INSTRUCTION MANUAL

ATyS d H

Remotely Operated Transfer Switching Equipment

EN

www.socomec.com/en/atys-dh

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Innovative Power Solutions

EN CONTENTS

1. GENERAL SAFETY INSTRUCTIONS

This manual provides instructions on safety, connections and operation of the ATyS d H transfer switch.

- Whether the ATyS d H is sold as a loose product, as a spare, as an enclosed solution or as any other configuration, this device must always be installed and commissioned by qualified and experienced personnel, in line with the manufacturers recommendations, following good engineering practices and after having read and understood the details in the latest release of the relative product instruction manual.
- Maintenance on the product and any other associated equipment including but not limited to servicing operations must be performed by adequately trained and qualified personnel.
- Each product is shipped with a label or other form of marking including rating and other important specific product information. One must also refer to and respect markings on the product prior to installation and commissioning for values and limits specific to that product.
- Using the product outside the intended scope, outside SOCOMEC recommendations or outside the specified ratings and limits can cause personal injury and/or damage to equipment.
- This instruction manual must be made accessible so as to be easily available to anyone who may need to read it in relation with the ATyS d H.
- The ATyS d H meets the European Directives governing this type of product and includes CE and CCC marking on each product.
- No covers on the ATyS d H should be opened (with or without voltage) as there may still be dangerous voltages inside the product such as those from external circuits.
- **Do not handle any control or power cables connected to the ATyS d when voltage may be present on the product directly through the mains or indirectly through external circuits.**
- Voltages associated with this product may cause injury, electric shock, burns or death. Prior to carry out any maintenance or other work on live parts or other parts in the vicinity of exposed live parts, ensure that the switch including all control and associated circuits are de-energized.
- Danger: Transportation Precaution. Do not enter the area under the ATS when it is lifted or suspended (such as when using a lifter or chain block as in case of lifting equipment failure the ATS may suddenly fall. This ATS is heavy therefore entering such an area may cause serious injury.
- For drawout type ATyS d H products: Do not leave the ATS in the drawout position as the transfer may fall and cause serious damage and / or injury. When the TSE is to be drawn-in or drawn-out, ensure that switch A and switch B are both in the “open position”. Failure to do so may result in extensive damage and/or fire.

DANGER	WARNING	CAUTION
RISK: Electric shock, burns, death	**RISK:** Possible personal injury	**RISK:** Equipment damage

- As a minimum the ATyS d H comply with the following international standards: IEC 60947-6-1 and GB 14048-11.

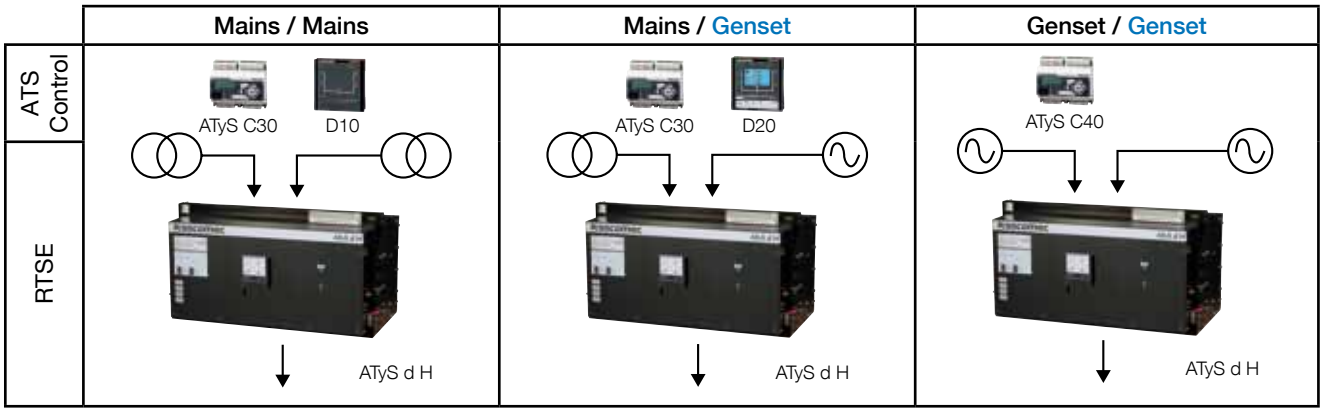
2. INTRODUCTION

ATyS d H “remotely operated transfer switching equipment” (RTSE) is designed for use in power systems for the safe transfer of a load supply between a normal and an alternate source. The changeover is done in open transition and with minimum supply interruption during transfer ensuring full compliance with IEC 60947-6-1 and GB 14048-11.

The ATyS d is a full load break Class PC RTSE, capable of “making and withstanding short circuit currents” assigned to IEC 60947-6-1 and GB 14048-11, with utilization categories of up to AC32B / AC33iB respectively.

ATyS d H source changeover switches ensure:

- Power Control and Safety between a normal and an alternate source.
- A complete product delivered as a fully assembled and tested solution.
- Integrated and robust switch disconnection.
- Window with clearly visible position indication I – 0 - II.
- An inherent mechanical interlock.
- Stable positions (I – 0 – II) non affected by typical vibration and shocks.
- Constant pressure on the contacts non effected by network voltage.
- Energy Efficient with virtually no consumption whilst on the normal, alternate or off positions.
- Emergency manual operation (off load).
- Integrated switch position auxiliary contacts.
- Self powered actuator through Source I and Source II power terminals.
- Compatibility with virtually any make of ATS, AMF, Genset controller.
  (Typically a SOCOMEC ATyS C20 / C30 / C40 ATS Controller and driven through volt free contacts)
- Power supply continuity for most applications.



3. THE ATYS FAMILY PRODUCT RANGE

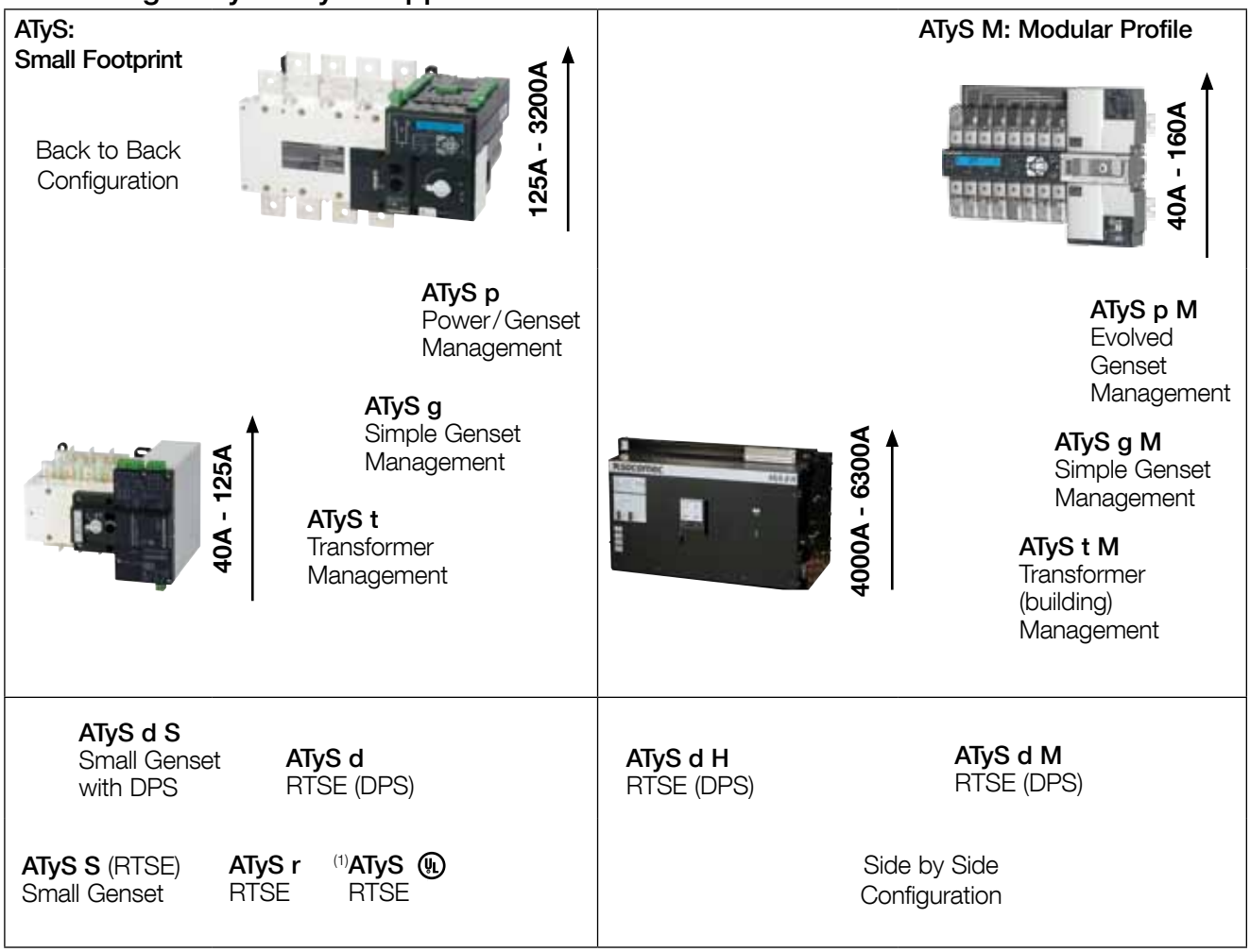
SOCOMEC has been manufacturing power control and safety products since 1922. The first generation of SOCOMEC “motorised changeover switches” were introduced in 1990 and today the ATyS brand has become trusted by major players in the power industry worldwide.

The ATyS Family includes a complete range of remotely operated transfer switch equipment (RTSE) as well as automatic fully integrated products and solutions (ATSE). Selecting the right ATyS will depend on the rating, the application as well as the nature of installation in which the ATyS will be installed.

This instruction manual includes details and instructions specific to the “ATyS d H” RTSE only. For all other ATyS family of products please refer to the specific instruction manual related to that product. (Available for download on www.socomec.com).

An overview of the ATyS range below up to 3200A is presented below:

Just the right ATyS for your application…



3.1. ATyS d H (High Ratings)

The ATyS d H is self-powered remotely operated transfer switching equipment (RTSE) with dual power supply for high current ratings. (Fixed or drawout, 3/4P rated from 4000 – 6300A).

3.2. The ATyS Range Key Features

Selecting the right ATyS will depend on the application, the functionality required as well as the nature of the installation in which the ATyS will be installed. Below is an outline product selection chart listing the key features of each product to help to select the right ATyS for your needs.

IEC 60947-6-1	ATyS S	ATyS Sd	ATyS r	ATyS d	ATyS t	ATyS g	ATyS p	ATyS d H
UL 1008			ATyS UL					
Changeover with control driven by dry contacts	●	●	●	●	●	●	●	●
Manual Emergency Operation with external handle	●	●	●	●	●	●	●	●
AC control voltage supply	●	●	●	●	●	●	●	●
Wide band DC control voltage supply	●							
Watchdog relay to ensure product availability			●	●	●	●	●	
Override controls and force switch to zero (off) position			●	●	●	●	●	
Integrated position auxiliary contacts	●	●	●	●	●	●	●	●
Source availability LED display				●	●	●	●	
Remote Display module RJ45 connection for D10				●	●	●		
Integrated Dual power supply		●		●	●	●	●	●
Network - Network Applications	●	●	●	●	●		●	●
Network - Genset Applications	●	●	●	●		●	●	●
Genset - Genset Applications	●	●	●	●				●
Pre-defined fixed I/O			● 5/1	● 5/1	● 9/2	● 11/3	● 5/2	
Programmable I/O							● 6/1	
Additional programmable I/O modules (Optional up to 4 modules)							● 8/8	
Remotely operated Transfer Switching Equipment (RTSE Class PC)	●	●	●	●				●
Automatic Transfer Switching Equipment (ATSE Class PC)					●	●	●	
Remote + Manual Control	●	●	●	●				●
Auto + Remote + Manual Control					●	●		
Auto + Remote + Local + Manual Control							●	
Auto-configuration of voltage and frequency levels					●	●	●	
Switch Position LED display					●	●	●	
Security Sealing Cover					●	●		
Configuration through potentiometers and dip switches					●	●		
Test on load functionality						●	●	
Test off load functionality						●	●	
Programmable configuration with keypad and LCD display							●	
Metering & Measurement: kW; kVar; kVA + kWh; kVarh; kVAh							●	
Communication RS485 + Ethernet + Ethernet gateway (Optional)							●	
Webserver Access through optional Ethernet module (Optional)							●	
Easy Configuration software (Through Ethernet/Modbus)							●	
Remote Terminal Unit RJ45 connection for D20							●	
Data Logger for Event Recording with RTC (Through Ethernet/Modbus)							●	
Programmable Engine Exerciser functionality (Through Ethernet/Modbus)							●	
Multi level password access							●	
Load Shedding function							●	
Capacity Management functionality							●	
Peak shaving functionality							●	
4 - 20mA communication module (Optional)							●	
KWh Pulsed output module (Optional)							●	
Counters KWh, permutation…							●	
LCD display for programming, metering, timers and counters							●	
Possibility to add optional functionality							●	

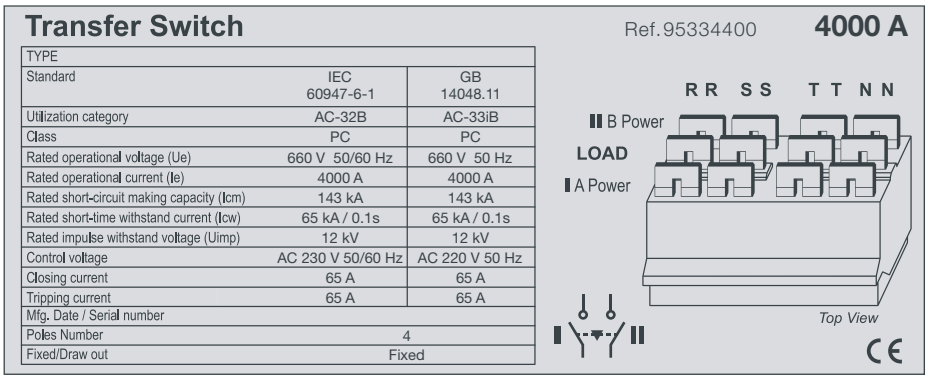
4. GENERAL OVERVIEW

4.1. ATyS d H: RTSE Product introduction

1. Draw in / Draw out indicator.
2. Name plate and product characteristics
3. Emergency manual operating lever
4. Manual lever inlet
5. Selector switch handle for manually closing switch II (B power closing)
6. Draw in and draw out trigger cover (Draw out version only)
7. Draw in and draw out handle (Draw out version only)
8. Auxiliary wiring terminal block
9. Transfer switch drawout cradle
10. Position indicator for switch I (A power : I On – OFF)
11. Position indicator for switch II (B power : II On – OFF)
12. Draw in and draw out trigger (Draw out version only)
13. Circuit diagram

4.2. ATyS d H: RTSE Sticker identification and details

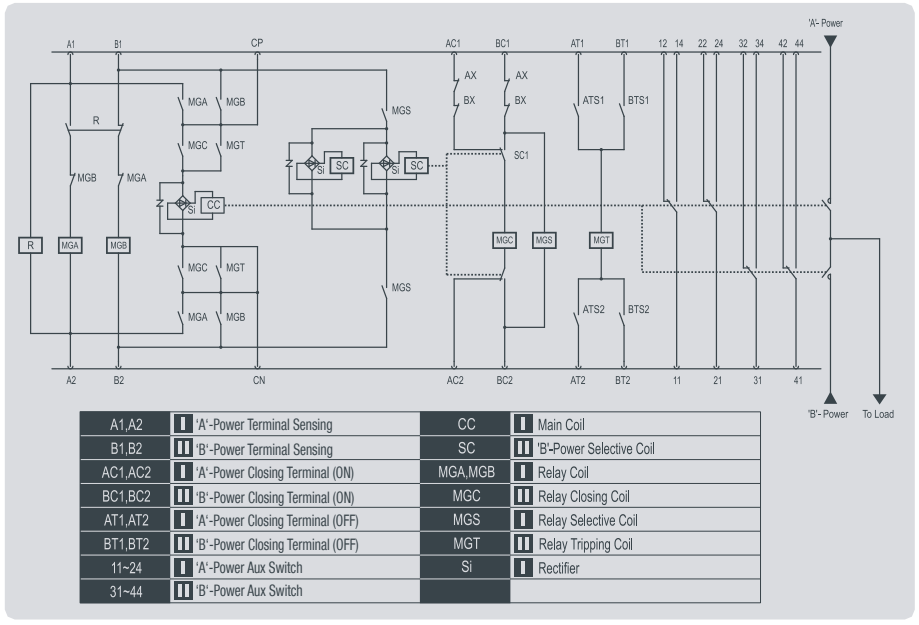
4.2.1. Name plate and product characteristics



Transfer Switch Ref.95334400 **4000 A**

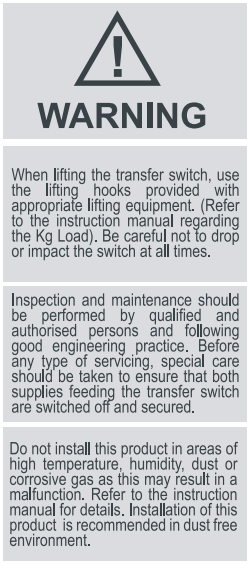
TYPE		
Standard	IEC 60947-6-1	GB 14048.11
Utilization category	AC-32B	AC-33iB
Class	PC	PC
Rated operational voltage (Ue)	660 V 50/60 Hz	660 V 50 Hz
Rated operational current (Ie)	4000 A	4000 A
Rated short-circuit making capacity (Icm)	143 kA	143 kA
Rated short-time withstand current (Icw)	65 kA / 0.1s	65 kA / 0.1s
Rated impulse withstand voltage (Uimp)	12 kV	12 kV
Control voltage	AC 230 V 50/60 Hz	AC 220 V 50 Hz
Closing current	65 A	65 A
Tripping current	65 A	65 A
Mfg. Date / Serial number		
Poles Number	4	
Fixed/Draw out	Fixed	

4.2.2. Circuit diagram



A1,A2	I 'A'-Power Terminal Sensing	CC	I Main Coil
B1,B2	II 'B'-Power Terminal Sensing	SC	II 'B'-Power Selective Coil
AC1,AC2	I 'A'-Power Closing Terminal (ON)	MGA,MGB	I Relay Coil
BC1,BC2	II 'B'-Power Closing Terminal (ON)	MGC	II Relay Closing Coil
AT1,AT2	I 'A'-Power Closing Terminal (OFF)	MGS	I Relay Selective Coil
BT1,BT2	II 'B'-Power Closing Terminal (OFF)	MGT	II Relay Tripping Coil
11~24	I 'A'-Power Aux Switch	Si	I Rectifier
31~44	II 'B'-Power Aux Switch		

4.2.3. Manual operation guide and warning stickers

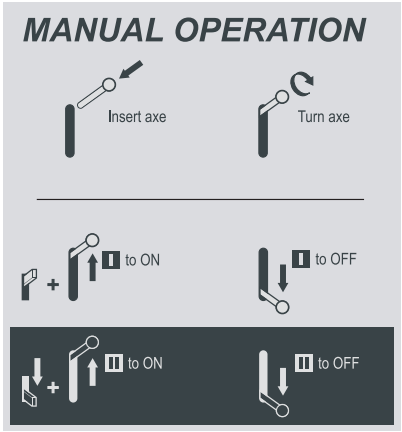


WARNING

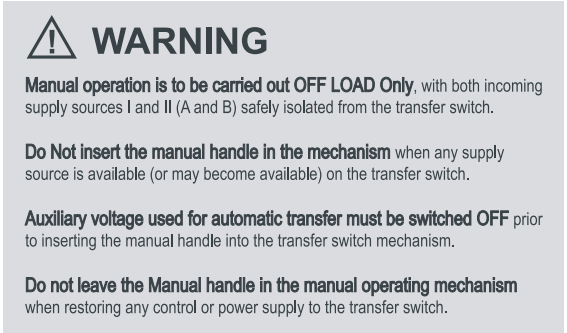
When lifting the transfer switch, use the lifting hooks provided with appropriate lifting equipment. (Refer to the instruction manual regarding the Kg Load). Be careful not to drop or impact the switch at all times.

Inspection and maintenance should be performed by qualified and authorised persons and following good engineering practice. Before any type of servicing, special care should be taken to ensure that both supplies feeding the transfer switch are switched off and secured.

Do not install this product in areas of high temperature, humidity, dust or corrosive gas as this may result in a malfunction. Refer to the instruction manual for details. Installation of this product is recommended in dust free environment.



MANUAL OPERATION



WARNING

Manual operation is to be carried out OFF LOAD Only, with both incoming supply sources I and II (A and B) safely isolated from the transfer switch.

Do Not insert the manual handle in the mechanism when any supply source is available (or may become available) on the transfer switch.

Auxiliary voltage used for automatic transfer must be switched OFF prior to inserting the manual handle into the transfer switch mechanism.

Do not leave the Manual handle in the manual operating mechanism when restoring any control or power supply to the transfer switch.

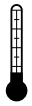
4.3. ATyS d H : ATSE Environmental

The ATyS d H product meets the following environmental requirements:

4.3.1. IP Rating

- IP2X against direct contact for the ATyS d H (Front with all covers closed)
- IP 0 for the bare power section without terminal shields in place.

4.3.2. Operating Conditions

4.3.2.1. Temperature 

- From -10 to +60 °C

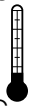
4.3.2.2. Hygrometry 

- <85% humidity without condensation at 40 °C
- <90% humidity with condensation at 20 °C

4.3.2.3. Altitude 

- Up to 2000m in altitude without derating

4.3.3. Storage Conditions

4.3.3.1. Temperature 

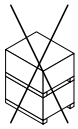
- From -20 to +60 °C

4.3.3.2. Storage duration period

- Maximum storage up to a period of 12 months
  (Recommendation : To be stored in dry, non corrosive and non saline atmospheric conditions)

4.3.3.3. Storage position

- On a flat surface capable of handling >200kg and respecting the markings on the packaging.
  Attn: This product is relatively heavy!
  Do not stack.



4.3.4. Volume and shipping weights by reference ATyS d H

Rating	Type	N° of Poles	Reference Number IEC	Reference Number CCC	Net Weight (Kg)	Shipping Weight (Kg)	Product packed (Length x Width x Height (mm)
4000 A	Fixed	3	9533 3400	9533 3400-CN	200	270	920x1220x900
		4	9533 4400	9533 4400-CN	250	320	920x1220x900
	Drawout	3	9533 3401	9533 3401-CN	300	380	1370x1220x900
		4	9533 4401	9533 4401-CN	400	480	1370x1220x900
5000 A	Fixed	3	9533 3500	9533 3500-CN	200	270	920x1220x900
		4	9533 4500	9533 4500-CN	250	320	920x1220x900
	Drawout	3	9533 3501	9533 3501-CN	300	380	1370x1220x900
		4	9533 4501	9533 4501-CN	400	480	1370x1220x900
6300 A	Fixed	3	9533 3630	9533 3630-CN	200	270	920x1220x900
		4	9533 4630	9533 4630-CN	250	320	920x1220x900
	Drawout	3	9533 3631	9533 3631-CN	300	380	1370x1220x900
		4	9533 4631	9533 3631-CN	400	480	1370x1220x900

4.3.5. CE marking

The ATyS d H complies with the European directive for:

- Electromagnetic compatibility no. 2004/108/CE dated 15th of December 2004.
- Low voltage directive no. 2006/95/CE dated 12th of December 2006.

CE

4.3.6. EMC standard

The ATyS d H is designed and built in accordance with IEC 60947-1 and GB 14048-11 standards.
(Products intended to be installed in an Industrial, Environment)

4.4. ATyS d H accessories

4.4.1. Customer Mounted Accessories

The ATyS d H is defined as remotely operated transfer switching equipment. When associated with an ATS controller the product is a fully compliant automatic transfer switch (ATSE) to safely transfer from a load supply from the normal to the alternative source as and when required.

SOCOMEC recommend to use the ATyS C20/C30 or C40 ATS controller depending on the application. Refer to the ATyS C20/30/40 instruction manual for wiring with these products.

For special applications please contact SOCOMEC.

CURRENT TRANSFORMERS

An extensive range of CT's are available from SOCOMEC. Please refer to the latest SOCOMEC general catalogue for details.

REMOTE INTERFACES

ATyS D10 (Door mounted remote display panel) and ATyS D20 (Remote display and control panel) may be used together with the ATyS C30 ATS controller

- Remote Display: Allows source supply state and switch positions to be displayed remotely.
- Remote Control: Allows remote configuration, control of the ATyS C30+ ATyS d H and metering (from front panel) on which the device is mounted. Typically door mounted or ≤3m away from the C30

COMMUNICATION CABLE

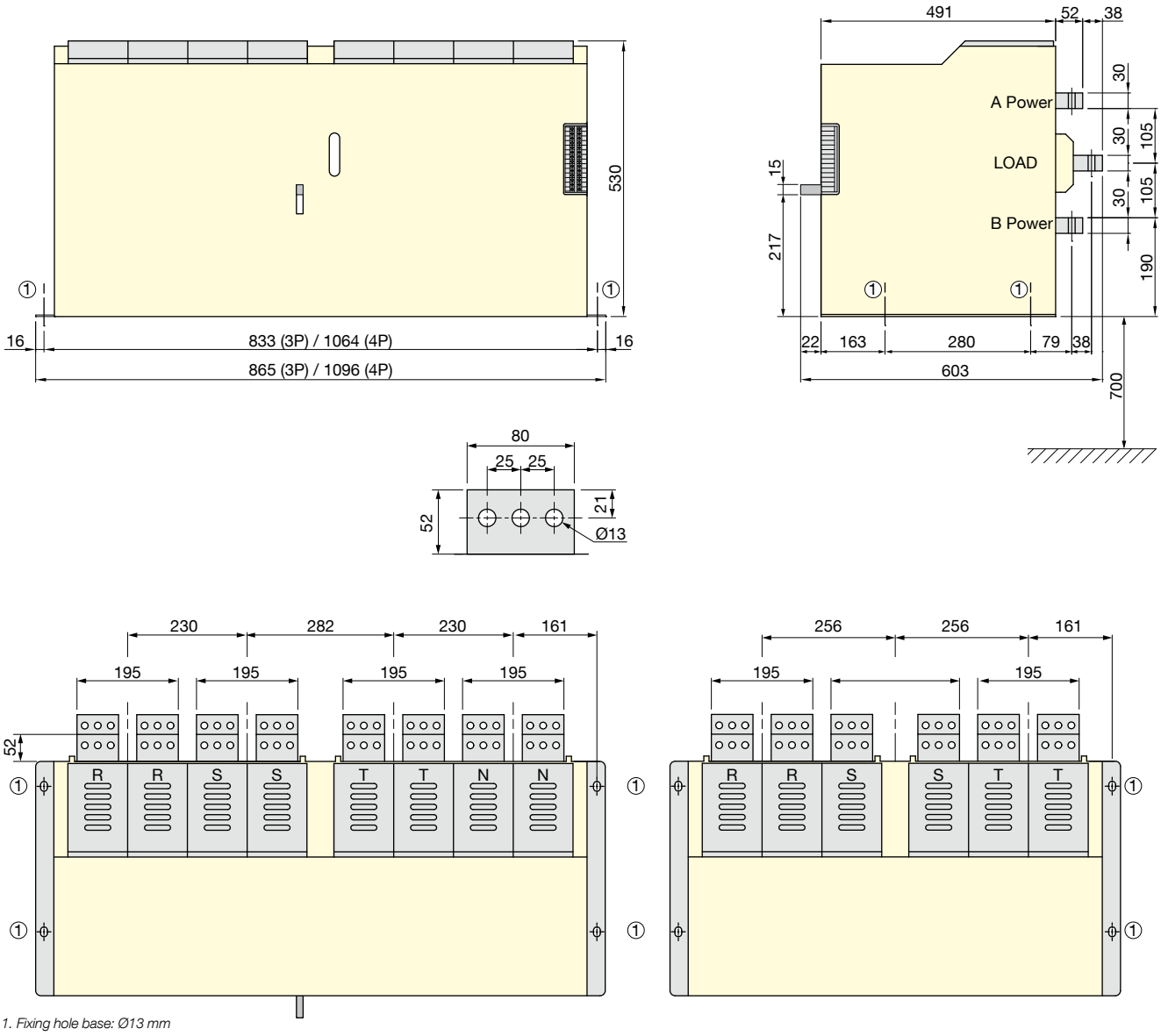
RJ 45 interface cable (3m long) for use between the ATyS D10 / D20 and the ATyS C30.

Others : Refer to the latest SOCOMEC product catalogue. (Downloadable from www.socomec.com)

5. INSTALLATION

5.1. ATyS d H Product dimensions and power terminals

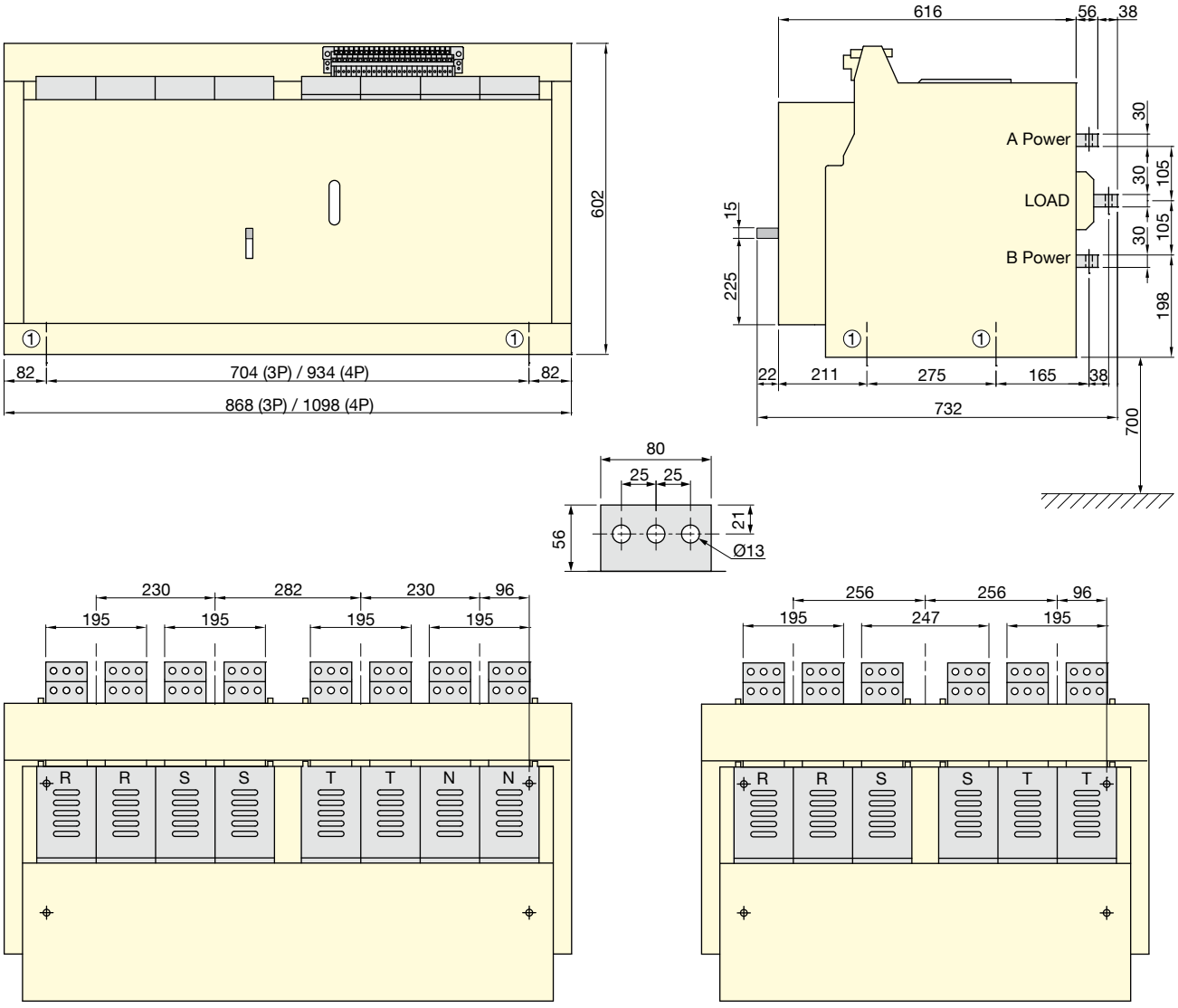
5.1.1. Dimensions 4000 - 6300 A Fixed



1. Fixing hole base: Ø13 mm

NOTE: When installing the ATyS dH in a panel it is recommended to allow a minimum height of 700 mm from the bottom of the product to the floor of the enclosure for ease of access.

5.1.2. Dimensions 4000 A - 6300 A Draw Out



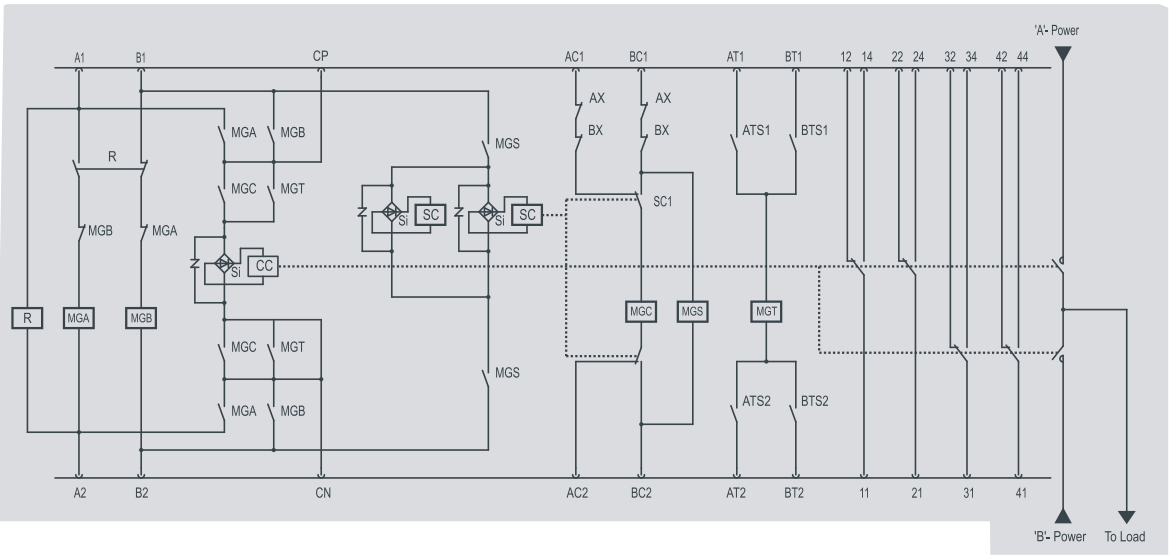
1. Fixing hole base: Ø13 mm

5.2. Mounting Orientation

4000 A 5000 A 6300 A	OK 	Others positions are not allowed

CAUTION	Always install the product on a flat and rigid surface paying attention to the net weight of the product being installed.

5.3. Control Wiring Connection Terminals 4000, 5000, 6300 A

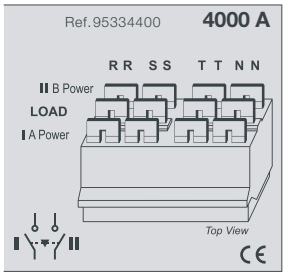


A1,A2	'A'-Power Terminal Sensing	CC	Main Coil
B1,B2	'B'-Power Terminal Sensing	SC	'B'-Power Selective Coil
AC1,AC2	'A'-Power Closing Terminal (ON)	MGA,MGB	Relay Coil
BC1,BC2	'B'-Power Closing Terminal (ON)	MGC	Relay Closing Coil
AT1,AT2	'A'-Power Closing Terminal (OFF)	MGS	Relay Selective Coil
BT1,BT2	'B'-Power Closing Terminal (OFF)	MGT	Relay Tripping Coil
11~24	'A'-Power Aux Switch	Si	Rectifier
31~44	'B'-Power Aux Switch		

NOTE: CP-CN output terminals are the dual power supply (DPS) phase/neutral control power output terminals intended for use with position order signals. (Refer to 5.4.7. for wiring with an ATyS C30 ATS controller).

NOTE: on A1,A2,B1,B2 connections, a 6mm^2 cable and 65A peak protection devices must be used.

5.4. Power circuits and bar connections



Recommended tightening torque:
4000A: M12 / 45 Nm
5000A: M12 / 45 Nm
6300A: M12 / 45 Nm

Maximum tightening torque:
4000A: M12 / 45 Nm
5000A: M12 / 45 Nm
6300A: M12 / 45 Nm

NOTE: Terminals RR, SS, TT and NN are each to be connected in parallel and must be bridged as shown above. Bridging bars are not included with the product and must be supplied by others.

5.5. Busbar connection recommandations

Rating	Cross section per bar	Quantity of bars per phase	Type of screw	Recommended tightening torque (N.m)
4000 A	100mm x 10mm	4	M12	45Nm
5000 A	100mm x 10mm	5	M12	45Nm
6300 A	100mm x 10mm	6	M12	45Nm

5.6. Assembly of customer mounted accessories

DANGER	Never handle any customer mounted accessories while there may be the risk of voltage being or becoming present.

NOTE: If you are using an external controller different from ATyS C20/C30/C40 please note that a delay timer in 0 position (OFF-OFF) must be established with a minimum time of 1,5 seconds.

5.6.1. ATS Controller for use with the ATyS d H

ATyS C20/C30/C40 are modular ATS control relays. They ensure the automatic control of remotely operated transfer switching equipment such as the ATyS r, ATyS d, ATyS S, ATyS d S, ATyS d M and ATyS d H as well as common contactors, circuit breakers or most other motorised transfer switches.

ATyS C20/C30

- Inputs for auxiliary contact position information.
- 3U measurement on network 1 and 1U on network 2.
- 2 programmable inputs for the following functions: test on/off load, manual retransfer, start/stop transfer cycle.
- Up to 2 programmable outputs for the following functions: source availability information and circuit breaker control.
- 1 relay output for genset control.
- D10 or D20 remote interfaces are available for transferring data or control to the front cabinet panel (only on C30 version).

ATyS C20 controller

ATyS C30 controller

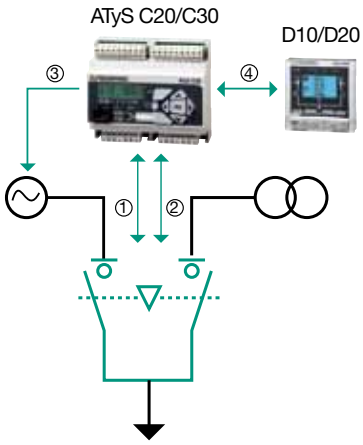
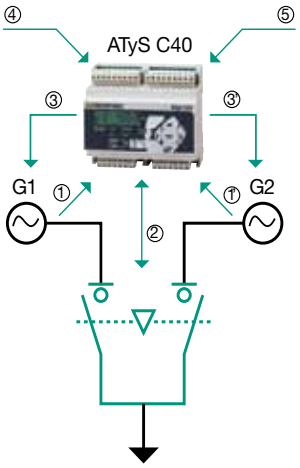
ATyS C40

- Dual genset controller with a redundant genset application cycle (basic cycle).
- 1U and F measurement on each source - genset 1 & genset 2.
- 3 programmable inputs for the following functions: test on/off load, manual retransfer, start/stop transfer cycle.
- 1 programmable output for the following functions: source availability information and circuit breaker control.
- 2 genset control contacts (Gen1 & Gen2).

ATYS_599_C

ATyS C40 controller

5.6.2. Typical configurations

ATyS C20/C30 :	ATyS C40 :
Transformer /transformer and transformer / genset applications  1. Measurement and power supply 2. Control and position information feedback 3. Genset start / stop control 4. ATyS display/interface connection (only on C30 version)	Genset / genset applications  1. and 1'. 1U and F measurement for each genset 2. Control and position information feedback 3. and 3'. Genset «start/stop» control 4. External «start/stop» command for basic cycle 5. DC power supply

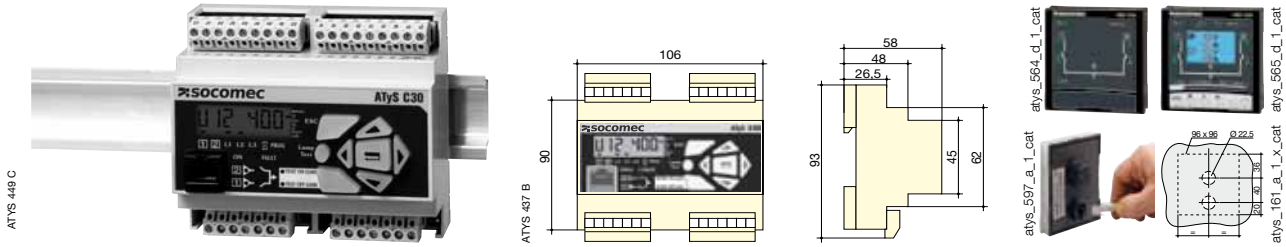
5.6.3. ATyS C20/30/40 references

Type	ATyS C20 Reference	ATyS C30 Reference	ATyS C40 Reference
Supplied from measurement circuit	1599 **3020**	1599 **3030**	
DC power supply		1599 **3031**	1599 **3040**

5.6.4. ATyS C20/30/40 Electrical characteristics

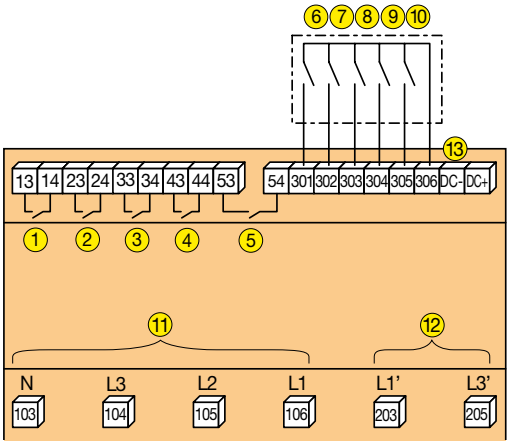
Supplied from measurement circuit	110 … 400 VAC
DC power supply	9 … 30 VDC
Measurement range	110 … 400 VAC / ± 10 %
Frequency	50/60 Hz
Accuracy	± 1 %

5.6.5. Installation of the ATyS C20/30/40 and D10/20



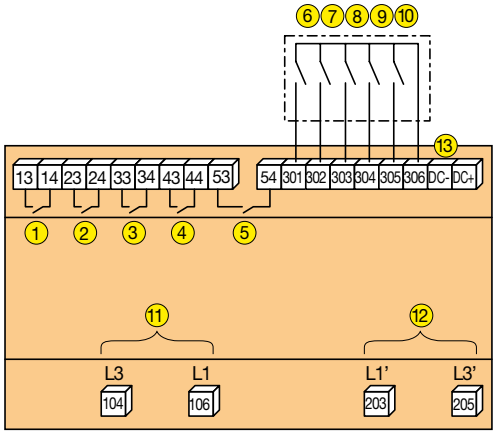
5.6.6. ATyS C20/30/40 terminal connection

5.6.6.1. ATyS C20/30 connections



1. Genset start / stop control
2. Position 1: power control
3. Position 2: power control
4. O1: programmable output
5. O2: programmable output
6. AC1: auxiliary contact position 1
7. AC0: auxiliary contact position 0
8. AC2: auxiliary contact position 2
9. I1: programmable input
10. I2: programmable input
11. Source 1 : 3 U network measurement and power supply
12. Source 2 : 1 U network measurement and power supply
13. DC power supply 9-30 VDC
(version 1599 3031)

5.6.6.2. ATyS C40 connections



1. Genset G1 start / stop control
2. Position 1: power control
3. Position 2: power control
4. O1: programmable output
5. Genset G2 start / stop control
6. AC1: auxiliary contact position 1
7. I3: programmable input
8. AC2: auxiliary contact position 2
9. I1: programmable input
10. I2: programmable input
11. Genset G1: 1U measurement
12. Genset G2: 1U measurement
13. DC power supply 9-30 VDC

5.6.7. Interfacing the ATyS C20/30/40 with the ATyS d H

The ATyS d H includes 4 inputs to control the supply source selector and switch positions:
- Input “Source I” - A power closing terminal
- Input “Source II” - B power closing terminal
- Input “Source I” - A power tripping terminal
- Input “Source II” - B power tripping terminal

To transfer the source supply from source I to source II the following sequence must be followed:

To transfer the switch to source II (B) from source I (A) electrically (with push buttons or an ATS controller) ensure to follow the following sequence:
- Trip switch I to the OFF position – Momentarily close Input “Source I “A” power tripping terminal”
- Activate switch II to the ON position – Momentarily close input “Source II “B” power closing terminal”

To transfer to source I (A) from source II (B) orders must be given in the following sequence:
- Trip switch II to the OFF position – Momentarily close Input “Source II “B” power tripping terminal”
- Activate switch I to the ON position – Momentarily close input “Source I “A” power closing terminal

CAUTION	• When tripping or transferring the switch positions ensure to provide a dry contact signal for at least 0.5s • DO NOT activate switch I and switch II position inputs simultaneously as this will permanently damage the switching coil in the transfer switch. • DO NOT open and close the switch repeatedly or without any interval between operations. Minimum interval between signals is 1.5s

- With the ATyS C20/30/40 ATS controller programmed in the SETUP menu to “Impulse Logic” the controller includes 3 dry contact outputs dedicated to position I (23/24), position II (33/34) and position 0 (43/44). When controlling the ATyS d H connect outputs “source I (A) power tripping terminal” and “source II (B) power tripping terminal” to input position 0 of the ATS controller.

Setup

ESC

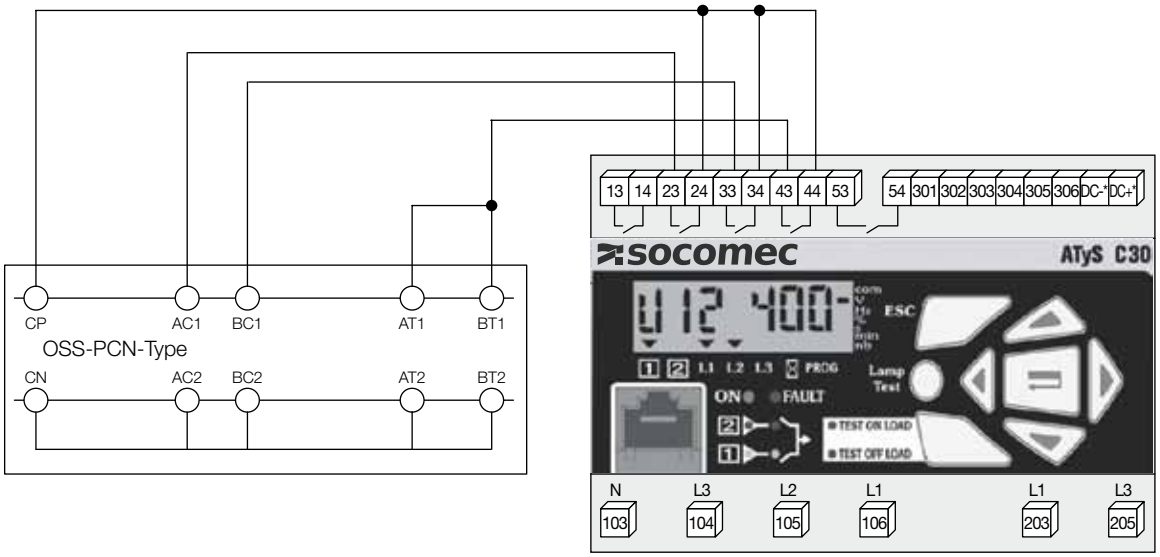
Impulse, breaker or contactor logic

CAUTION

- Ensure to program the logic type to Impulse (Imp) in the setup menu.

LCD	Denomination	Definition	Setting range	Default value
	Type of control logic selection	Impulse, contactor or breaker. It might be necessary for some breakers not to set up 1DT and 2DT timers to 0 (2sec. for example).	Imp, Con, brE	Imp

- Connect terminals AT1 and BT1 (Trip) on the ATyS d H to terminal 43 (position 0 order) on the ATS controller as shown in the diagram below.
- Connect terminals AC1 (source I “A” closing) on the ATyS d H to terminal 23 (position I order) on the ATS controller as shown below.
- Connect terminals BC1 (source II “B” closing on the ATyS d H to terminal 33 (position II order) on the ATS controller as shown below.



- The ATyS C20/30/40 must be configured to a stop in the “0 position” for a delay that is set higher than that as set on the transfer switch. (Minimum setting value 1.5s)

Timer

ESC

1 Dead Timer

Timer

ESC

2 Dead Timer

CAUTION

- Ensure to set the 1dt and 2dt (0position dead timers) to a minimum of 1.5s in the Timers menu.

For other settings and programming details specific to the ATyS C20/30/40 refer to the latest associated instruction manual available for free download from www.socomec.com

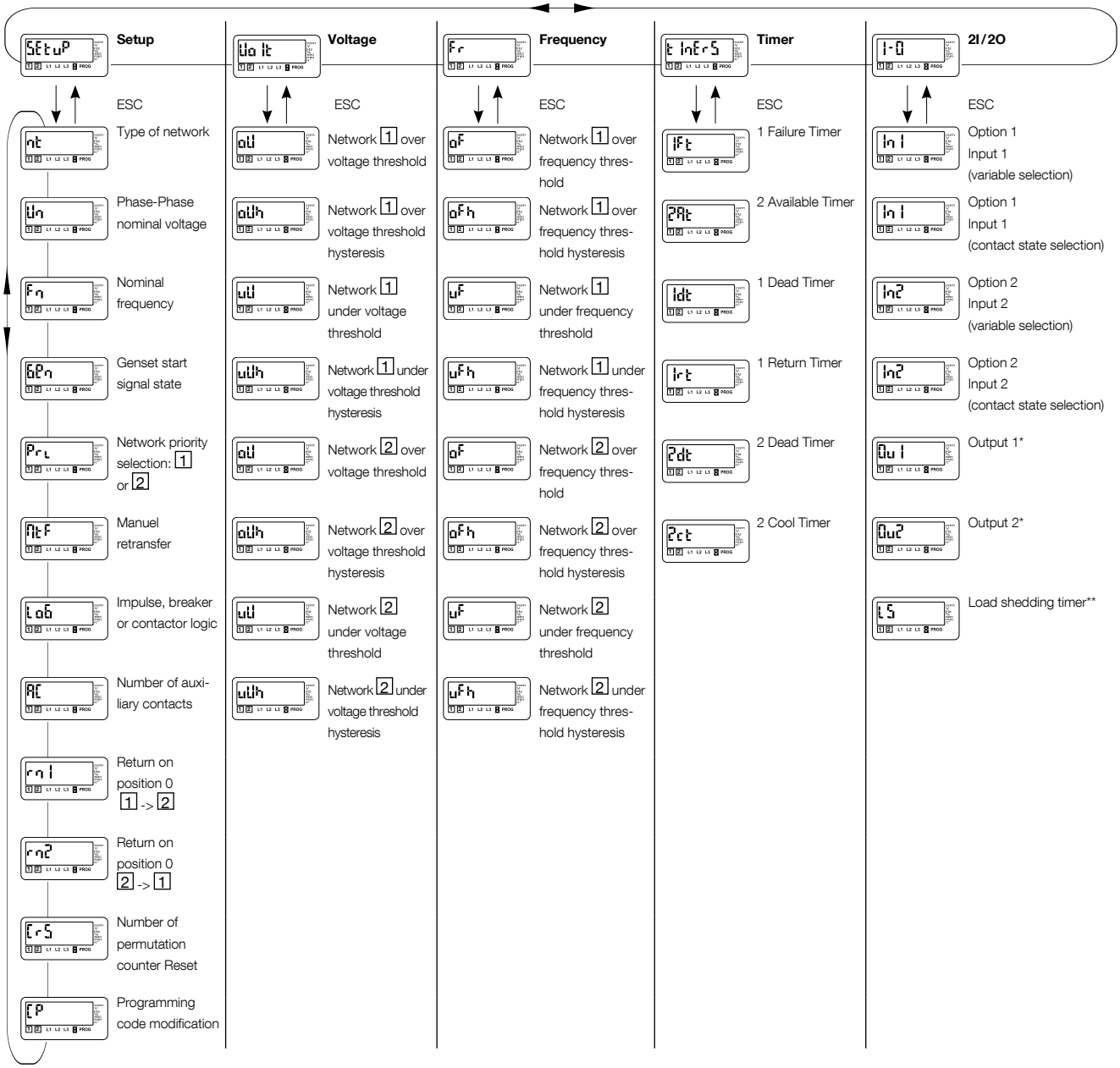
6. ATYS D H CONTROLLER PROGRAMMING

The ATyS d H can be controlled by an ATyS C20/30/40 ATS controllers, BMS or PLC system or most other compatible ATS control systems providing dry contact outputs.

ATyS C20 controller

ATyS C30 controller

ATyS C40 controller



For complete details concerning the ATyS C 30 programming refer to the C20/30/40 instruction manual downloadable from www.socomec.com

7. ATYS D H OPERATING MODES

The ATyS d H includes three operating modes as follows:
- Remote mode that accepts orders from external push buttons. (On-Load)
- Automatic mode when associated with an ATS Controller. (On-Load)
- Manual / Emergency operation. (OFF Load)

7.1. Manual operation procedure

This procedure is intended for use “Off-Load” during a maintenance or emergency transfer operation.

CAUTION

- Ensure to put the ATS controller /transfer switch into Manual Mode before attempting to carry out manual operation.
- Manual operation “MUST” be done under no load condition.

⚠ WARNING

Manual operation is to be carried out OFF LOAD Only, with both incoming supply sources I and II (A and B) safely isolated from the transfer switch.

Do Not insert the manual handle in the mechanism when any supply source is available (or may become available) on the transfer switch.

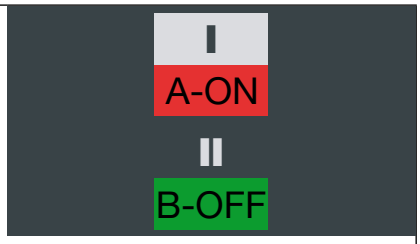
Auxiliary voltage used for automatic transfer must be switched OFF prior to inserting the manual handle into the transfer switch mechanism.

Do not leave the Manual handle in the manual operating mechanism when restoring any control or power supply to the transfer switch.

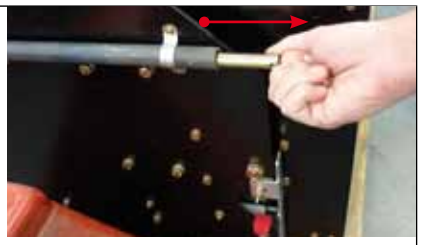
7.2. Manual transfer procedure

7.2.1. Transfer from source I to source II (A to B Power)

1 Check that the position indicator B shows B-OFF. Trip (Switch off) the switch if the indicator A is shown as ON. (Refer to the next step to Trip)



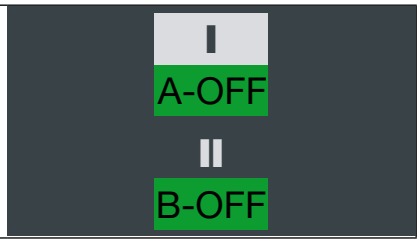
2 Remove the handle from its storage location.



3 Insert the manual lever into the dedicated hole through the front cover as shown

4 Push the lever down to the full.

5 Check that indicator A is in the OFF position.



6 ATTENTION: Follow this instruction carefully.
Press and hold “B power selection lever” as shown with the left hand.

7

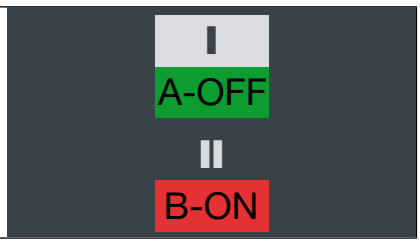
Insert the manual lever into the location and pull the lever up to the full.
The switch shall be switched to B power.

8

Release the “B power selection lever and withdraw the manual lever.

9

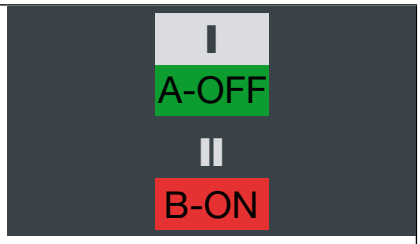
Check that the position indicator B is -ON.



7.2.2. Transfer from “B” to “A” Power

1

Check that the position indicator A shows A-OFF.
Trip (Switch off) the switch if the indicator B is shown as ON. (Refer to the next step to Trip)

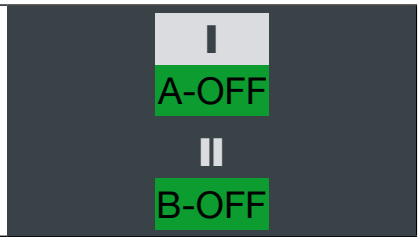


2

Insert the manual lever into the dedicated hole through the front cover as shown, and push the lever down to the full.

3

Check that indicators A and B are in the OFF position.

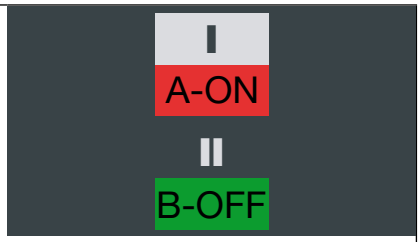


4

To switch to A Power.
Insert the manual lever into the lever hole, and pull the lever up to the full.

5

Check that the position indicator A is -ON.
In case the indicator does not show A-ON, repeat the above mentioned step



7.3. Method to draw in and draw out the switch

7.3.1. Draw out method

Applicable to transfer switch equipment including a drawout chassis.

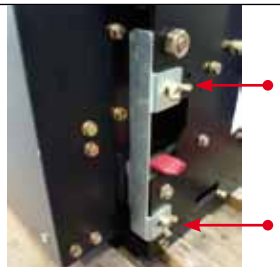
1

Ensure that the transfer switch is in the power OFF position for A and B source supplies.

Follow the manual tripping instructions described above in case A or B indicate ON.

2

Remove the protection cover for the draw in draw out lever by removing the 2 butterfly nuts as shown.



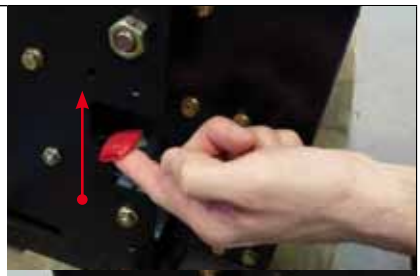
3

Locate the two (2) draw in / draw out levers located at the left and right side of the switch cradle and lift them upwards as shown.

ATTENTION: Attempting to draw in or out the transfer switch without lifting both these levers will cause significant damage to the mechanism.

Caution: The safety bar will not allow draw in-out handle to be inserted with the transfer switch in the «ON» position.

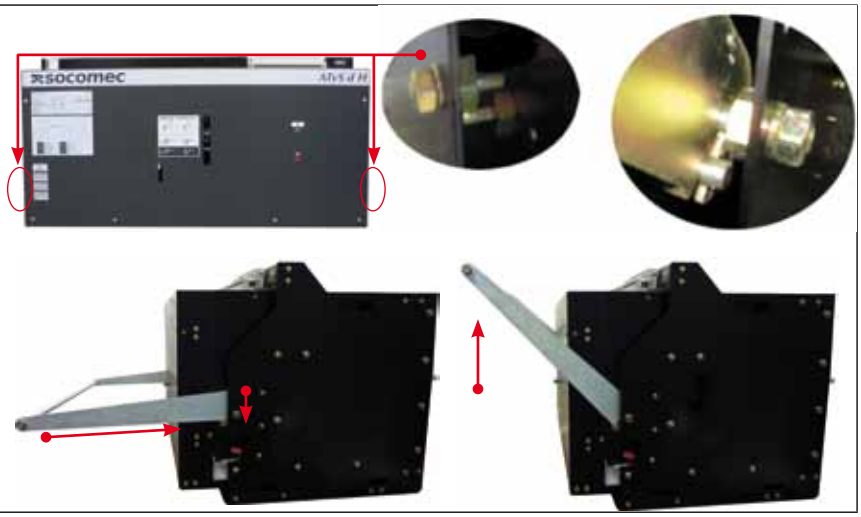
Insert the draw in-draw out handle as shown in the step below with the draw in-out lever pushed up.



4

Caution: The transfer switch may start to draw out moving into the «TEST» position. (This is with the draw in-out handle inserted and pushed up as the lever may start to move down).
When in the «TEST» position, push the draw in-out lever up, and pull the transfer switch out until it reaches the «Disconnected» position.

Caution: The transfer switch may fall if it is pulled out beyond the the disconencted position or faster then the draw out force required.
Remove the switch from the cradle with the draw in/out lever pushed up to the «Disconnected» position.

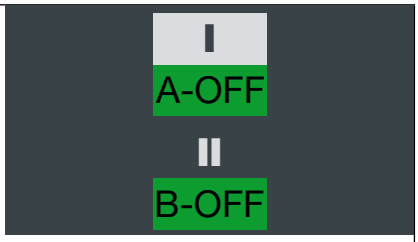


7.3.2. Draw in method

Applicable to transfer switch equipment including a drawout chassis only.

1

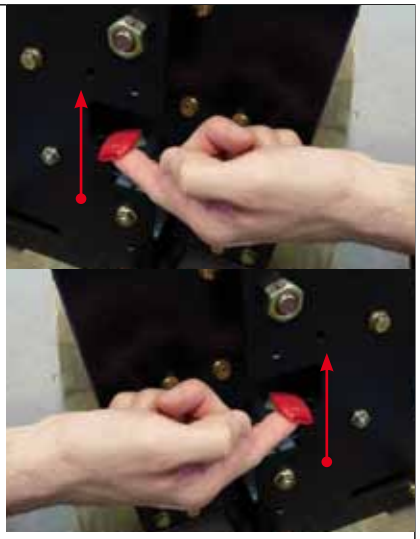
Ensure that both switches A and B are in the OFF position.



Note: In case A or B indicate ON follow the manual tripping instructions described above before drawing out the switch.

2

Locate the two (2) draw in / draw out levers located at the left and right side of the switch cradle and lift them upwards as shown.



ATTENTION:
Attempting to draw in or out the transfer switch without lifting both these levers will cause significant damage to the mechanism.
Insert the draw in-draw out handle with the draw in-out lever pushed up.

3

Disconnected position:

- With the transfer switch in the disconnected position: (The main circuit terminals and operating circuit terminals disconnected).
- Carefully place the transfer switch on the cradle rail in the locations provided on the left and right side of the cradle.
- Insert the switch inside the panel until the draw in / draw out lever falls back.

Draw in / draw out rail.

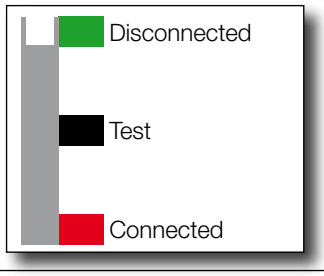
«Disconnected» will show in Draw in-out indicator window.

- In the disconnected position, push up the draw in / draw out lever located on both sides of the cradle as shown above.

ATTENTION: It may cause damage if if the draw in / draw out levers were not pushed up.

- Push the transfer switch inside the panel until the draw in / draw out lever falls back.

«Test» will show in Draw in / draw out indicator window.



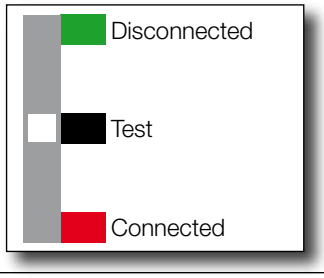
4

TEST position

In this position the Test off load is available with the main circuit terminals disconnected and the control operation circuit connected.

ATTENTION : Ensure that the draw in / draw out lever moved down to indicate TEST. It the position does not indicate TEST incorrect operation may occur during the test.

Ensure that after TEST both power sources A and B are put to the OFF position before a draw in or out operation.
(Refer to manual operation above to trip A or B to OFF)



5

Connected position

This is the normal operating position with the transfer switch main circuit connected.

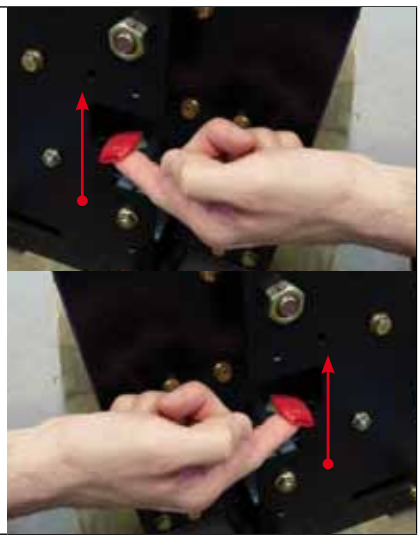
In the TEST position and with both A and B in the OFF position, push up the draw in / draw out lever located on both sides of the cradle.

Caution : It may cause damage if draw in-out lever is not pushed up.

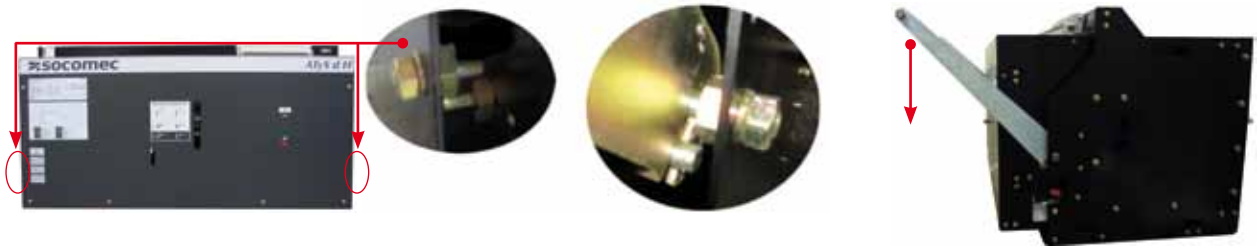
Push the transfer switch inside the panel firmly until the draw in-draw out lever falls back.

Push the transfer switch in firmly until the draw in-draw out handle reaches the locking pin.

Caution : The Switch will not go to the fully drawn-in compartment (connected) with A or B in the ON position.

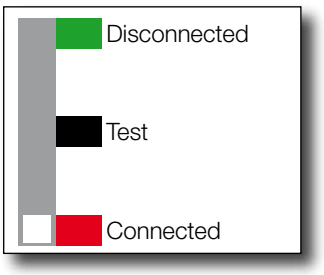


6



7

After pushing the transfer switch fully into the cradle, push down the draw in-draw out handle, and check that the draw in/out indicator is in the «Connected» position.



8

After the draw in action is complete, replace the cover of the draw in-out lever and fix the butterfly nuts. (2 nuts)

Caution: The transfer switch may draw itself out due to vibration if the cover is not fixed tightly as shown.

8. ATYS D H CHARACTERISTICS

After all checks have been verified and all programming and commissioning procedures are ready and ok, put the ATyS d H into AUTO operation. To be carried out by qualified and trained personnel.

4000 to 6300 A

Thermal current I_{th} at 40°C	**4000 A**	**5000 A**	**6300 A**
Rated operating voltage U_e (V)		660	
Rated insulation voltage U_i (V)		660	
Rated impulse withstand voltage U_{imp} (kV)		12	
Number of poles		3 and 4 poles (with fully rated neutral)	
Rated short-circuit withstand at 660 VAC			
Rated short-time withstand current 0.1s I_{cw} (kA rms)		65	
Rated short-circuit making capacity I_{cm} (kA peak)		143	
Utilisation category at 660 Vac - AC32B - IEC 60947-6-1	4000 A	5000 A	6300 A
Utilisation category at 660 Vac - AC 33iB (6xIn cos ø 0.5) - GB 14048-11	4000 A	5000 A	6300 A
Connection			
Rear connection with busbar	•	•	•
Switching time			
I to 0 (ms)		≤ 150	
0 to I and 0 to II (ms)		≤ 90	
II to 0 (ms)		≤ 200	
I-0-II / II-0-I (s)		≤ 1.2	
Operating frequency		<10 operations per hour	
Power supply			
VAC power supply (Self powered directly off SI and SII power termials)		230	
Main coil operating current (peak during transfers)		65 A(1)	
Mechanical characteristics			
Durability (number of operating cycles)		3000	
Weight (kg) - Fixed model 3 poles / 4 poles	200 / 250	200 / 250	200 / 250
Weight (kg) - Drawout type 3 poles / 4 poles	300 / 400	300 / 400	300 / 400

(1) Instantaneous value. For a complete operation, power should be available during 0.5 s.

NOTE: Maximum cable length for position orders 5m

9. ATYS D H FAMILY: ORDERING INFORMATION

The following is an ordering guide for ATyS d H remotely operated transfer switching equipment. This guide is intended so as to explain the logic behind SOCOMEC ATyS reference numbers.
When ordering please consult the latest SOCOMEC catalogue.
Typical ATyS d H reference numbers:

95 3 3 4 400 -CN

Product	**Type**	**Ctrl Voltage**	**N° of poles**	**Rating**	**CCC / IEC**
95: I - O - II	3: ATYS d H	3: 230VAC	3: 3 Pole 4: 4 Pole	400: 4000A fixed 401: 4000A drawout 500: 5000A fixed 501: 5000A drawout 630: 6300A fixed 631: 6300A drawout	CCC: CN IEC: leave blank

CAUTION	To order a complete automatic transfer switch order the transfer switch based on the ordering information above and the ATyS C20/30/40 ATS controller separately depending on the requirement. (Refer to the spares and accessories section for reference details)

10. SPARES AND ACCESSORIES

10.1. ATyS C20/30/40 ATS Controller

ATyS C20/30/C40 are modular control relays that allow virtually any type of motorised changeover control: ATyS and ATyS M, ATyS H contactors, circuit breakers or other motorised switches.

			
Type	**ATyS C20 Reference**	**ATyS C30 Reference**	**ATyS C40 Reference**
Supplied from measurement circuit	1599 **3020**	1599 **3030**	
DC power supply		1599 **3031**	1599 **3040**

Refer to the ATyS C20/30/40 instruction manual for details.
Available for download from www.socomec.com

10.2. Maintenance spares

Description	
Contactor MC40 Contactor MC22 Contactor MR4	Contact SOCOMEC
8 pole relay HR7	
Bridge rectifier DD11 Silicon rectifier GBPC	
Main solenoid coil SPG Selective solenoid coil DS3	
Limit switch DZ10 Limit switch 215G Limit switch V163	
Shock absorber MAK	
Arc chamber AC	

11. PREVENTIVE MAINTENANCE

Maintenance should be planned carefully and carried out by qualified and authorized personnel. Consideration of the critical level and application where the product is installed should form an essential and integral part of the maintenance plan. Good engineering practice is imperative whilst all necessary precautions must be taken to ensure that the intervention (whether directly or indirectly) remains safe in all aspects.
It is recommended to clean from dust and any residue that may be present every six months. It is also recommended to verify the tightening torque of all connections and to operate the product in a full operating cycle (I – 0 – II – 0 – I : Auto and Manual) at least once every year. The main contacts should be checked visually and carefully inspected for distortion or discolour of the contacts area.

Checks	**Interval**			
	Normal environment		Severe environment	
Instantaneous	Once	6 months	Once	6 months
Periodic	Once	1 year	Once	6 months
Temporary	Not necessary			

11.1. Instantenous checks

Checks Type	**Details**
Visual check	Discoloration of terminals due to overheating Discoloration of insulation Corrosion on any part of the product Dust in or on the product Abnormal odour from or around the product Damage such as breakage and/or distortion

11.2. Periodic checks

Item		**Requirement check for…**	**Trouble shooting and action**
Insulation materials	Contacts enclosure insulation	Damage or cracks	Stop operation safely and consider to replace the damaged parts
		Humidity and/or dust	If a lot of humidity and/or dust is present plan a safe intervention to clean the product
		Loose bolts	Tighten the bolts at the specified torque
		Arc damage on insulation barriers	If heavy spoiling is found check the contacts for any damage and consider to safely replace the damaged parts
	Arcing chamber	Serious damage to the Arcing chambers	Discoloration is considered to be a normal condition but consider to replace any parts that are broken
		Serious damage to the Arcing barriers	Consider to replace any parts that are broken or damaged.
Conductive parts	Contacts	Damage to auxiliary contacts	Light discolour - Clean with sand paper. If serious discolour consider to replace the contacts
		Surface contact	Ensure that the contact is good to avoir overheating
		Damage to contacts	Consider to replace the contacts
		Discolouring of the contacts	Clean or replace contacts depending on the damage
		Loose bolts on the contacts	Tighten to the specified torque
Operation	Mechanical Operation	Moving parts dry or scratched	Lubricate moving parts
		Damage or rust on moving parts	Evaluate the damage and replace the parts when safe
		Damage or rust on the springs	Replace the damage parts
		Loose bolts and nuts	Tighten to the specified torque
		Loose or damaged E ring, shock absorbers and/or stoppers	Fix or replace in the right position

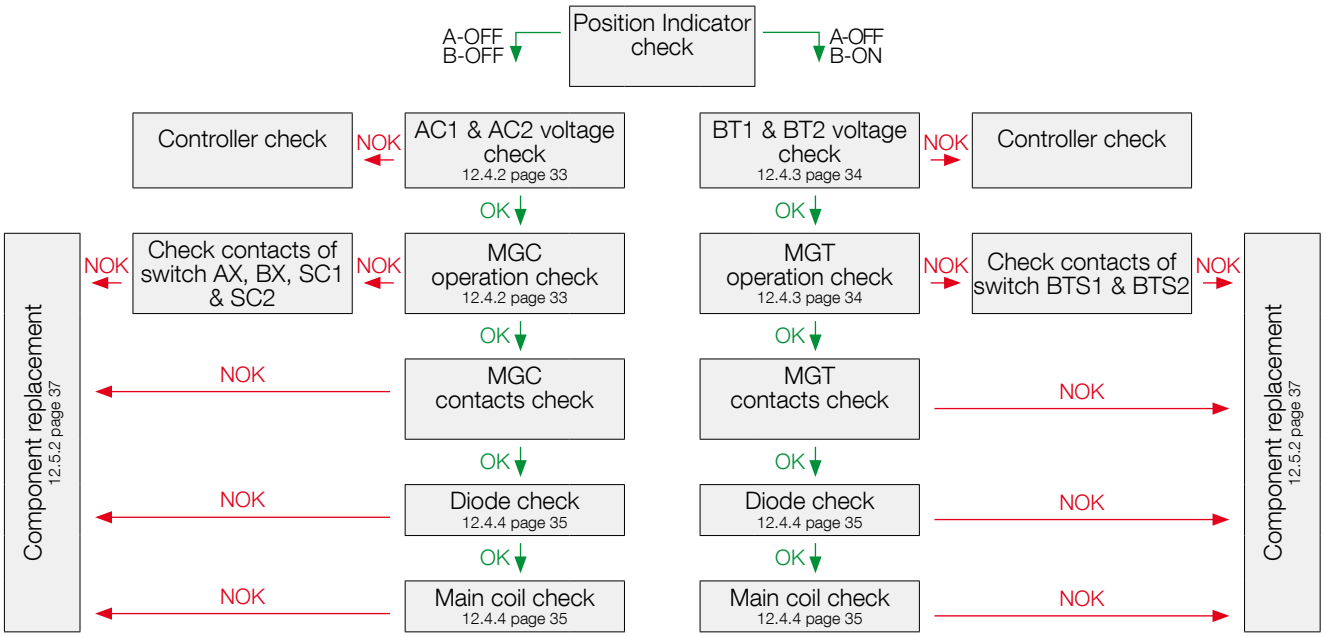
12. MAINTENANCE AND TROUBLE SHOOTING

DANGER	Maintenance and trouble-shooting must only be carried out by qualified and authorised personnel that are equipped with the right tools and protective wear whilst following safe procedures and practices. Failure to do so may result in electric shock, burns, physical disability and/or death. Furthermore note that any maintenance such as verification of the contacts: replacement on the main coil... will required the use of adequate lifting equipment.

12.1. The ATyS d H fails to switch to A-ON (Position I)

- Check that the voltage on terminals A1 and A2 is available and within the limits of 220-240 VAC
- Check that the circuit breaker for A power is ON
- Check that the power output between terminals CP and CN is within 220-240 VAC
- Refer to section «12.4.1. Circuit and components check (Dual Power Supply output circuit – DPS)», page 32

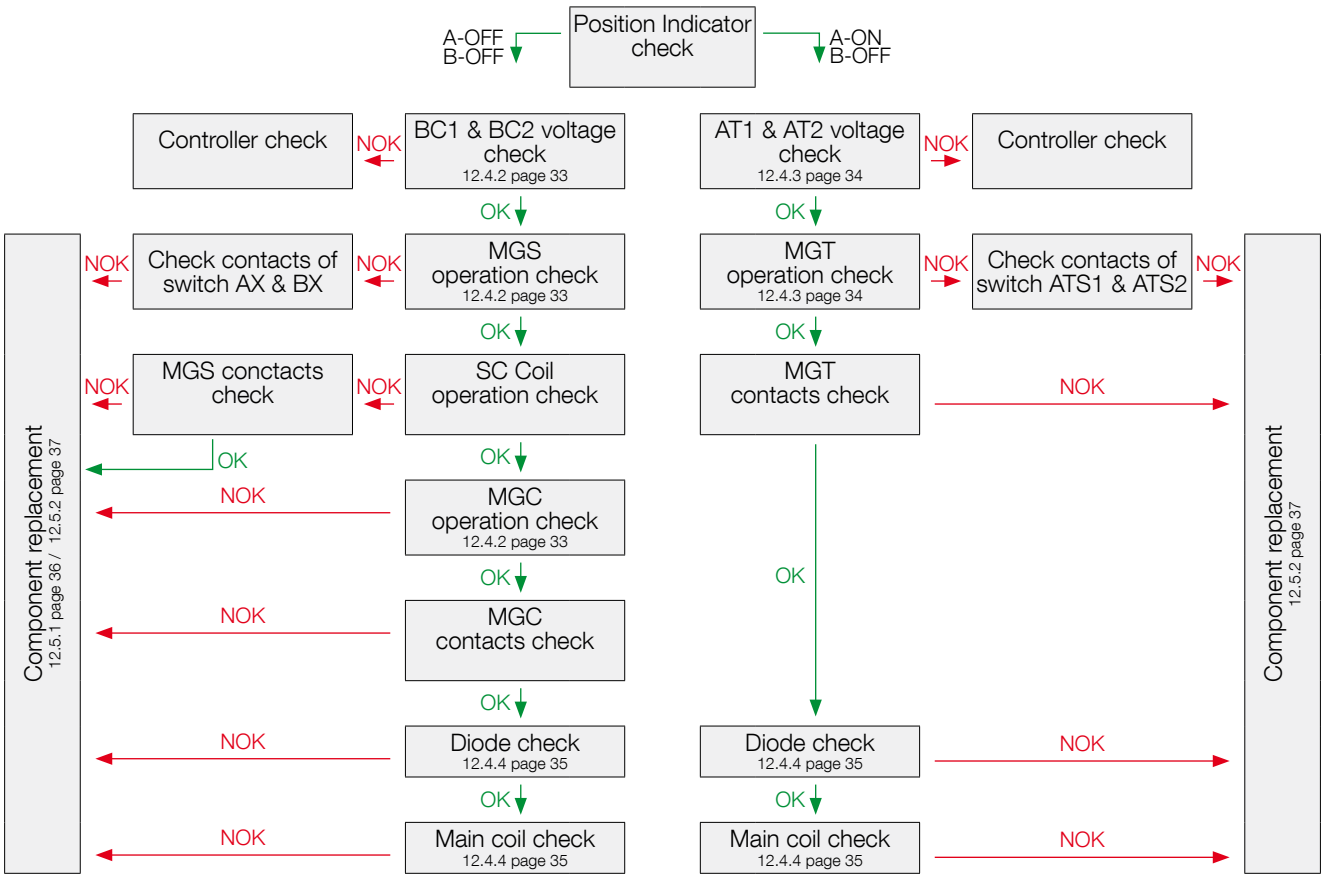
After carefully checking the above go through the following fault-finding procedures:



12.2. The ATyS d H fails to switch to A-OFF or B-OFF (Position I or position II to OFF)

- Check that the voltage on terminals B1 and B2 is available and within the limits of 220-240 VAC
- Check that the circuit breaker for B power is ON
- Check that the power output between terminals CP and CN is within 220-240 VAC
- Refer to section «12.4.1. Circuit and components check (Dual Power Supply output circuit – DPS)», page 32

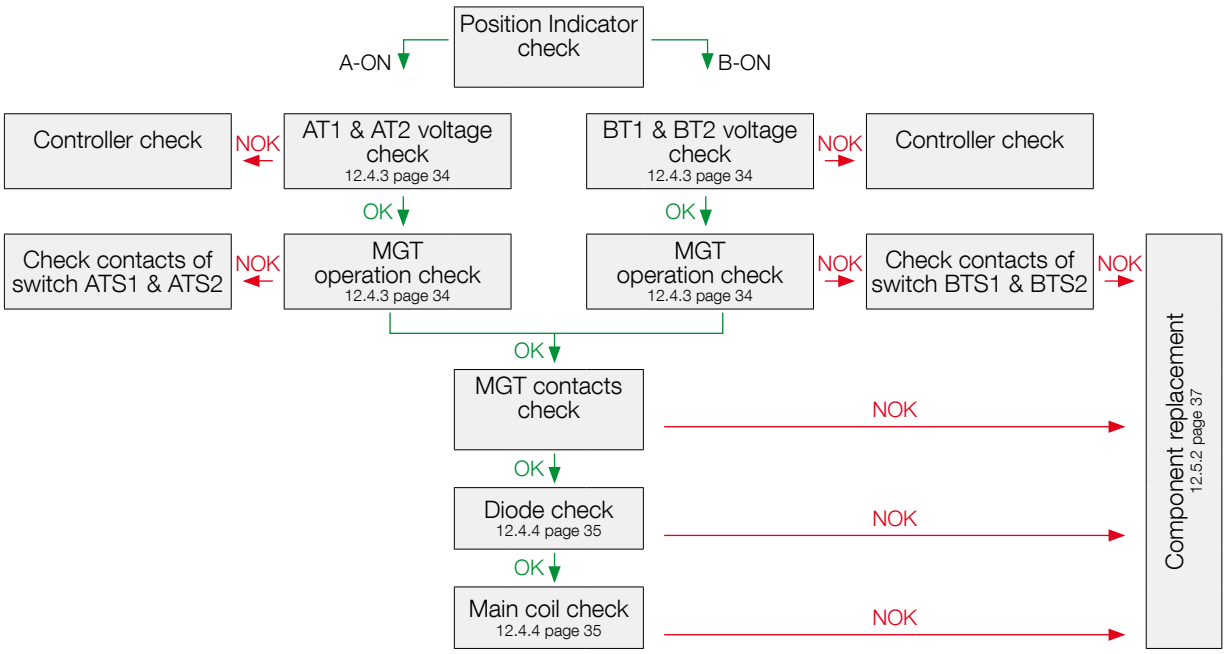
After carefully checking the above go through the following fault-finding procedures:



12.3. The ATyS d H fails to switch to B-ON (Position II)

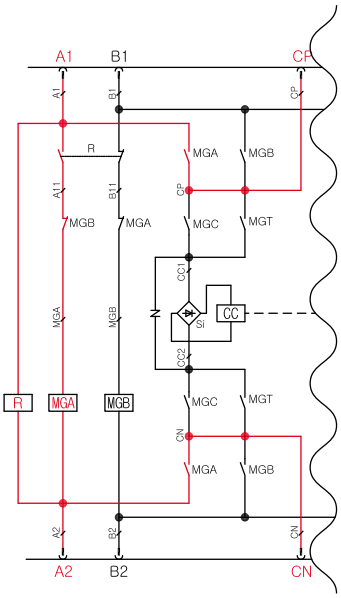
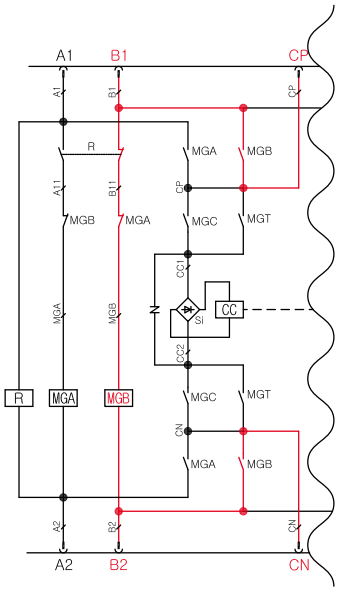
- Check that the voltage on terminals “A1 and A2” or “B1 and B2” is available and within the limits of 220-240 VAC
- Check that the circuit breaker for A power and/or B power is ON
- Check that the power output between terminals CP and CN is within 220-240 VAC
- Refer to section «12.4.1. Circuit and components check (Dual Power Supply output circuit – DPS)», page 32

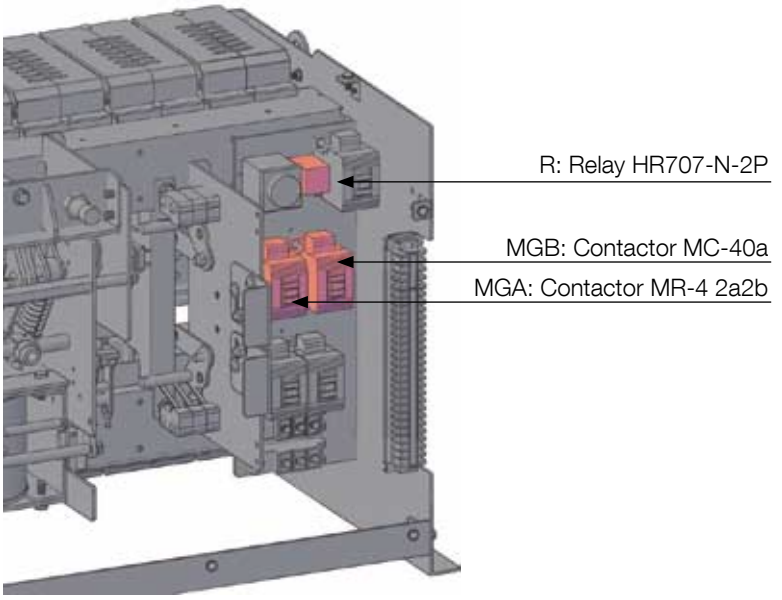
After carefully checking the above go through the following fault-finding procedures:



12.4. Loop checks

12.4.1. Circuit and components check (Dual Power Supply output circuit – DPS)

A1, A2 power input	B1, B2 power input
	



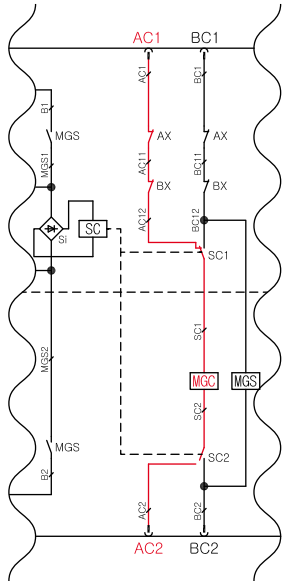
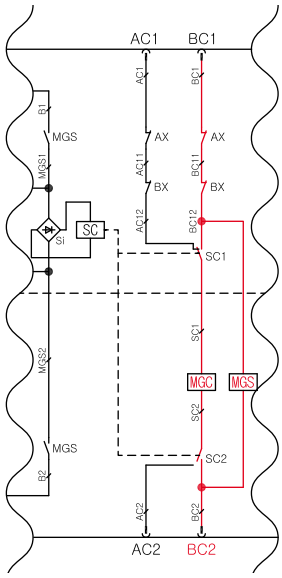
Note:

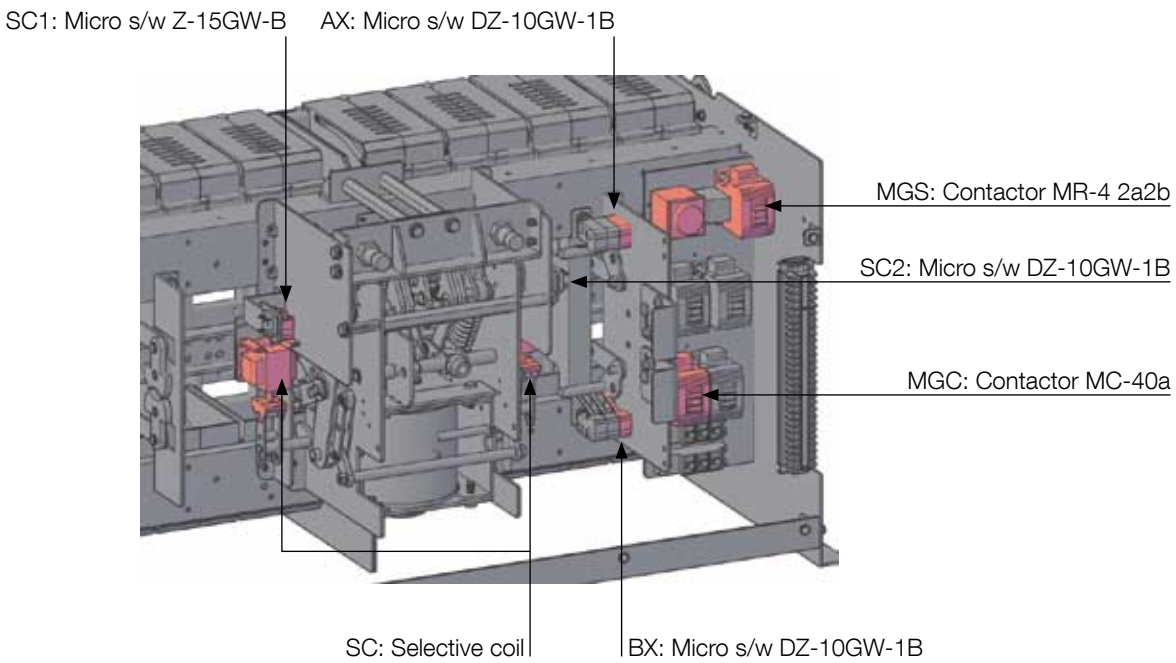
A – Power fed through A1 – A2 input terminals takes priority over B – Power supplied through B1 – B2 terminals. The output terminals CP – CN are supplied by A – Power when both A and B – Power supplies are both available.

- Should there be no output phase / neutral voltage between CP – CN terminals with A1 – A2 active, check relay R and contactor MGA for contact continuity and correct operation.
- Should there be no output phase / neutral voltage between CP – CN terminals with B1 – B2 active, check relay R and contactor MGB for contact continuity and correct operation.

12.4.2. Change MGC circuit check (Contactor closing coil)

Ensure that any automatic controls in auxiliary equipment is put to manual mode before carrying out an MGC circuit check.

AC1, AC2 power input	BC1, BC2 power input
	



- Give the A-ON order by powering AC1 and AC2 terminals with an impulse command.
- Should MGC not operate check the contacts of AX, BX, SC1, SC2.

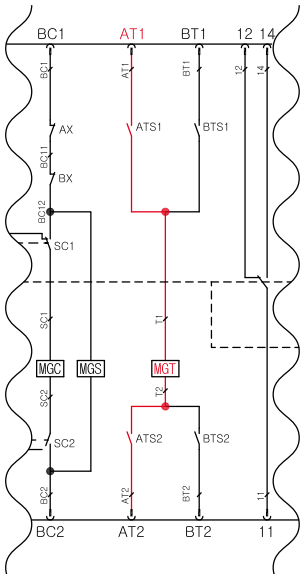
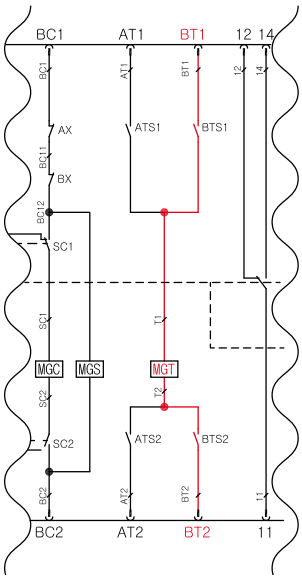
Action required: Replace any component found defective.

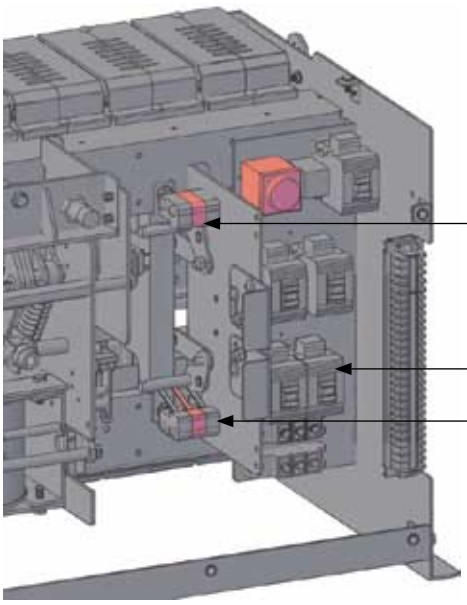
- Similarly give the B-ON order by powering BC1 and BC2 terminals with an impulse command.
- If MGS is not operating properly then check that contacts SC1 and SC2 operate solenoid SC.

Action required: Replace any component found defective.

12.4.3. MGT circuit check (Relay tripping coil)

Ensure that any automatic controls in auxiliary equipment is put to manual mode before carrying out an MGT circuit check.

AT1, AT2 power input	BT1, BT2 power input
	



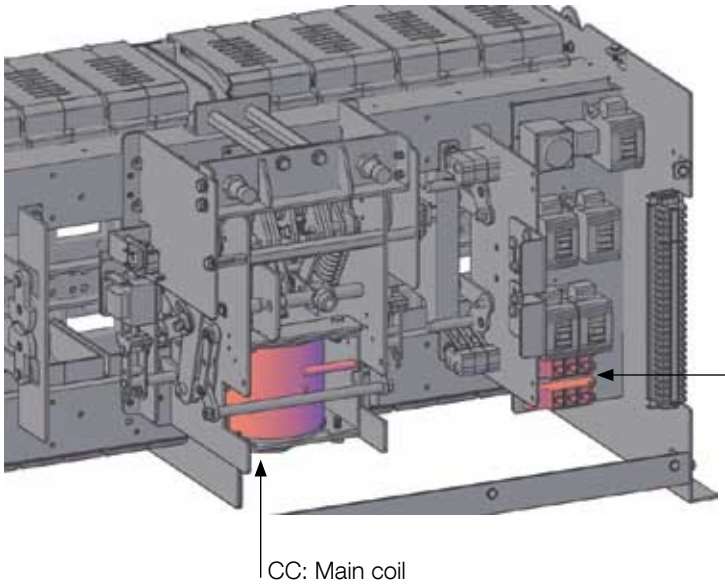
- Give the A-OFF order by powering AT1 and AT2 terminals with an impulse command.
- Should MGT not operate check the micro switch contacts of ATS1, ATS2.

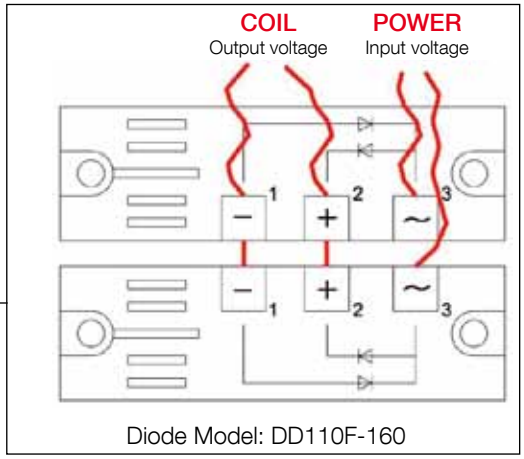
Action required: Replace any component found defective.

- Similarly give the B-ON order by powering BT1 and BT2 terminals with an impulse command.
- If MGS is not operating properly then check that contacts BTS1, BTS2.
- If MGS does not operate then check the that micro-switch SC1 and SC2 operate selective coil SC.

Action required: Replace any component found defective.

12.4.4. Diode rectifier & Main coil check

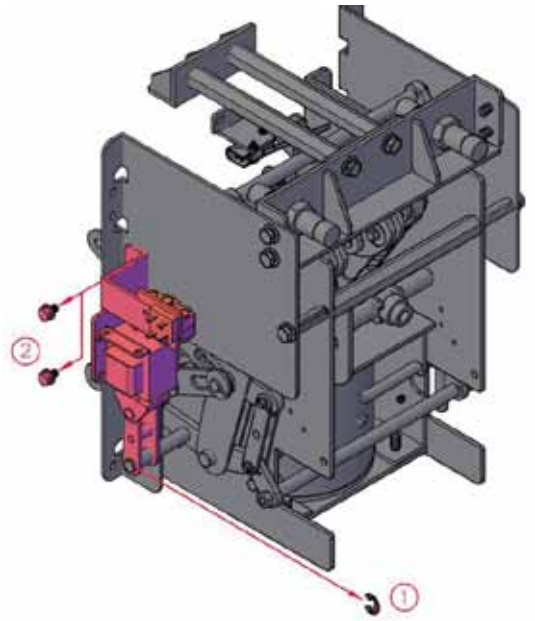




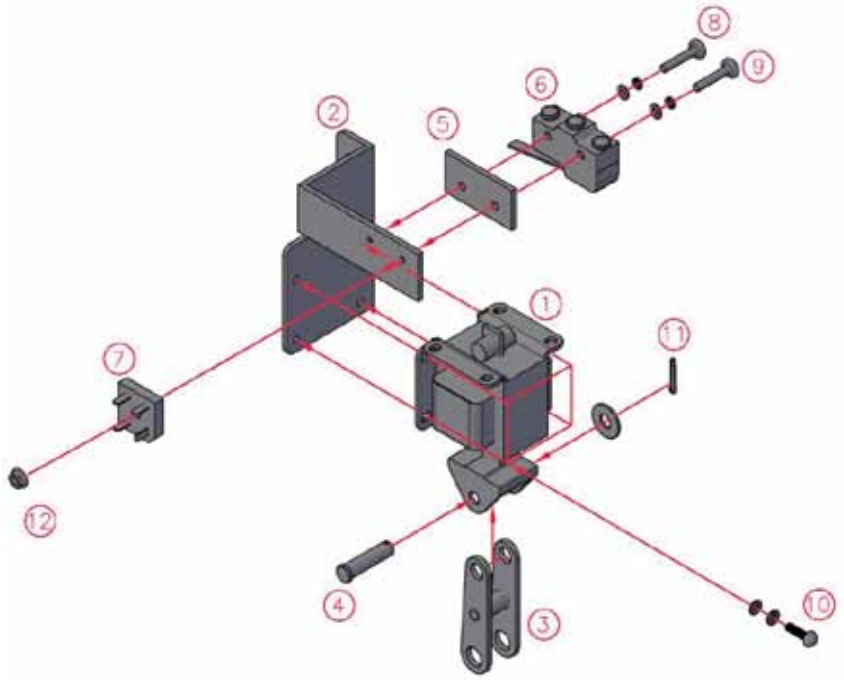
- Check the input AC voltage of the rectifier
- Replace the diode if there is input voltage with no output on the component. (Refer to the diagram above for contacts and polarity).
- If the diode is found to be OK check the voltage and resistance value of the main coil. The diode must be put out of circuit to check measure resistance of the main coil.
- The resistance should be 2.2 Ω

12.5. Construction of the main components

12.5.1. Selective coil assembly



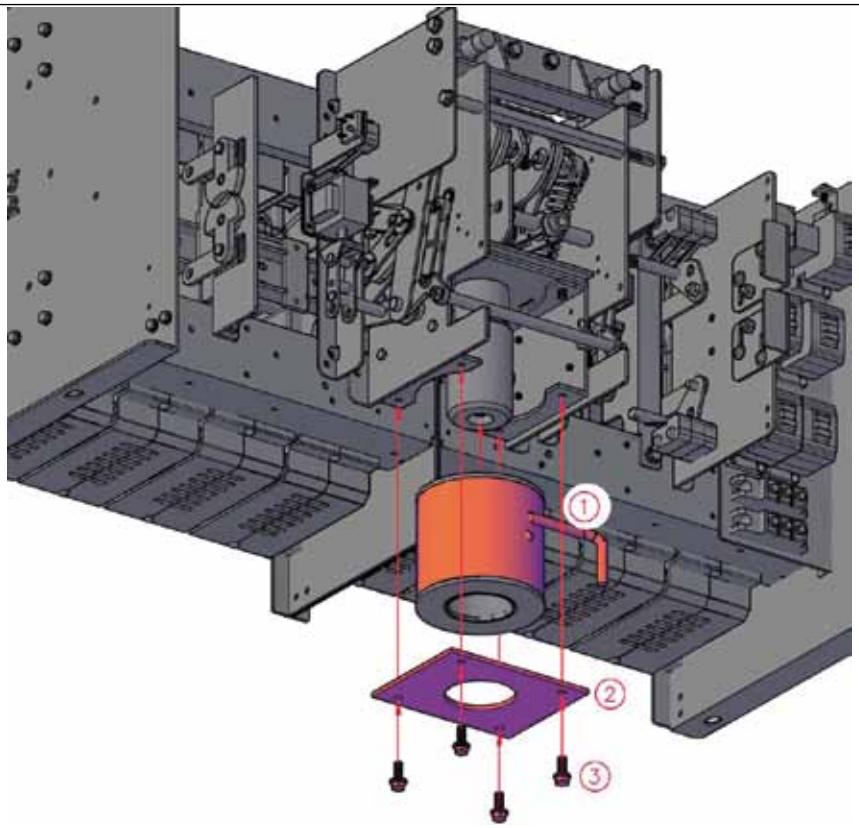
Parts name
① E Washer Ø 10mm
② Screw M6x12



Parts name
① Selective coil DS-302MD
② SNP1190
③ SNG1010
④ SNC1150
⑤ STP1220
⑥ SC1, SC2 Micro s/w Z-15GW-B
⑦ Silicon Rectifier GBPC5010
⑧ Screw M4x25
⑨ Screw M4x40
⑩ Screw M5x10
⑪ Split pin Ø 2x30
⑫ Nut M5

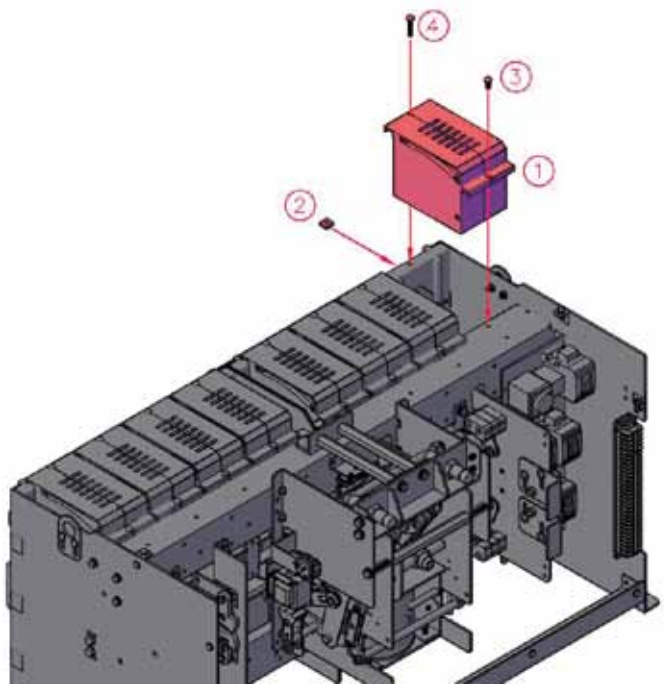
Note: The selective coil assemblies SC are placed on either side of the main electro-mechanical switching assembly shown above.

12.5.2. Main coil



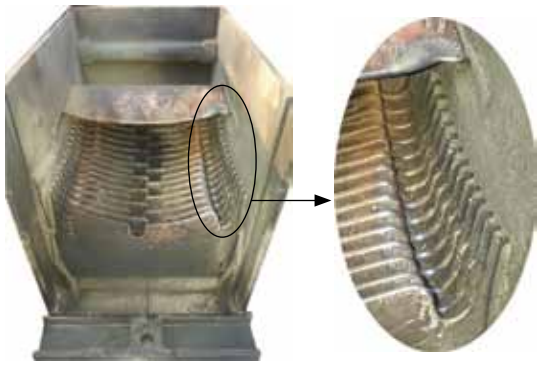
Parts name
① CC Main-coil - 2.2 Ω
② SPP1460
③ Screw M8x20

12.5.3. Arc chamber



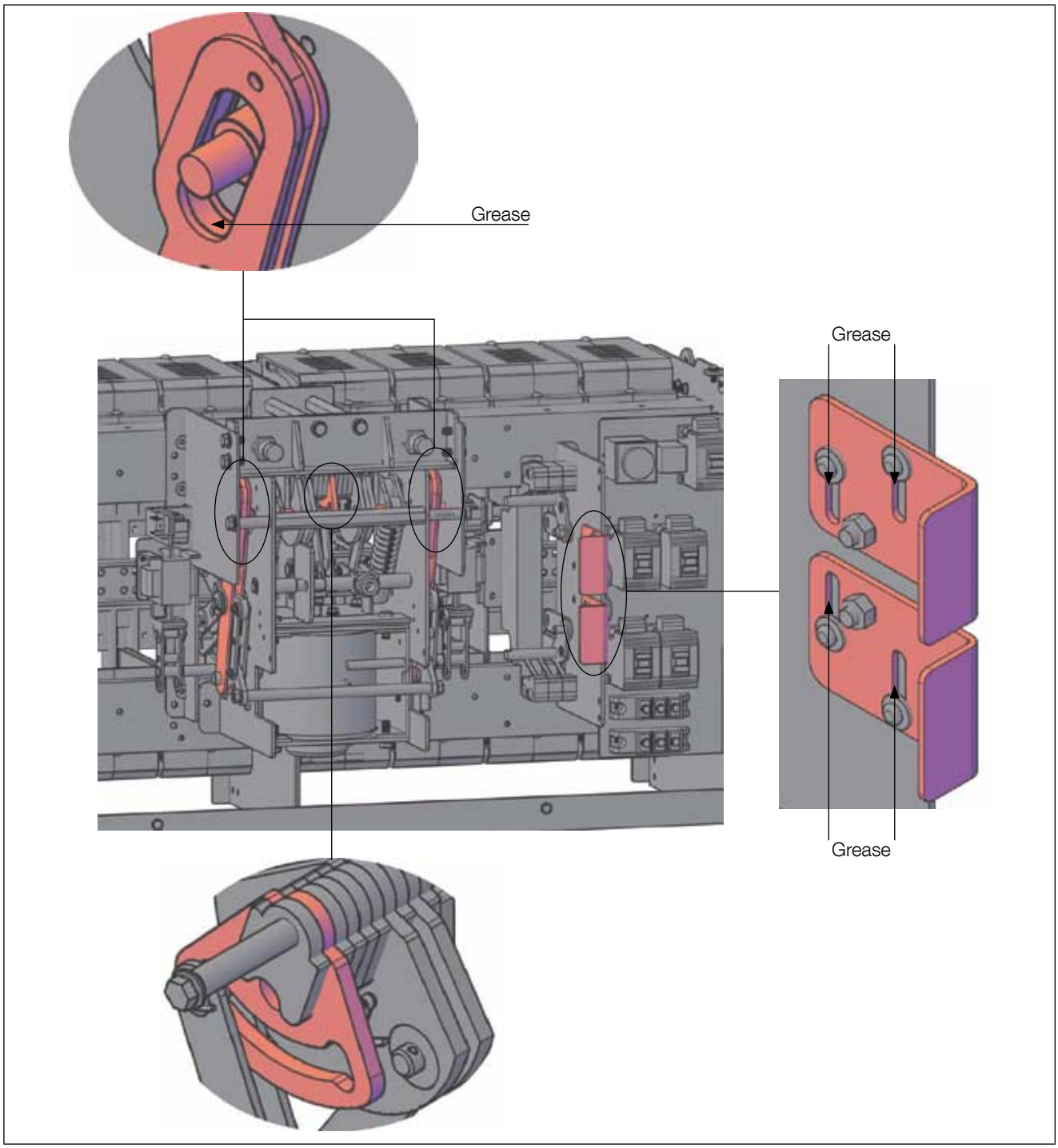
Parts name
① SPG1780
② BMC1600
③ Screw M6x16
④ Screw M6x30

When to replace the Arc chamber?
Typically when > 2mm detection of grit accumulates

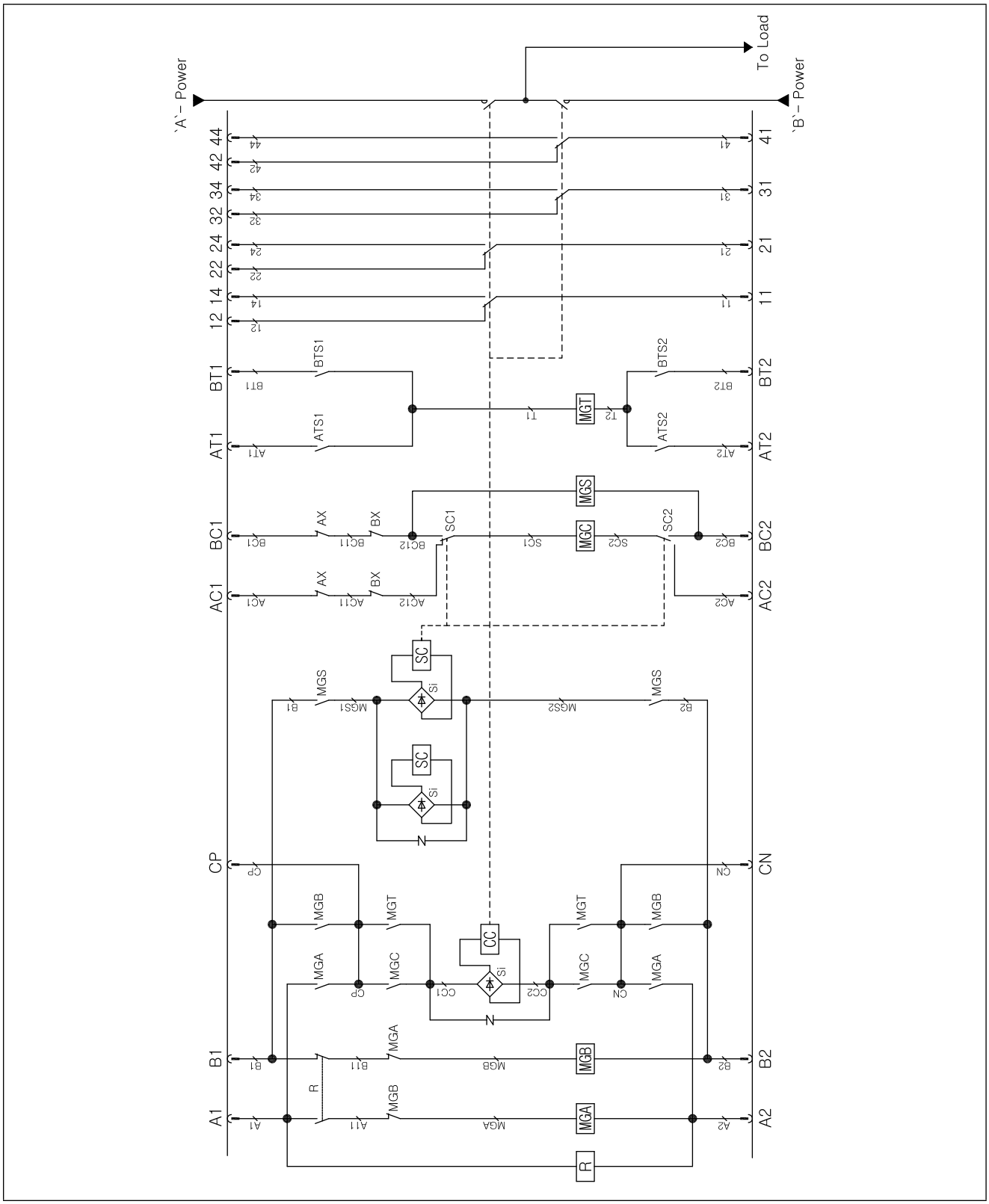


12.6. Lubrication

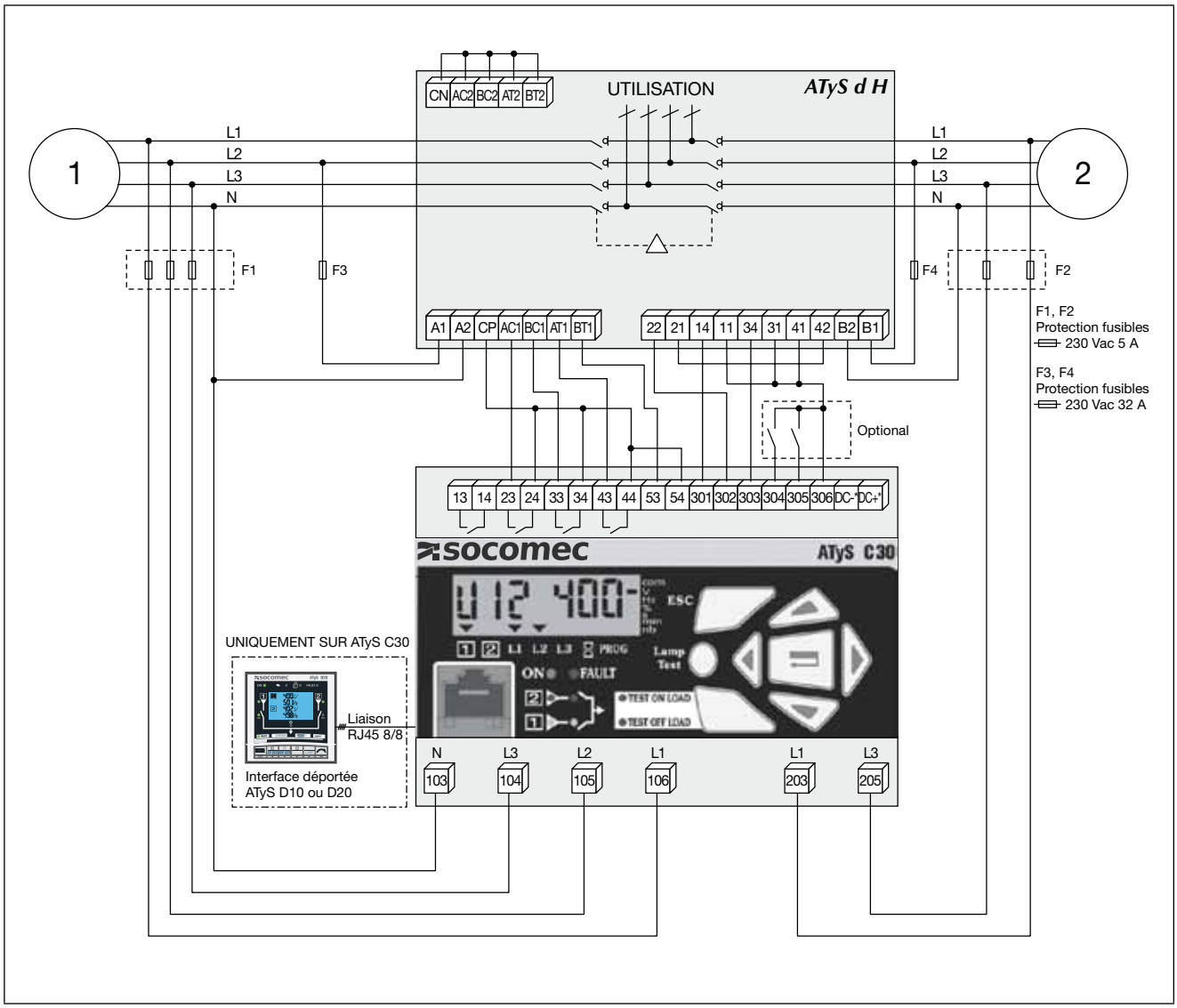
Grease shall be injected onto specific points in the mechanical cradle evenly and “MUST” only be applied to parts and in the marked positions as shown below.



13. CIRCUIT DIAGRAM



13.1. Circuit diagram for ATyS d H and ATyS C20 / C30



LCD Connections on the ATyS dH Terminals	Connections on the ATyS C20/30 Terminals
A1-A2 : Power Supply Source I (230Vac Phase/ Neutral)	301 : Aux. Input – Switch in position I
B1-B2 : Power Supply Source II (230Vac Phase/ Neutral)	302 : Aux. Input – Switch in position 0
CP – CN : Phase / Neutral internal dual power supply (DPS) output	303 : Aux. Input – Switch in position II
AC1 – AC2 : Position I order input terminals	24-34-44-54 : Common link for order outputs
BC1 – BC2 : Position II order input terminals	304 : Programmable input I order (Optional)
AT1 – AT2 : Position 0 order input terminals for switch I	305 : Programmable input II order (Optional)
BT1 – BT2 : Position 0 order input terminals for switch II	306 : Common output link for Aux. inputs
11-31-41 : Common link for switch position aux outputs	23 : Position I order output
42 – 21 : Serial Link (0 pos. aux contact switch I to switch II)	33 : Position II order output
22 : Output - Switch I and Switch II in 0 position (OFF)	43 : Position 0 order output for switch I
14 : Aux contact output – Switch in position I	53 : Position 0 order output for switch II
34 : Aux contact output – Switch in position II	13-14 : Genset start signal output relay
	103-104-105-106 : 3 phase & N sensing source I
	203 – 205 : Phase / N sensing source II

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