal voltage value (originally set to 400V), the nominal frequency value and the network configuration.	The light for the SOURCE in question is lit
	Check the voltage and frequency thresholds and hystereses for this source, in the Volt and Frequency menus	The light for the SOURCE in question is lit
The product displays the message F13 ROT-1 or F23 ROT-2	Check for phase rotation consistency (or conventional direction) between the source and parameter ROT in the SETUP menu, or between the two sources.	The SOURCE lights will be lit
Nothing happens following loss of the priority source	Check the setting of 1FT	Wait for the end of 1FT, before closing contact 73-74
	Check the status of the generator start signal contact (contact 73-74) at the end of 1FT	Contact 73-74 is closed
	Check the wiring from the starting order (73-74) to the genset controller.	The SOURCE light (emergency side) is lit
	Check the setting of parameters RETURN 0 and 2nd TRIP	If YES, the product must switch to position 0
The product does not switch over after the priority source is lost	Check for the back-up source.	The SOURCE light (emergency side) is lit
	Check the back-up source voltage and frequency thresholds and hystereses.	The SOURCE light (emergency side) is lit
	Check that the front cover is correctly closed.	The AUT light is lit
	Check that automatic operation has not been inhibited by exterior orders	The AUT light is lit

5.2. Repair (continued)

Symptoms	Actions to be carried out	Expected results
The product does not switch over upon the priority source being restored	Check the priority source voltage and frequency thresholds and hystereses.	The SOURCE light (priority side) is lit
	Check that the time-delay 1RT (Source 1 Return Timer) has counted down, and that it is not too long.	The display indicates 1RT xxxSEC.
	Check in programming mode that the "manual back transfer" function is not activated * * if this function is unnecessary	In the SETUP menu, the RETRANS variable must be at NO
	Check that the front cover is correctly closed.	The AUT light is lit
	Check that automatic operation has not been inhibited by exterior orders	The AUT light is lit
The return to priority source 1 has been executed, but source 2 is still running	Check that CDT (Cool Down Timer) has counted down (in case of M-G application)	The display indicates CDT xxx SEC after switchover to the priority source
	Check the status of the generator start signal contact (contact 73-74) (M-G application)	Contact 73-74 changes status after time-delay CDT has counted down
	Check that the product is not in MAN. or INH mode	The AUT light is lit
ON LOAD and OFF LOAD tests cannot be started via the keypad	Check that the front cover is properly closed (AUTO mode)* * in MAN. mode, OFF LOAD TEST only	The AUT light is lit
	Check the operating mode password (factory code 0000) to access the test functions	The ON LOAD TEST or OFF LOAD TEST lights are lit, according to the selected test mode
	Check that the product is in M-G application	Parameter APP is at M-G
	Check that there is no mains loss upon starting the test	The SOURCE light (priority side) is lit.
	Check the status of the generator start signal contact (contact 73-74)	Contact 73-74 is closed
The product cannot be switched over using a handle	Check that the changeover switch is not locked.	Switching is possible.
	Check that the appropriate adjustment torque is applied on the ALLEN key	Switching is possible.
	Check the direction of rotation of the handle	Manual switchover from position 1 to position 2 is executed clockwise. The return manoeuvre is executed anti-clockwise
The changeover switch will not go to AUTO mode	Check that the front cover is correctly closed	The AUT light is lit
	Check that the sensor under the front cover is not broken	The AUT light is lit
	Check in the programming that AUTO mode is forced	The AUT light is lit
	Check that the input INH is open.	The AUT light is lit
The product cannot be locked	Check the changeover switch position	Locking is only possible in position 0 as standard * * locking in positions I-0-II possible as factory option
The product is faulty	Refer to chapter 4.3.3 Error messages list	

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