telergon
gorlan team

Motorised unit kit

Installation and operation guide

Ref. 4251Z009 Rev. 01

Edition january 2015

gorlan team

Index

Please follow carefully the instructions included in this manual for a correct installation and operation. If you need any further information, please contact our Technical Department.

Verification of the parts contained in the kit

Before unit assembly check that the following parts are included in the carton box:

- Motorised unit MU.
- Plastic bag containing screws for fixing the motorised. unit to the switch/changeover, and electrical connectors.
- Coupling shaft.
- Auxiliary manual handle for direct operation.
- Interface (changeover only).

Safety warnings

During installation and operation of the Motorised unit it is necessary to observe the following recommendations:

- Check that operational voltage of the unit matches with the power supply of the distribution network where the unit is going to be connected and also that the motor kit matches with the switch or changeover switch that is going to be assembled with ***(see annex 1 and 2, page 10)***.
- Before installation check that both, changeover and MU unit are in 0 (OFF) position.
- MU must be assembled by qualified personnel.
- Follow carefully the installation instructions and the wiring diagrams.
- The MU must be installed on the switch/changeover switch before being operated. Do not switch the voltage supply until the whole wiring operation has been performed.
- Do not dismantle, repair or modify this unit, as it may cause malfunctioning or electrical shock.
- Do not supply voltage or connect the MU if any of the parts are damaged.
- Take into account possible voltage drops in the wiring.
- Telergon will not held any responsibility for inappropriate use of the MU or the misinterpretation of the information contained in this document.
- The installation of this device in a domestic environment can cause radiofrequency interference.

When installing the unit in unstable power supply networks or with distrubances caused by switching processes a surge protection device (SPD) class II according to IEC/EN 61643-1 must be installed.

If the secondary line of the changeover switch is a generator set, check that the generator set switches off after retransferring the lines(t>1 min.)

Standards

- IEC/EN 60947-1 and 3. Low voltage devices. General part and switch - disconnectors.
- IEC/EN/UNE 61000-6, Parts 2 and 4. Electromagnetic compatibility in industrial environments, immunity and emission.
- According to European Standard 2006/95/CE for low voltage.
- According to European standard 2004/108/CE of EMC.

This product in under CE marking

NOTE: The content of this document can be modified without previous warning.

Product assembly

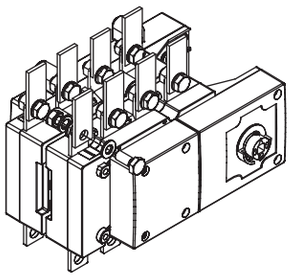
Check that operational voltage of the unit matches with the power supply of the distribution network where the unit is going to be connected and also that the MU matches with the changeover switch that is going to be assembled with *(see annex 1, page 10)*.

MU must be installed with the changeover switch and MU in 0 (OFF) position.

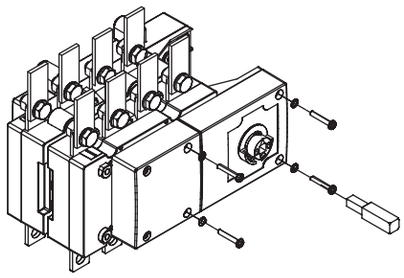
The correct mounting position of the whole set is in horizontal, just as shown in the following images.

MU must be assembled to the changeover switch following the steps below:

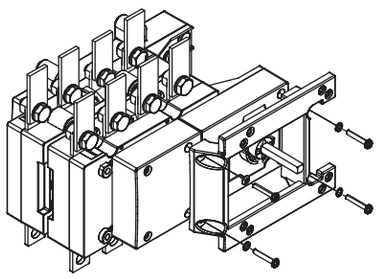
FOR CHANGEOVER SWITCH SERIES S5F 125...200A



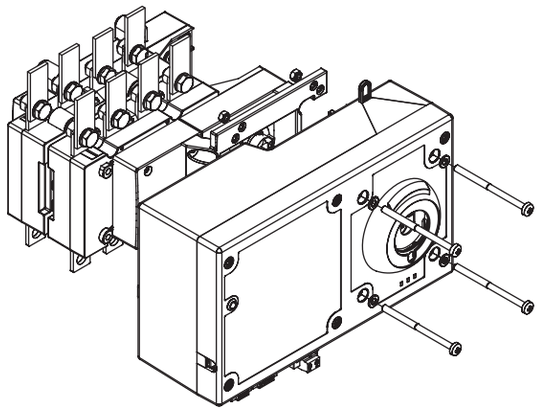
1 Set the changeover switch in its place fix the busbars and unite the common output



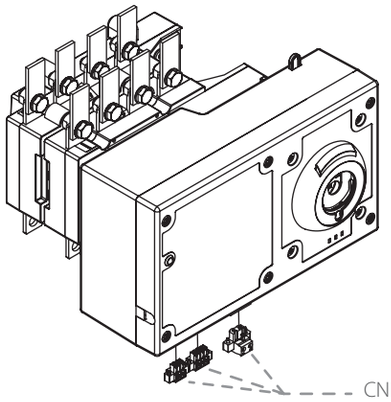
2 Insert the coupling shaft and fix it with an allen key 2,5 DIN 90011. Without removing the front cover, remove the four screws indicated



3 Place the interface and screw it on top of the changeover switch M3.5x30 DIN7985 (x4) screws and A.E.T. 4,3 (x4) washers are included

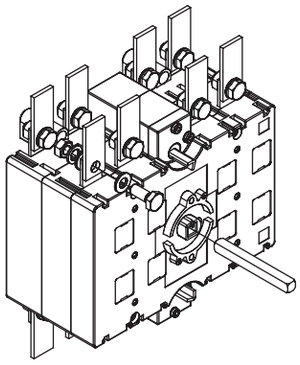


4 Screw the motorized unit (with changeover switch and MU in 0 (OFF) position). M5 x 75 DIN 7985 (x 4) screws, A.E.T. 5,3 (x 4) washers, M5 DIN 933 (x4) nuts are included

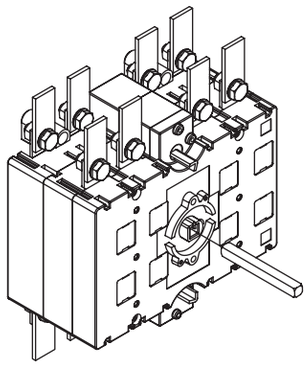


5 Locate the connectors (CN1, CN2, CN3) and make the connections according to the electrical diagram *(see annex 4, page 13)*

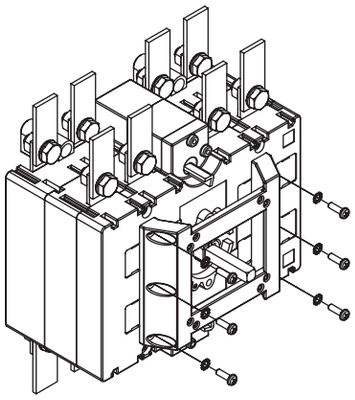
FOR CHANGEOVER SWITCH SERIES CC 250...400A



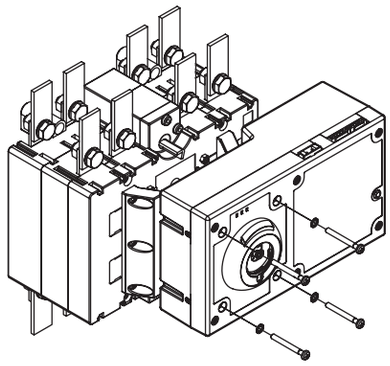
1 Set the changeover switch in its place and fix the busbars



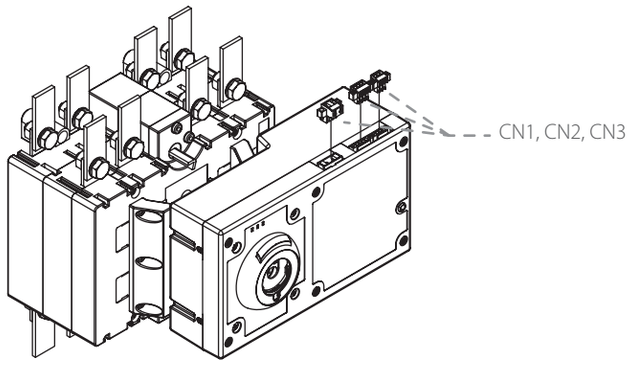
2 Insert the coupling shaft and fix it with an allen key 2,5 DIN 90011



3 Place the interface and screw it on top of the changeover switch.M5x15 DIN7985 (x6) screws and A.E.T. 5,3 (x6) washers are included



4 Screw the motorized unit (with changeover switch and MU in 0 (OFF) position). M5 x 75 DIN 7985 (x 4) screws, A.E.T. 5,3 (x 4) washers, M5 DIN 933 (x4) nuts are included



5 Locate the connectors (CN1, CN2, CN3) and make the connections according to the electrical diagram
(see annex 4, page 13)

Product assembly

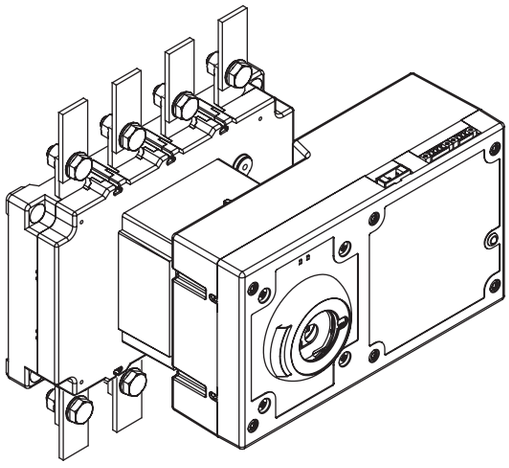
Check that operational voltage of the unit matches with the power supply of the distribution network where the unit is going to be connected and also that the MU matches with the switch that is going to be assembled with *(see annex 2, page 10)*.

MU must be installed with the switch and MU in 0 (OFF) position.

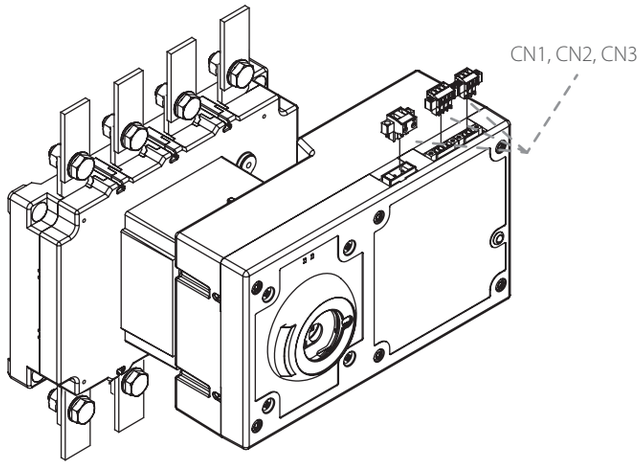
The correct mounting position of the whole set is in horizontal, just as shown in the following images.

MU must be assembled to the switch following the steps below:

FOR SWITCH SERIES S5/S6 200...400A



1 Set the changeoverswitch in its place and fix the busbars



2 Locate the connectors (CN1, CN2, CN3) and make the connections according to the electrical diagram *(see annex 4, page 13)*

SWITCH 0-I
CHANGEOVER SWITCH I-0-II

A

MU power supply

B

Input signals

C

Output signals

D

Position leds:

Changeover switch 0-I-II

Switch 0-I

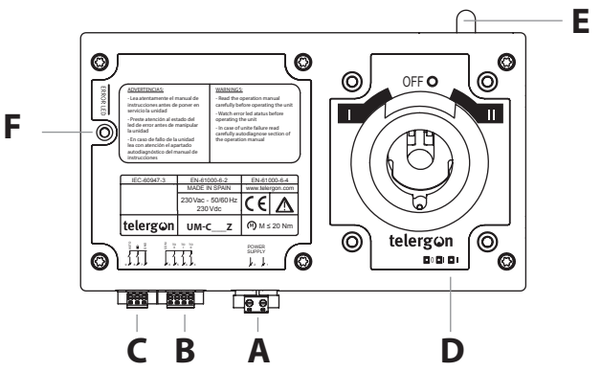
E

Padlock slider

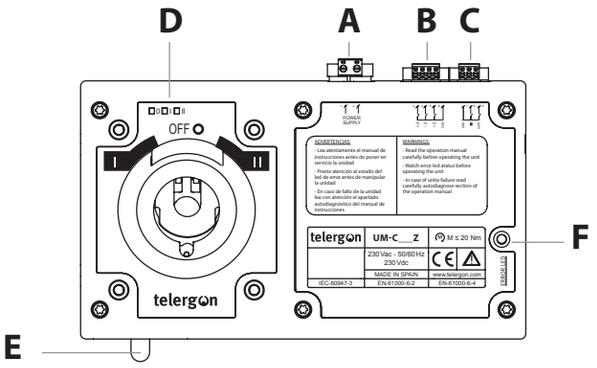
D

Error led

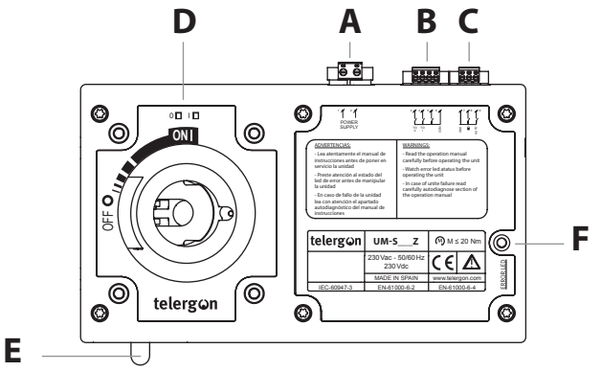
CHANGEOVER SWITCH S5F

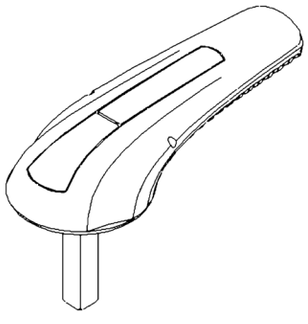


CHANGEOVER SWITCH CCF



SWITCH S5/S6





AUXILIARY MANUAL HANDLE

For maintenance or emergency operating

Product guide

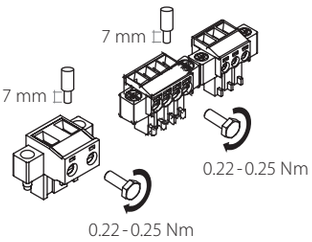
MOTOR KIT POWER SUPPLY

The MU requires a voltage supply for its operation (terminals 1-2). For the motorized unit to have an uninterrupted supply system (mains – secondary sources), the client shall prepare a circuit similar to the example (*) ***shown in page 13***.

Available power supply: 230Vac/dc.

When installing the unit in unstable power supply networks or with disturbances caused by switching processes a surge protection device (SPD) class II according to IEC/EN 61643-1 must be installed.

	Terminals
	1-2
Maximum wiring capacity	4 mm² (w/o comp. lugs) 2,5 mm² (w. comp. lugs)
Maximum wiring capacity	1,5 mm²



CHANGEOVER SWITCH INPUT SIGNALS

The electrical inputs set the position to move to the MU. The digital inputs configuration allow them to be operated through a non voltage contact (relay, switch).

Using an isolated contact its activation must close the circuit between the correspondent input terminal and the +5Vdc (terminal 6).

	Terminal	5Vdc
To 0	3	6
To I	4	6
To II	5	6
Maximum wiring capacity	**4 mm² (w/o comp. lugs) 2,5 mm² (w. comp. lugs)**	
Maximum wiring capacity	**1,5 mm²**	

SWITCH INPUT SIGNALS

The electrical inputs set the position to move to the MU. The digital inputs configuration allow them to be operated through a non voltage contact (relay, switch).

Using an isolated contact its activation must close the circuit between the correspondent input terminal and the +5Vdc (terminal 6).

Switching order	Terminal	5Vdc
To 0	3	6
To I	4	6
Maximum wiring capacity	**4 mm² (w/o comp. lugs) 2,5 mm² (w. comp. lugs)**	
Maximum wiring capacity	**1,5 mm²**	

OUTPUT SIGNALS

Indicate the operational mode (Automatic or locked) of the switch / changeover switch.

Performed through a contact based on a solid state.

The outputs signals can be fed through the MU internal auxiliary voltage +5Vdc(terminal 6) as outputs common and the corresponding terminal.

The outputs can also be controlled through an external voltage source located between the position outputs and the GND terminal (Vmax=315Vac/dc, Imax=120mA).

Motorized unit state	Terminal	+5Vdc	GND
LOCKED mode	8	6	7
AUTOMATIC mode	9	6	7
Maximum wiring capacity	**4 mm² (w/o comp. lugs) 2,5 mm² (w. comp. lugs)**		
Maximum wiring capacity	**1,5 mm²**		

Imax = 100 mA x Terminal. Connection+5Vdc
Imax = 120mA x Terminal. External power supply + GND

Operational modes

Automatic

This is the standard status of the unit and it is activated when auxiliary manual handle or padlock are not installed. The unit only obey input signals.

Manual

This mode is activated when inserting and locking the auxiliary manual handle on its housing (handle ring). The unit can only be moved with auxiliary manual handle. Electrical operations are not allowed.

Locked

This mode is activated when extracting the padlock slider. Manual or electrical operations are not allowed.

AUTOMATIC OPERATION

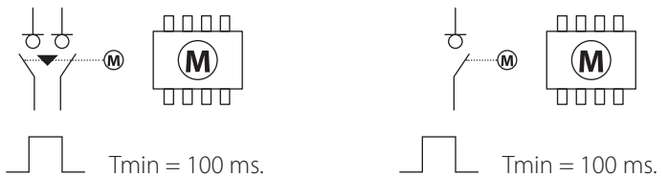
In this mode the unit only acts according to digital inputs.

MU moves according to the first order received either with continuous signal or pulses.

PULSE OPERATION

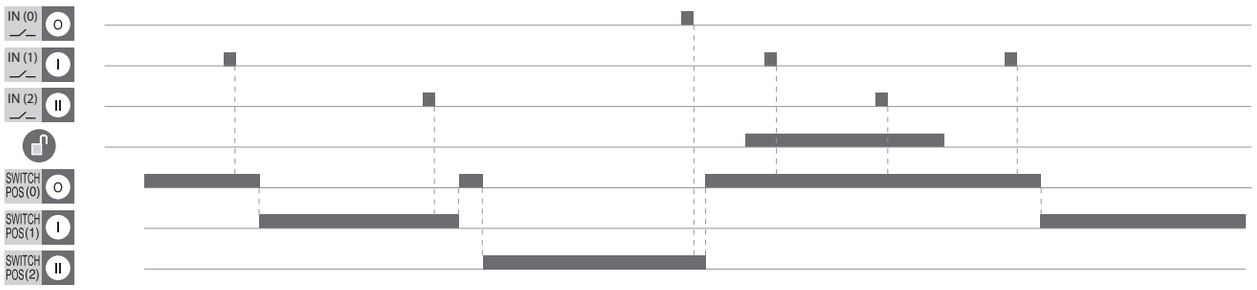
Movement operation is indicated by pulses between common terminal and terminal 3 (position 0), 4 (position I of switch or changeover switch) and 5 (position II, only changeover switch).

Example of control by pulse:



CONTROL BY PULSE

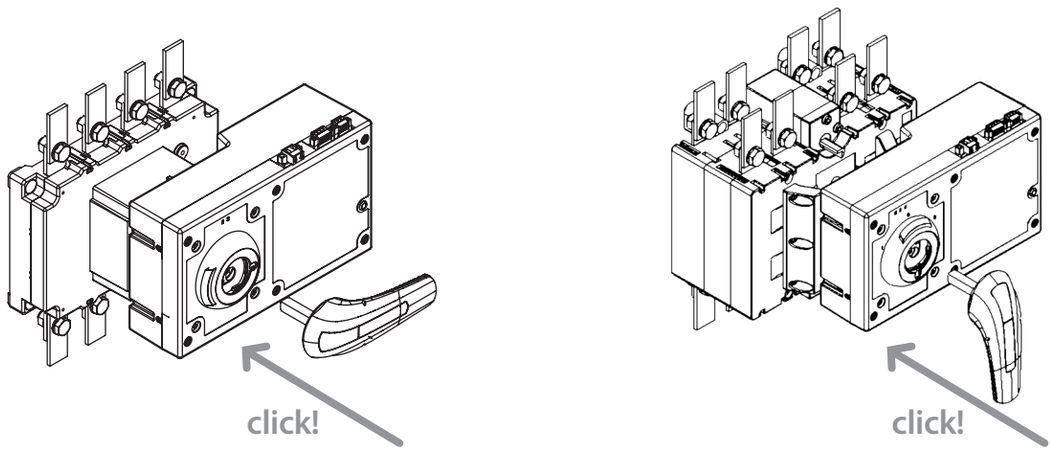
CONTROL BY MANTAINED PULSE



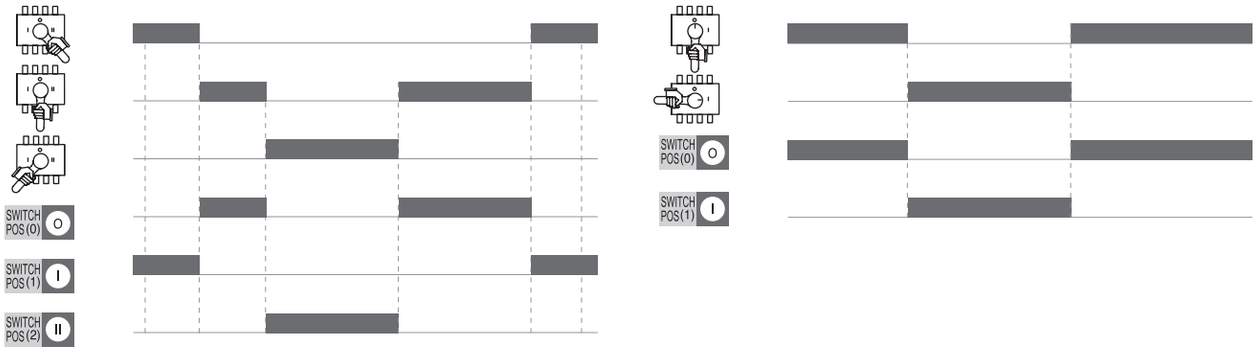
Operation modes

MANUAL OPERATION

Manual operation is activated automatically when inserting the auxiliary manual handle on its housing.
Handle insertion must be performed until it reaches its locked position.



Once handle is locked the unit changes to manual operation and movements can only be performed with the auxiliary manual handle.



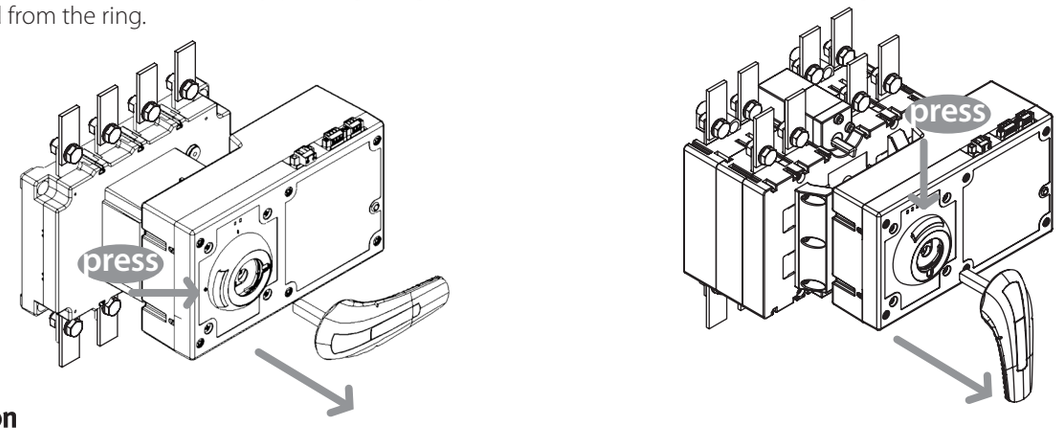
Inputs

No automatic operation is allowed in this mode. The unit will not obey any electrical input signal.

Return to automatic operation

Once manual operation is done the unit returns to AUTOMATIC mode by releasing and extracting the auxiliary manual handle.

Handle extraction is performed by pressing the grey push button located in the handle ring. Once pressed the handle is released from the ring.



Operation modes

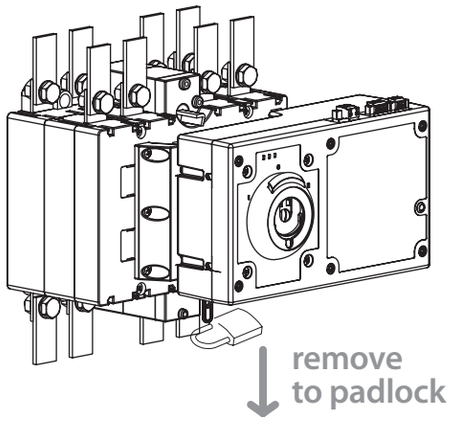
LOCKED MODE

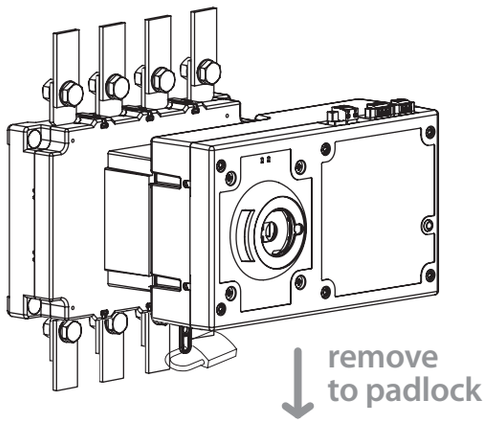
In this mode neither manual nor automatic operation can be performed. This mode can be activated by two ways:

- Extracting the padlock slider
- Inserting the auxiliary manual handle, changing to 0 (OFF) position and activating the handle padlockable lever

UNIT LOCKING VIA PADLOCKABLE LEVER ACTIVATION

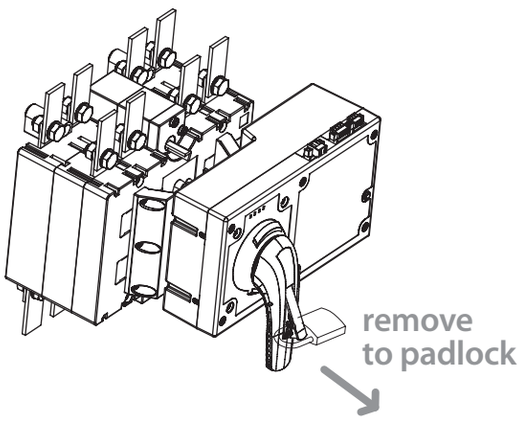
This padlock can be in any position according to changeover switch I-0-II or switch - disconnector 0-I.

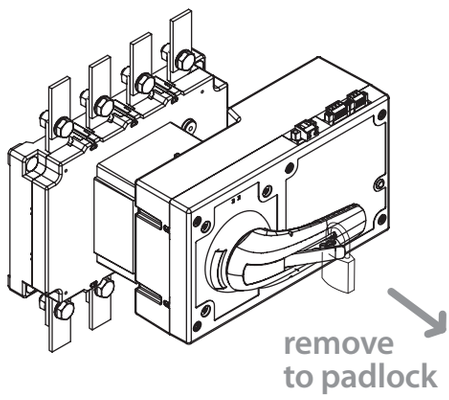




UNIT LOCKING BY AUXILIARY MANUAL HANDLE

This padlock is only allowed at 0 (OFF) position, once locked, the handle cannot be removed from the MU .





Any of the locking modes activates the output signal in between terminals 7 and 8.

Error led

MU has an integrated led for failure indication. It can be activated in any of the below situations:

– Failure due to movement under locked position: The unit shaft has moved with the unit in Locked mode.

– Failure due to final position not reached: The ongoing movement has not been finalized.

– Failure due to broken clutch: A shaft movement has been performed with auxiliary manual handle while the MU state was AUTO.
(see annex 7, page 16).

NOTE: Once error led is activated, the MU remains loked.
MU unlocking is only possible by switching OFF and ON power supply.

Annexes

ANNEX 1: CHANGEOVER SWITCH REFERENCES

MU range is available for changeover switches in the 125 to 400 Amp range. Power supply is 230 Vac/dc.

			Changeover switches I-0-II	
			3 P	3 P + N
Amp.	Size	Series	Code	Code
125	0	S5F	S5F01253PS0	S5F01253NS0
160	0	S5F	S5F01603PS0	S5F01603NS0
200	0	S5F	S5F02003PS0	S5F02003NS0
250	1	CCF	CCF02503PS0	CCF02503NS0
315	1	CCF	CCF03153PS0	CCF03153NS0
400	1	CCF	CCF04003PS0	CCF04003NS0

		Motorized unit MU
		230 Vac/dc
Amp.	Series	Code
125-200	S5F	UM-C0A230Z
250-400	CCF	UM-C1A230Z

ANNEX 2: SWITCH REFERENCES

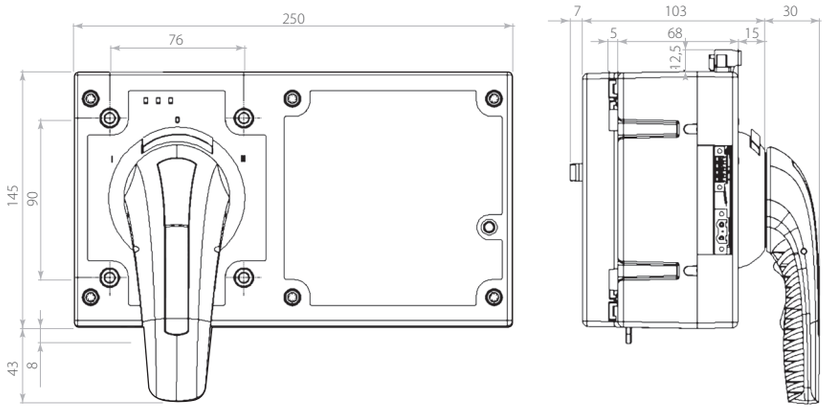
MU range is available for switches in the 200 a 400 Amp range. Power supply is 230 Vac/dc.

		Switches 0-I S5000		Switches 0-I S6000	
		3P	3P+N	3P	3P+N
Amp.	Size	Code	Code	Code	Code
200	1	S5-02003PR0	S5-02003NR0	S6-02003PS0	S6-02003NS0
250	1	S5-02503PR0	S5-02503NR0	S6-02503PS0	S6-02503NS0
315	1	S5-03153PR0	S5-03153NR0	S6-03153PS0	S6-03153NS0
400	1	S5-04003PC0	S5-04003NC0	S6-04003PD0	S6-04003ND0

Motorized unit MU
230 Vac/dc
Code
UM-S1A230Z

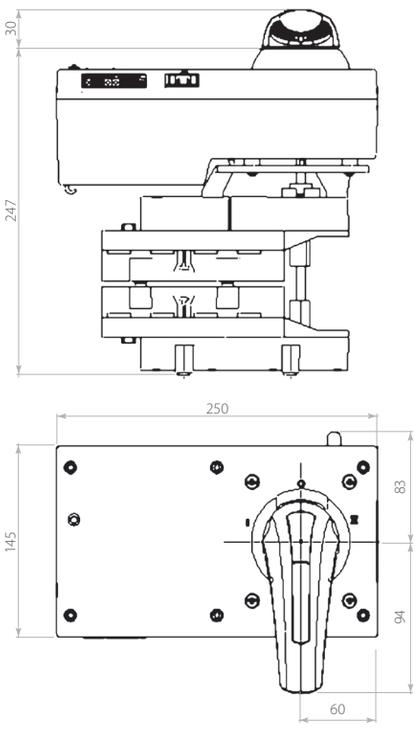
ANNEX 3: DIMMENSIONS (mm)

MU

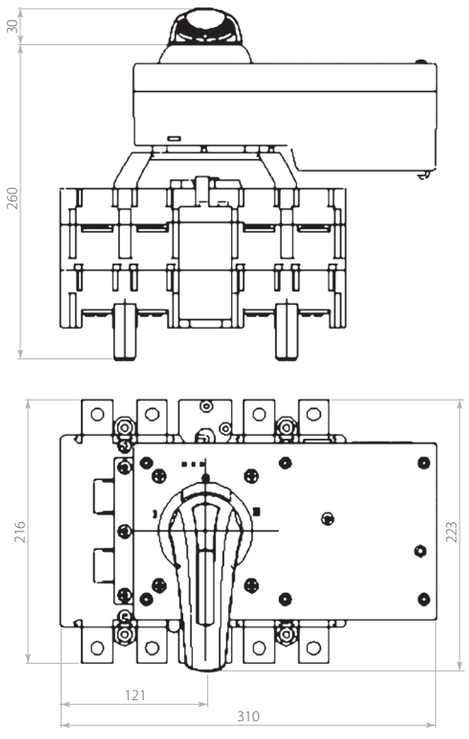


CHANGEOVER SWITCH

S5F+UM 125 … 200 Amp



CCF+UM 250 … 400 Amp

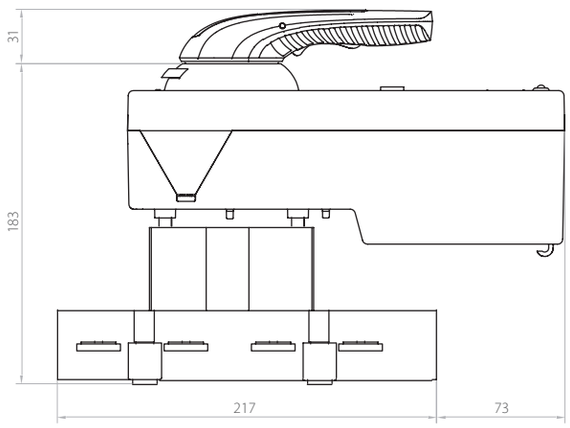


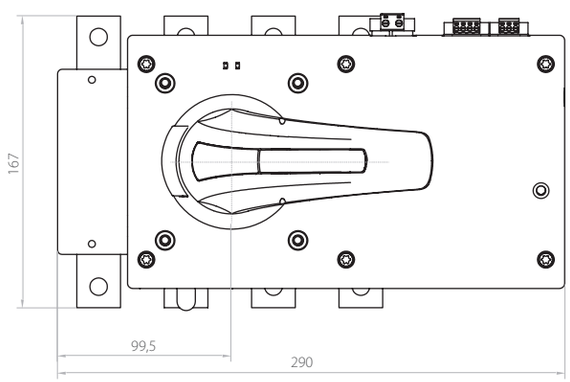
Annexes

ANNEX 3: DIMMENSIONS (mm)

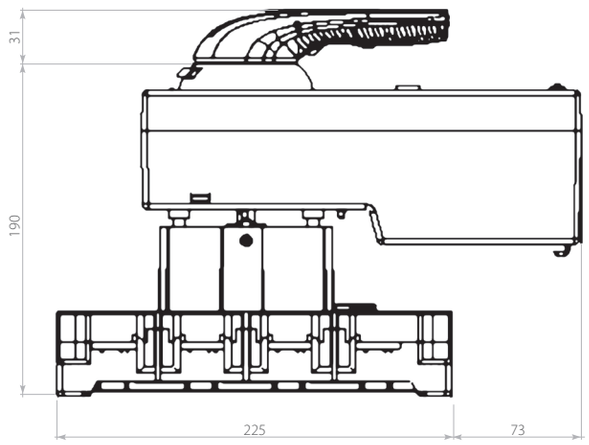
SWITCH - DISCONNECTOR

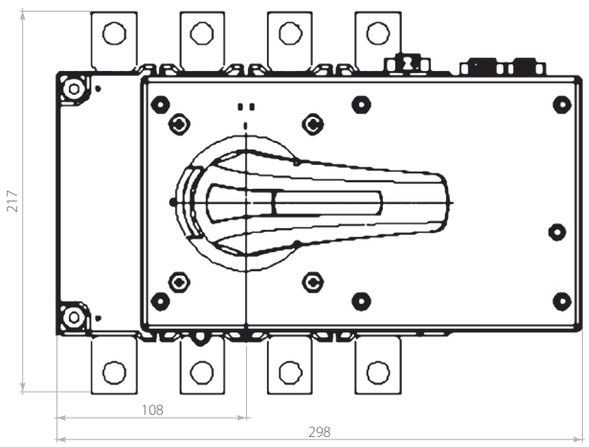
S5+UM 200 ...400 Amp





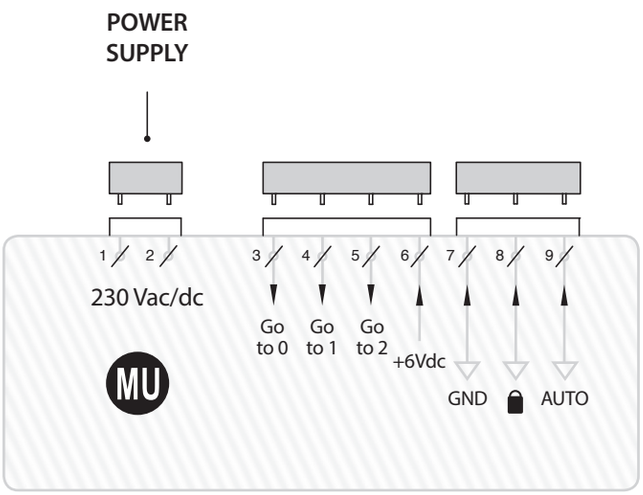
S6+UM 200 ... 400 Amp



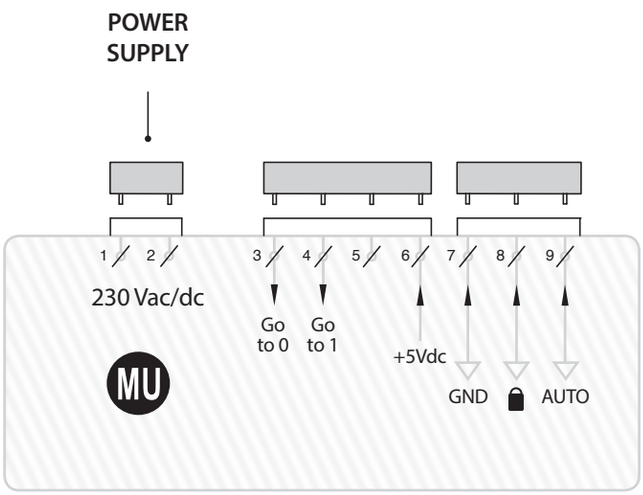


ANNEX 4: WIRING DIAGRAM

CHANGEOVER SWITCH I-0-II

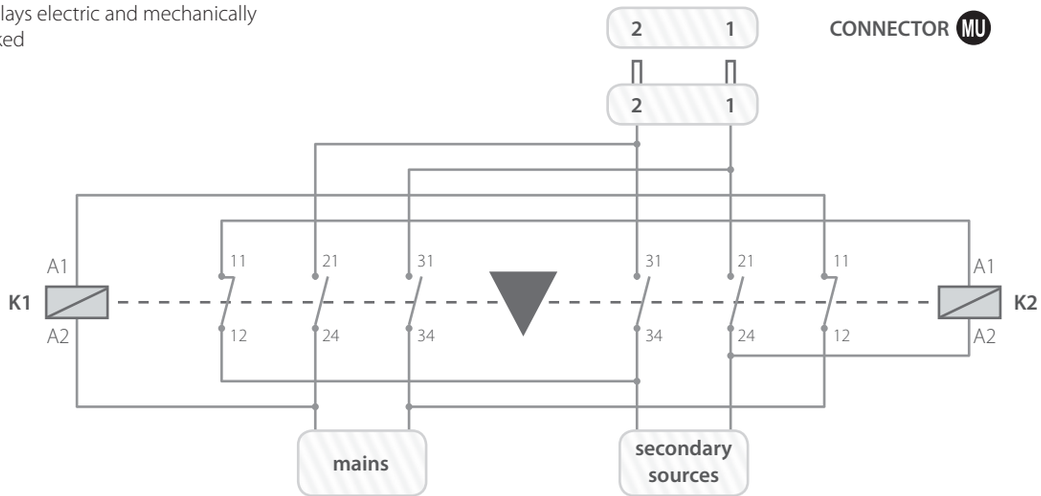


SWITCH-DISCONNECTOR 0-I



*** WIRING PROPOSED FOR EXTERNAL UNINTERRUPTED SUPPLY**

K1, K2 = 230 Vac = Coil 230 Vac
K1, K2 relays electric and mechanically interlocked



Annexes

ANNEX 5: ELECTRICAL FEATURES TABLE

		Switch 0-I	Changeover siwtch I-0-II
Operational torque	Nm	20	20
Rated operational voltage	V	230Vac/dc	230Vac/dc
Operating voltage range *(1)	ΔV	0,85*V a 1,15*V	0,85*V a 1,15*V
Operating voltage range acc. IEC 60947-6	ΔV	0,95*V a 1,10*V	0,95*V a 1,10*V
Cable of voltage supply	mm^2	1,5 - 2,5	1,5 - 2,5
Cable section area Input Signals	mm^2	0,5 - 1,5	0,5 - 1,5
Cable section area Auto-Lock mode Outputs	mm^2	0,5 - 1,5	0,5 - 1,5
Inrush Current	A	1,1	1,1
Use current	mA	45	45
Protective Fuse *(2)	A	0,5	0,5
Operating angle		0-90º (0 - I)	- 70º / 0º / +70º (I - 0 - II)
MU number of operations	Cycles	10000	10000
Operation speed (0-I-II-0)	Cycles/hour	120	120
Operating temperature		- 25ºC + 55ºC	- 25ºC + 55ºC
Transportation and storage temperature		- 40ºC + 70ºC	- 40ºC + 70ºC
Weight	Kg	1,8	1,8

*(1) Based in our own tests
*(2) Fuse reference F0,5AL250 V (Littelfuse)

Pos.	Direction	Pos.	Device	Operating time
0	➡	I	Switch or changeover switch	750 ms
I	➡	0	Switch or changeover switch	750 ms
0	➡	II	Changeover switch	750 ms
II	➡	0	Changeover switch	750 ms
I	➡	II	Changeover switch	1,5 seg
II	➡	I	Changeover switch	1,5 seg

ANNEX 6: EMC TABLE (ELECTROMAGNETIC COMPATIBILITY)

Inmunity					
Test	**Standard**	**According to standard**	**According to standard**	**Results achieved**	**Values avhieved in tests**
		UNE/EN 61000	**IEC 60947-6**		
Electrostatic discharges	EN 61000-4-2	Special, B	Special, A	Special, A	±8KV air discharge ±4KV equipment discharge
Electromagnetic H.F. field	EN 61000-4-3	Level 3, A	Level 3, A	Level 3, A	10V/m. from 80MHz to 1 GHz
Fast transients (Burst)	EN 61000-4-4	Level 3, B	Level 3, A	Level 4, A	±4KV power supply, freq. Rep. 2,5kHz ±2KV signal supply, freq. Rep 5kHz
Fast transient (surge discharge)	EN 61000-4-5	Level 3, B	Level 3, A	Special, A	±4KV power supply L1-L2 Generator impedance 2Ω (wave 1.2/50 ms)
Conducted disturbances	EN 61000-4-6	Level 3, A	Level 3, A	Level 3, A	10V supply and signal
Electromagnetic field, industrial frequency	EN 61000-4-8	Level 4, A	-	Level 4, A	Field intensity 30A/m
Voltage dips, interruptions and voltage variations	EN 61000-4-11	Criterion B	-	Criterion A	30% Un - 1000 ms
		Criterion C	-	Criterion A	60% Un - 1000 ms
		Criterion C	-	Criterion B	95% Un - 5000 ms

Emission					
Test	**Standard**	**According to standard**	**According to standard**	**Results achieved**	**Values avhieved in tests**
		UNE/EN 61000	**IEC 60947-6**		
Emission of harmonic current	EN 61000-3-2	Level 3	Level 3	Level 3	0,02A total current (manual mode)
		Level 3	Level 3	Level 3	0,04A total current (automatic mode)
Unwanted voltage	EN 55011	Level 3	Level 3	Level 3	Qualified
Radiated emission	EN 55011	Level 3	Level 3	Level 3	Qualified

NOTE: The installation of this device in a domestic environment can cause radiofrequency interference
EN 61000 is equivalent to IEC 61000 - EN 55011 is equivalent to CISPR11
CRITERION **A**: Normal service behaviour in determined limits
CRITERION **B**: Transient alteration of the service. The appliance gets back to the normal performing without the intervention of the operator
Test level **3**: Typical industrial environment, without special installation measures
Test level **4**: Severe industrial environment
Special level: Level of higher electromagnetic severe environment

Annexes

ANNEX 7: DIAGNOSTIC TABLE

Síntoma	Posible causa	Acción recomenadada
Once MU is installed, in the first automatic operation, the unit does not change its position and error led turns ON	MU has not been installed with switch or changeover switch in "0" position	Disassemble the unit. Change the switch or changeover switch to "0" position. Reassemble the unit and repeat the manoeuvre
The MU does not operate at all and error led remains OFF	Supply voltage out of specification	Check with a multimeter the voltage between terminals 1 and 2 of the MU. The voltage must fulfil the range indicated ***(see annex 5, page 14)***
	Wiring to input signals is damaged	Check wiring continuity from remote control to the MU
The MU does not operate according to input signals and neither padlock slider nor auxiliary manual handle have been used. Error led is ON	Power fuse blown	Check fuse with a multimeter. If fuse is blown replace it with a new one equal to the specified ***(see annex 5, page 14)***
After inserting and releasing the auxiliary manual handle the MU does not operate according to input signals. Error led remains OFF	Auxiliary manual handle clutch has not returned to top position	Insert the auxiliary manual handle again and check that that during extraction it is rejected automatically by the clutch. Check with a multimeter that output between terminal 7 and 9 is closed (AUTO mode active)
Using auxiliary manual handle the switch or changeover switch position has been changed and after releasing the handle the MU does not operate according to input signals. Error LED remains OFF	Auxiliary manual handle clutch has not returned to top position	Insert the auxiliary manual handle again and check that during extraction it is rejected automatically by the clutch. Check with a multimeter that output between terminal 7 and 9 is closed (AUTO mode active)
Using auxiliary manual handle the switch or changeover switch position has been changed and after releasing the handle the MU does not operate according to input signals. Error LED is ON	No coherence in between MU position and switch or changeover switch position that can not be solved by MU logical control	Insert the auxiliary manual handle again and return the switch or changeover switch to prior to failure position. After releasing the handle check that AUTO operation has been restablished

NOTE: Once error led is activated, the MU remains loked. MU unlocking is only possible by switching OFF and ON power supply

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This guide is printed on paper coming from sustainable certified forestry

Management System ISO 9001:2008 ISO 14001:2004 TÜVRheinland CERTIFIED www.tuv.com ID 9105053481

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