telergon
gorlan team

Motorised unit

Switch
installation and operation guide

Ref. 4257Z002 Rev. 03

Edition July 2009

gorlan team

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

Usually the MU will be sent installed on the switch. In view to possible change operations, we also include instructions for installed like individual kit.

Verification of the parts contained in this unit

Before the installation ensure that the following parts are included in the carton box:

- Motorised unit MU.
- Plastic bag containing screws for fixing the MU to the switch, and electrical connectors.
- Switch - MU coupling shaft.
- Manual handle for direct operation.

Safety warnings

In the installation and during the operation of the MU it is necessary to observe the following recomendations:

- Make sure that the voltage of the MU is the same than the voltage we are going to work with, and the MU is suitable for the switch that is going to drive ***(see Annexe 1, page 12)***.
- Before intallation ensure that both, switch and MU are in 0 (OFF) position.
- Qualified personnel has to install the MU.
- Follow carefully the installation instructions and the wiring diagrams.
- The MU must be installed on the switch before being operated. Do not switch the voltage supply until the whole wiring operation has been made.
- Do not dismantle, repair or modify this unit, as it may cause malfunctioning or electrical discharges.
- Do not voltage supply or connect the MU if any of the parts are damaged.
- Take into account possible voltage drops in the wiring. ***(see Annexe 4, page 17).***
- Telergon is not responsible 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.

Standards

- IEC/EN 60947-1 and 3. Low voltaje 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 precious warning.

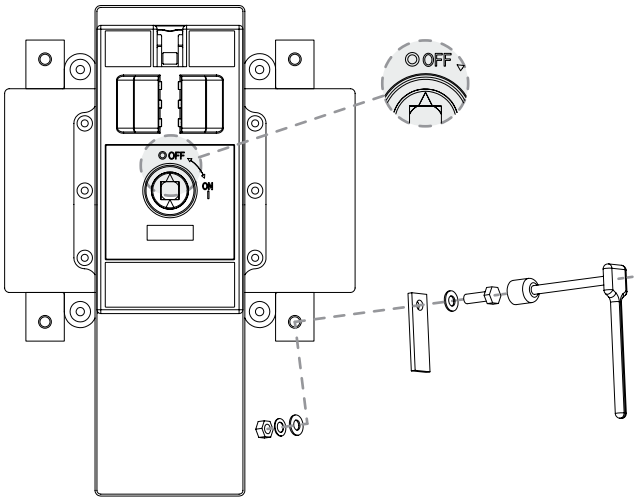
Installation / Mounting

Ensure that the voltage of the MU coincides with the voltage we are going to work with, and the MU is suitable for the switch that is going to drive. ***(see Annexe 1, page 12).***

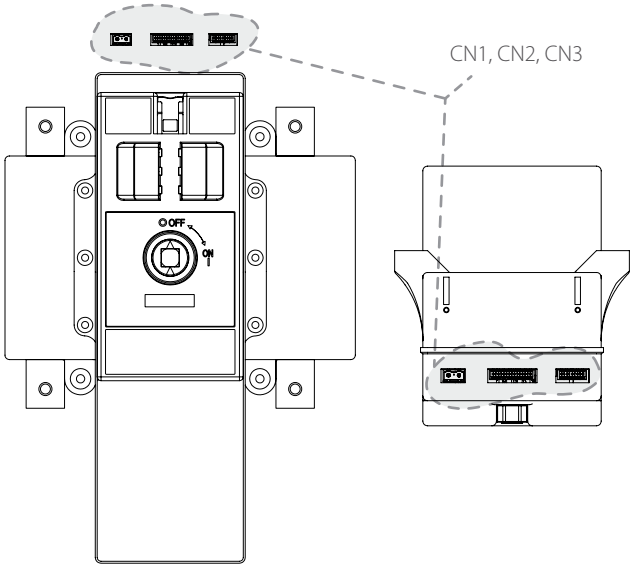
Before installation make sure that both the switch and the MU are in position 0 (OFF).

The MU must be installed on the switch before being operated following next steps.

FOR SWITCH SERIES S5000 200... 630 A

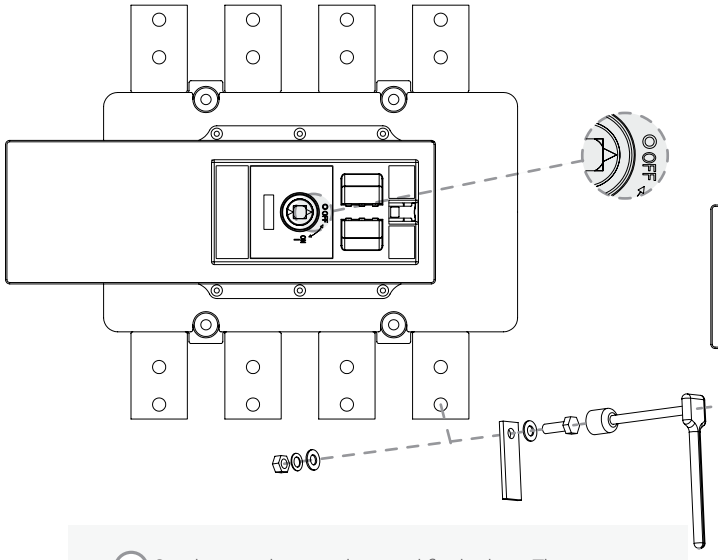


1 Set the switch in its place and fix the bars. Then screw the MU (with both switch and MU in position 0). M5 x 20 DIN 7985 screws (x 6) and A.E.T. 5,3 washers (x 6) included

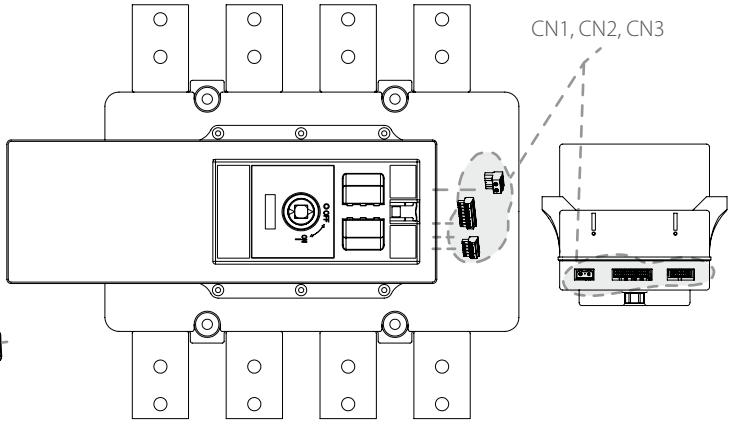


2 Fix connectors (CN1, CN2, CN3) and connect according to the wiring diagram ***(see Annexe 3, page 15-16)***

FOR SWITCH SERIES S5000 800... 1800 A

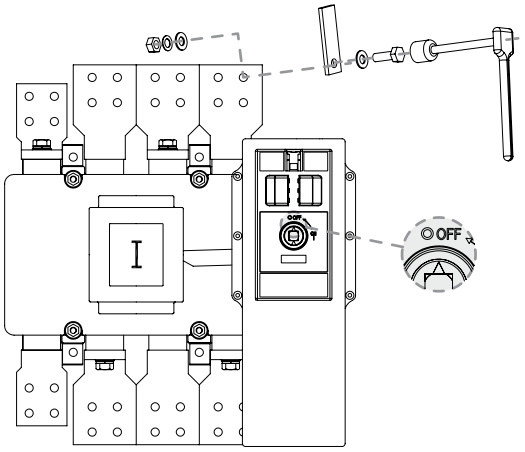


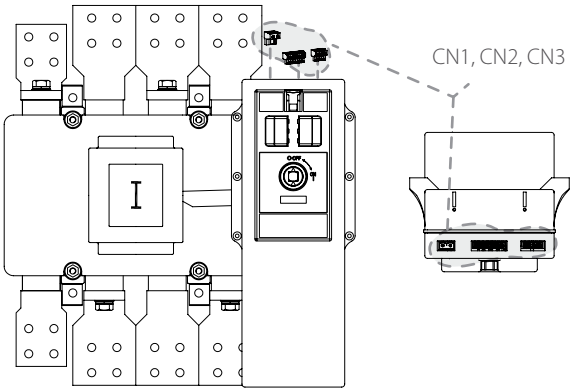
3 Set the switch in its place and fix the bars. Then screw the MU (with both switch and MU in position 0). M5 x 20 DIN 7985 screws (x 6) and A.E.T. 5,3 washers (x 6) included



4 Fix connectors (CN1, CN2, CN3) and connect according to the wiring diagram ***(see Annexe 3, page 15-16)***

FOR SWITCHES SERIES S5000 2000 - 3150 A





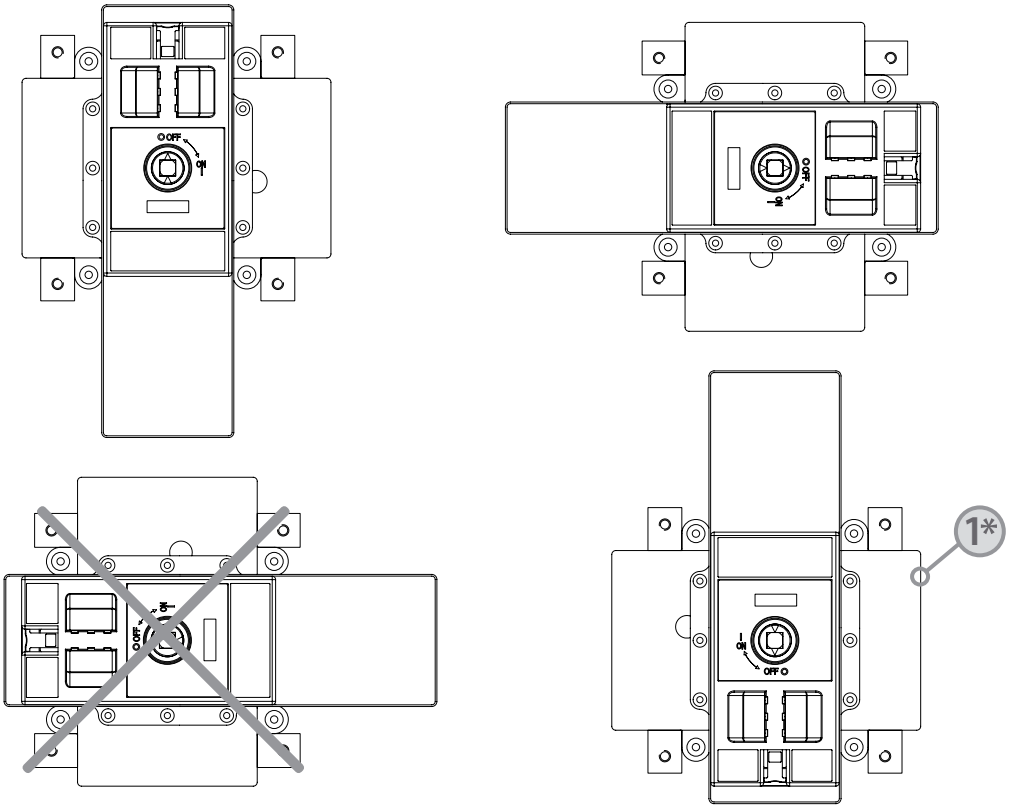
(1) Set the switch in its place and fix the bars. Then screw the MU (with both switch and MU in position 0). M5 x 20 DIN 7985 screws (x 6) and A.E.T. 5,3 washers (x 6) included

(2) Fix connectors (CN1, CN2, CN3) and connect according to the wiring diagram ***(see Annexe 3, page 15-16)***

MOUNTING POSITIONS

The positions of the MU depend the switch mounting position.

S5000
200... 630 A



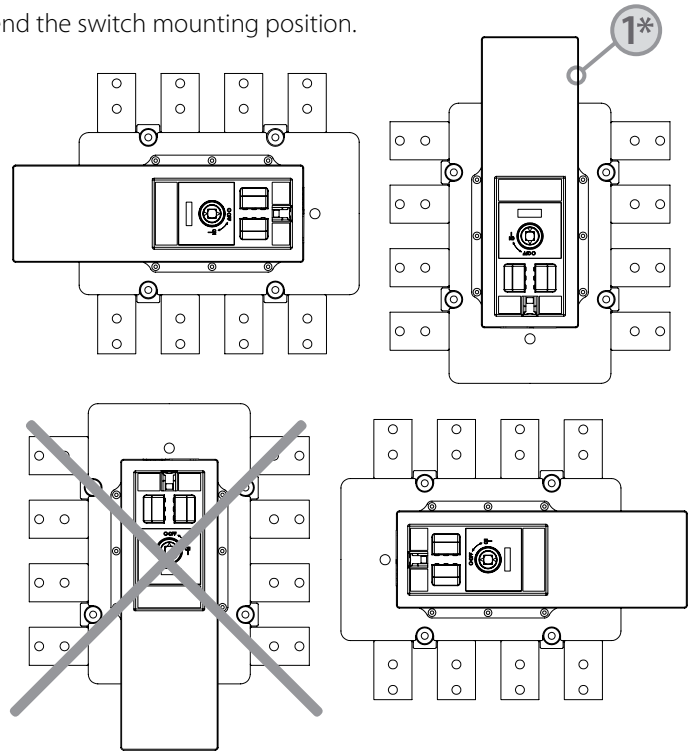
(1*) For inverted mounting there are references for MU with inverted frontal plates. Supply under request.

Installation / Mounting

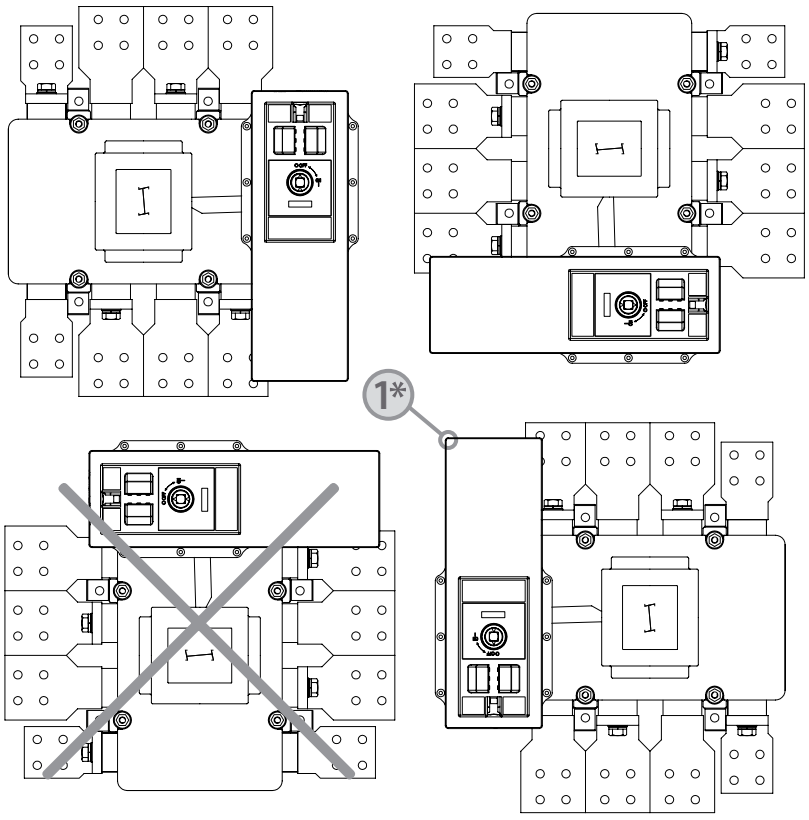
MOUNTING POSITIONS

The positions of the MU depend the switch mounting position.

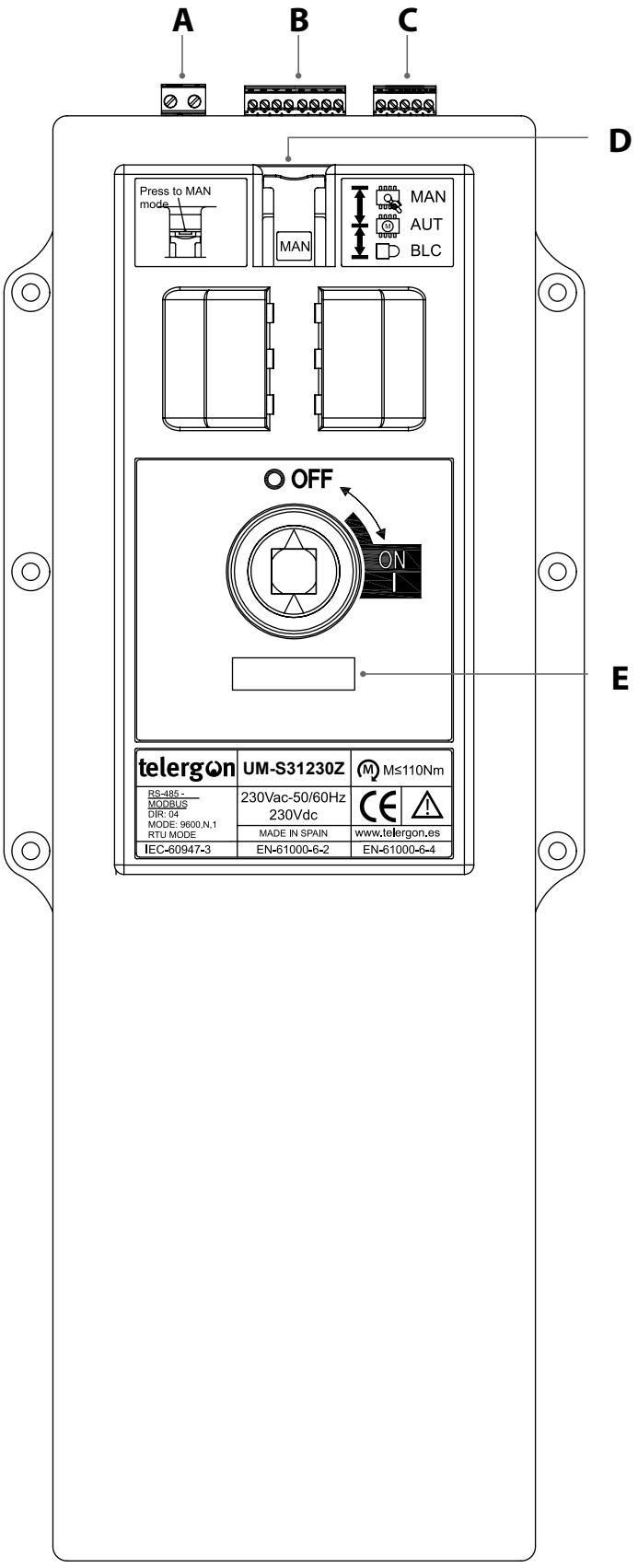
S5000
800... 1800 A



S5000
2000... 3150 A



1* For inverted mounting there are references for MU with inverted frontal plates. Supply under request.



A
MU voltage supply

B
Input signals and MODBUS

C
Output signals

D
Operation selector

E
Display

Auxiliary manual operation

Communication features

Reference

Motor torque

telergon	UM-S31230Z	M≤110Nm
RS-485 - MODBUS DIR: 04 MODE: 9600,N,1 RTU MODE	230Vac-50/60Hz 230Vdc	CE ⚠
	MADE IN SPAIN	www.telergon.es
IEC-60947-3	EN-61000-6-2	EN-61000-6-4

Voltage supply

Product guide

A - VOLTAGE SUPPLY

The MU requires a voltage supply for its operation (terminals 1-2).

For the MU to have an uninterrupted supply system (mains - secondary sources), the customer shall prepare a circuit similar to the example (*) ***at page 16.***

Supply voltage available ***(see Annexe 1, page 12)***.

	Terminals
Voltage supply	1-2

Terminal max. capacity: 4 mm² (without clamps) / 2,5 mm² (with clamps).

Terminal min. capacity: 1,5 mm² (see Annexe 4, page 17).

B - INPUT SIGNALS

The electrical inputs indicate to the MU the position to move.

The digital inputs configuration allow that they can be operated through a non voltage contact (relay, switch) or directly applying a voltage.

Using an isolated contact, the activation of it, must close the circuit between the correspondent input terminal and the +5 Vdc (terminal 4) or +24 Vdc (terminal 3) signal.

Using the direct application of the voltage, the voltage source must be in the same potential of the inputs. Therefore it is necessary to join the Ground of the source to the MU GND1 signal (terminal 10).

The maximum voltage that the input terminals can support is Vmax = 40 Vdc, Imax = 500 mA.

Switching order	Terminal	5 Vdc	24 Vdc	GND
Go to 0	7	4	3	10
Go to I	6	4	3	10

Imax= 500mA x Terminal. External Connection + GND

Terminal max. capacity: 1,5 mm² (without clamps) / 1 mm² (with clamps).

Terminal min. capacity: 0,5 mm². (see Annexe 4, page 17).

RS485 / MODBUS COMMUNICATION

Let the total digital control of the MU with the input/output management.

(see page 10 for table with addresses and operation).

Note: It is necessary to advise that the communications and the inputs are in the same potential.

	Terminal
-	A
+	B

Terminal max. capacity: 1,5 mm² (without clamps) / 1 mm² (with clamps).

Terminal min. capacity: 0,5mm² solid or stranded cable.

C - INPUT SIGNALS

Indicate the current position of the switch.

Performed through a contact based on a solid state relay.

The outputs can be supply through the MU internal auxiliary voltage +5 Vdc (connector 4) or +24 Vdc (connector 3) as outputs common and the corresponding terminal.

The outputs can also be controlled through a external voltage source located between the position outputs and the GND2 terminal (15) (Vmax = 315 Vac/dc, Imax = 120 mA)

These outputs can be used to operate an actuator (lamp, relay, led, etc).

An Error output signal is added. (***see part E, Display, page 7).***

Switching order	Terminal	5 Vdc	24 Vdc	GND
Position 0	12	4	3	15
Position I	13	4	3	15
Signal error	11	4	3	15

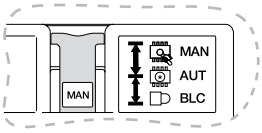
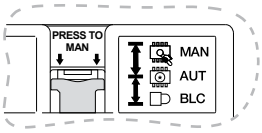
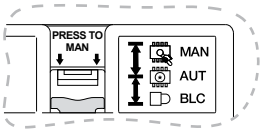
Imax = 100 mA x Terminal. Internal Connection 5 Vdc
Imax = 50 mA x Terminal. Internal Connection 24 Vdc
Imax = 120 mA x Terminal. External Connection + GND

Terminal max. capacity: 1,5 mm² (without clamps) / 1 mm² (with clamps).

Terminal min. capacity: 0,5 mm² (see Annexe 4, page 17).

Take into account terminals polarity (see Annexe 3, page 15-16).

D - OPERATION SELECTOR

Selector	Position	Description
	**MAN**	Operation only with the manual handle, electric operation not possible.
	**AUT**	Motorised operation with inputs/outputs or RS485 MODBUS.
	**BLC**	Lock position, manual and motorised operation not possible.

Note: For changing the selector from AUT to MAN press the lever behind the yellow selector.

E - DISPLAY

4 digits red display is added.

The display shows every moment the operation mode and the changeover position with the following messages:

Manual mode	Lock mode	Auto mode	Error messages	Test mode
Ma 0	Bl 0	Au 0	Err 0	8888
Ma 1	-	Au 1	Err 1	-
Ma 2	-	Au 2	Err 2	-

THE MU HAS 3 KIND OF ERRORS:

Error 1

Moving in lock mode failure.

The Shaft has been operated during lock mode.

Error 2

Non finished operation failure.

The operation in progress has not finished.

Error 3

Broken piston error.

A manual movement of the Shaft has been made during auto mode.

Besides, it is possible to configure the way the messages appear in the display, to adapt it to a MU with the motor up or down:

a) MU in manual mode.

b) Switch on ***"go to 1"*** and ***"go to 2"***.

c) Connect voltage supply and the message ***"Conf"*** will appear in the display.

d) Switch off ***"go to 1"*** and ***"go to 2"***.

e) ON / OFF ***"go to 2"*** to navigate through the menu.

f) ON / OFF ***"go to 1"*** to modify the options.

g) ON ***"go to 0"*** appears the option ***"Save"***. OFF ***"go to 0"*** and the current parameters will be saved. The message ***"OK"*** appears in the display.

h) Selecting auto mode and then manual mode, exits the menu without saving

Operating modes

There are 3 operating modes selectable with the frontal yellow selector (D):

- Manual operation
- Motorised operation
- Lock mode

Manual operation

To operate in this kind of mode the yellow frontal selector has to be in the manual position. To pass from AUT position to MAN position the lever behind the yellow selector has to be pressed.

The switch can be operated only with the direct handle.

Inputs

Automatic operation is not possible in this mode. The MU does not respond to the commands entered by the communication bus neither the electric signals.

Information about the switch position is sent via MOBUS.

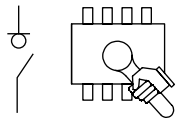
Outputs

Outputs can be supply through the internal auxiliary voltage of the MU +5 Vdc (Terminal 4, Imax = 100 mA) or +24 Vdc (Terminal 3, Imax = 50 mA), working as the outputs common and the correspondent terminal.

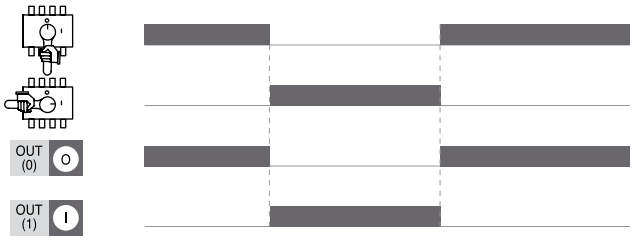
A external voltage supply can be used (Vmax = 315 Vac/dc, Imax = 120mA) located between the outputs and the GND terminal.

These outputs can be used to operate an actuator (lamp, relay, led, etc.).

Manual operating example:



Manual operating mode



Take into account terminals polarity (see Annexe 3, page 15-16).

Automatic operation

The switch can be remote-controlled in two ways:

- Control through electric inputs/outputs
- MODBUS control

In this operation mode the system can be driven in any of these control modes.

The MU executes the first input signal.

In order to avoid duplicate signals, when we give an order via MODBUS, the signal inputs will be blocked automatically, and then unblocked when the MU reaches the required position.

Between two signals, the MU disables the signal inputs during two seconds.

OPERATION MODE AUTO (inputs/outputs)

Inputs

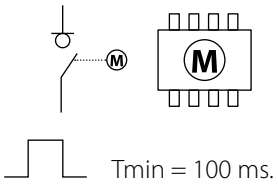
The switching is made by pulse or maintains contact.

CONTROL BY PULSE

The switching order is made by pulse between the common terminal and the terminals 7 (position 0) and 6 (position I)..

Minimum duration of pulse 100 ms.

Example of control by pulse:

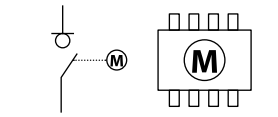


CONTROL BY PULSE

CONTROL BY MANTAINED CONTACT

The switching order is made by maintained pulse between the common terminal and the terminals 7 (position 0) and 6 (position I).

Example of control by maintained contact:



CONTROL BY MAINTAINED CONTACT

Outputs

Outputs can be supply by the internal auxiliary voltage of MU +5 Vdc (terminal 4, Imax = 100 mA) or +24 Vdc (terminal 3, Imax = 50mA) that acts as the output common, and the correspondent terminal.

Outputs can also be controlled by a external auxiliary supply (Vmax = 315 Vac/dc, Imax = 120 mA) located between the position outputs and the terminal GND.

These outputs can be used to operate an actuator (lamp, relay, led, etc.).

Take into account terminals polarity (see Annexe 3, page 15-16).

Operating modes

OPERATING MODE AUTO (MODBUS Protocol)

The devices communicate themselves through the MODBUS protocol, using a technique master-slave where only one device (the master) can start transactions (requests). Other devices (slaves) respond providing to the master the requested data, or realizing the requested action.

During the transmission, the MU uses a speed of 9600 baud, the address of the device is 04 h and it uses 8 bits without parity and with 1 stop bit in RTU format.

The MODBUS protocol indicates the format for the master´s request, and it includes the address of the slave device, a code of function that defines the requested action any data to be sent and a field for error checking. (When there is more than one, it will be necessary to put different addresses for each unit. This function shall be done in the factory under customer's request).

Slave answer message is also defined by the MODBUS protocol. It contains fields that confirm the action, any data to be returned and a field for error checking. If the message received by the slave is defective, or the slave is unable to make the requested action, it will generate an error message and send it as an answer.

ACTUATION ORDERS

To drive the switch, function 05 h (Force single coil) is used as follows.

Slave address	Function	High address	Low address coil	Force data high	Force data low	CRC high	CRC low	Meaning
-	05h	00h	00h	FFh	00h	-	-	Go to 0
-	05h	00h	01h	FFh	00h	-	-	Go to 1

(04h default)

The answer for a correct order is an echo to the received one.

The answer for a error order has the following form:

Slave address	Function	Error code	CRC high	CRC low	Meaning
-	85h	XXh	-	-	Function error

(04h default)

Where the value of the exception code XXh is among the following ones:

Code	Name	Meaning
01h	Illegal function	Function not recognised
02h	Illegal data address	Data address not valid. If not is 0000h or 0001h
03h	Illegal data value	Data field not valid. different to FF00h
04h	Slave device failure	If the motor fails, there is an internal failure, or blown fuse

(04h default)

DATA REQUEST

The function used is 02h "Read Input Status" and is used in the next general form:

Slave address	Function	Starting address high	Starting address low	Number of points high	Number of points low	CRC high	CRC low	Meaning
-	02h	00h	00h	00h	10h	-	-	Data request

(04h default)

The answer for this request is:

Slave address	Function	Bytes number	Second byte 8-F	First byte 0-7	CRC high	CRC low	Meaning
-	02h	02h	XXh	XXh	-	-	Answer

(04h default)

THE MEANING OF THE BITS OF THE RETURNED WORD

In order to code the different answers returned, every bit of the two bytes returned is used with the following meanings:

	Bit address	State	Meaning	State	Meaning
First byte	0	0	The switch is NOT in 0	1	The switch is in 0
	1	0		1	
	2	0		1	
	3	0	The switch is NOT in I	1	The switch is in I
	4	0	Automatic detector NOT activated	1	Automatic detector activated
	5	0	Lock detector NOT activated	1	Lock detector activated
	6	0		1	
	7	0		1	
Second byte	8	0	NO manipulation error	1	Manipulation error, it has been moved
	9	0	NO operation error	1	Operation error, does not reach the objective
	A	0	NO error of relay	1	Error of relay
	B	0	NO Blown fuse	1	Blown Fuse
	C	0	Configured in switch mode	1	Configured in changeover mode
	D	0	Pushbutton "go to 0" NOT actuated	1	Pushbutton "go to 0" actuated
	E	0		1	
	F	0	Pushbutton "go to I" NOT actuated	1	Pushbutton "go to I" actuated

Note: Bits 0 and 3 are activated separately; if one of them is activated, the other two must be deactivated.
Note: If both the bits 4 and 5 are in 0, the MU is in MAN. They can't be both activated at the same time.

The answer for an error has the following form:

Slave address	Function	Error code	CRC high	CRC low	Meaning
-	82h	XXh	-	-	Answer error

(04h default)

Where the value of the code XXh is among the following ones:

Code	Name	Meaning
01h	Illegal function	Function not recognised
02h	Illegal data address	Invalid data address, if is different to 0000h
03h	Illegal data value	Invalid data value, if is different to 0010h

Lock mode

In this mode of work is impossible the manual and electrical operation. This working mode is chosen locating the yellow selector in the lock position.

Consists of an unstable position where 3 padlocks can be located (Max ø6) to maintain it.

Annexe 1

REFERENCES

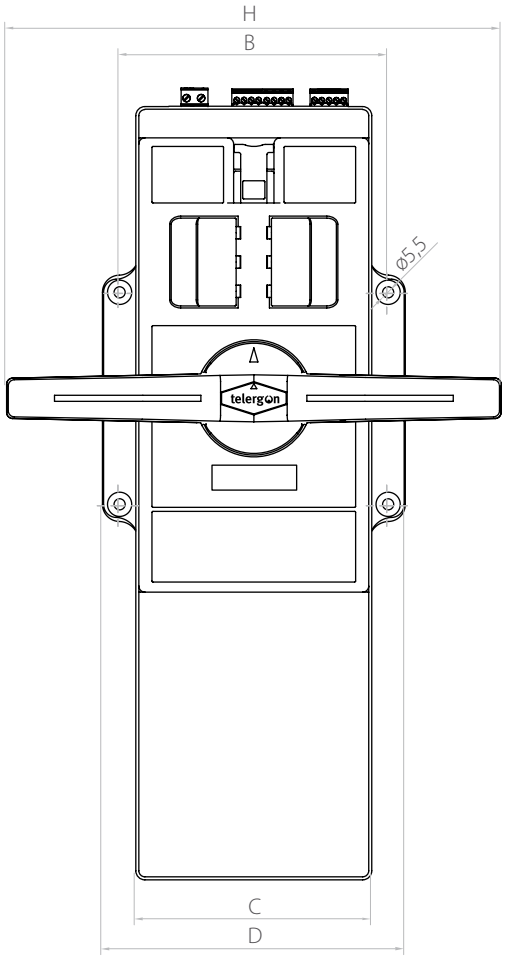
The range of MU is available from 200 to 3150 Amp, and voltage supplys are 120, 230 and 277 Vac/dc.

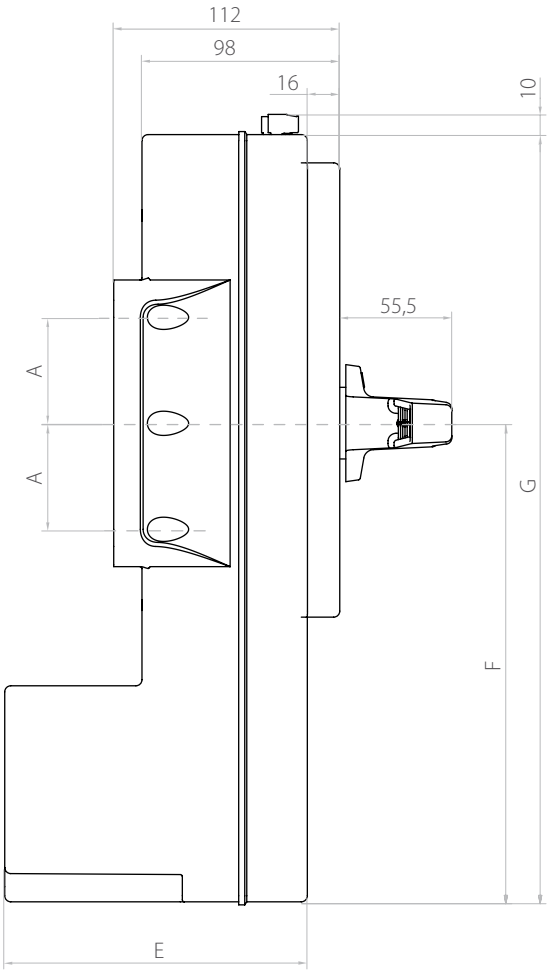
Switch 0 - 1 S-5000				Motorised Unit 0 - 1 UM				
Amp.	Size	3P	3P+N	120 Vac/dc	230 Vac/dc	277 Vac/dc	Size	Motor torque
		Switch Code	Switch Code	UM Code	UM Code	UM Code		Nxm
250	1	S5-02503PR0	S5-02503NR0	UM-S11120Z	UM-S11230Z	UM-S11277Z	T1	18
315	1	S5-03153PR0	S5-03153NR0	UM-S11120Z	UM-S11230Z	UM-S11277Z	T1	18
400	1	S5-04003PC0	S5-04003NC0	UM-S11120Z	UM-S11230Z	UM-S11277Z	T1	18
500	2	S5-05003PR0	S5-05003NR0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
630	2	S5-06303PR0	S5-06303NR0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
800C	2	S5-08003PC0	S5-08003NC0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
800	3	S5-08003PR0	S5-08003NR0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
1000C	3	S5-10003PC0	S5-10003NC0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
1250C	3	S5-12503PC0	S5-12503NC0	UM-S21120Z	UM-S21230Z	UM-S21277Z	T2	78
2000C	3	S5-20003PC0	S5-20003NC0	UM-S32120Z	UM-S32230Z	UM-S32277Z	T3	150
1000	4	S5-10003PS0	S5-10003NS0	UM-S31120Z	UM-S31230Z	UM-S31277Z	T3	150
1250	4	S5-12503PS0	S5-12503NS0	UM-S31120Z	UM-S31230Z	UM-S31277Z	T3	150
1600	4	S5-16003PS0	S5-16003NS0	UM-S31120Z	UM-S31230Z	UM-S31277Z	T3	150
1800	4	S5-18003PS0	S5-18003NS0	UM-S31120Z	UM-S31230Z	UM-S31277Z	T3	150
2000	5	S5-20003PP0	S5-20003NP0	UM-S32120Z	UM-S32230Z	UM-S32277Z	T3	150
2500	5	S5-25003PP0	S5-25003NP0	UM-S32120Z	UM-S32230Z	UM-S32277Z	T3	150
3150	5	S5-31503PP0	S5-31503NP0	UM-S32120Z	UM-S32230Z	UM-S32277Z	T3	150

For inverted mountings there are references for MU with inverted frontal plates. Supply under request.

Annexe 2

DIMENSIONS



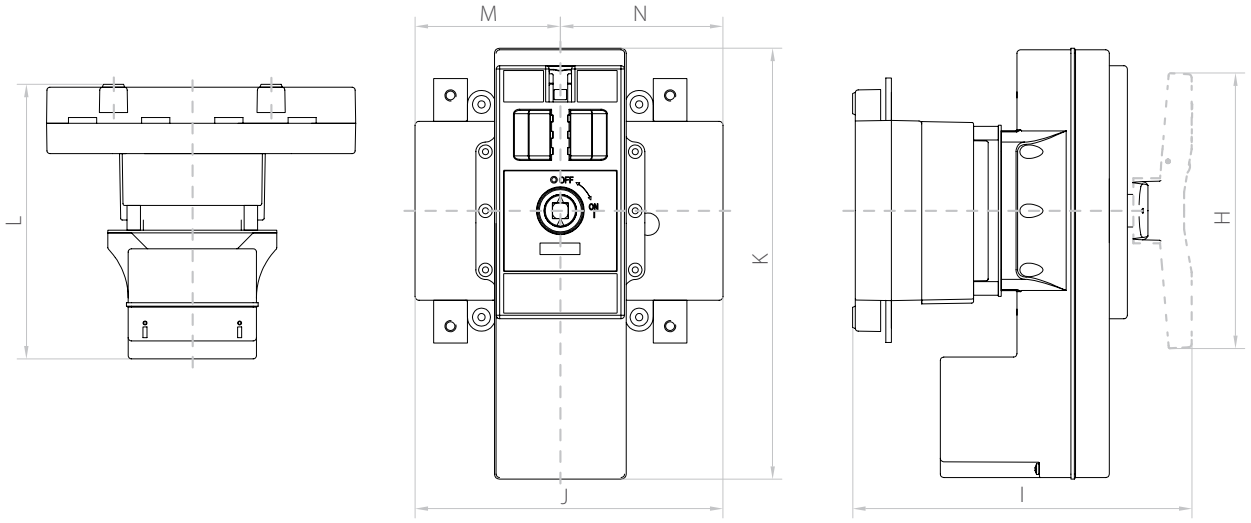


MU	A	B	C	D	E	F	G	H	I	J	K	L	M	N	M Max. Nxm
UM-S11120Z	52,5	133	117	150	150	237	380	245	276	217	380	220	100	117	18
UM-S11230Z															
UM-S11277Z															
UM-S12120Z									298	275	380	242	130	148	25
UM-S12230Z															
UM-S12277Z															
UM-S21120Z	88,5	167	153	184	172	312	455	361	311	487	290	255	312	175	78
UM-S21230Z															
UM-S21277Z															
UM-S31120Z									342	544	381 (1000A-1250A)	286	312	232	150
UM-S31230Z															
UM-S31277Z											441 (1600A-1800A)				
UM-S32120Z											543 (2000A-2500A)				150
UM-S32230Z															
UM-S32277Z											603 (3150A)				

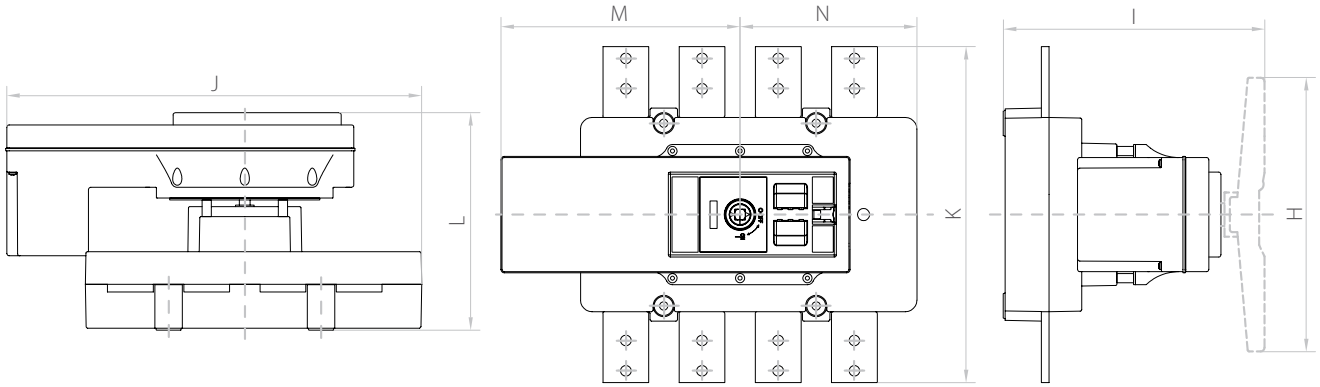
For inverted mountings there are references for MU with inverted frontal plates. Supply under request.

Annexe 2

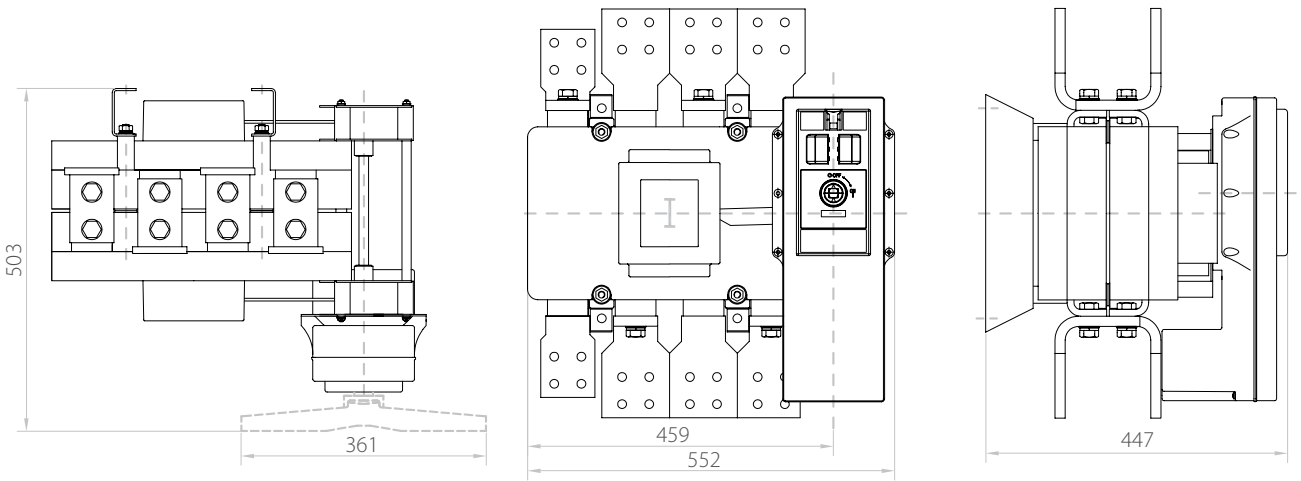
S5000 + MU (200... 630 A)



S5000 + MU (800... 1800 A)

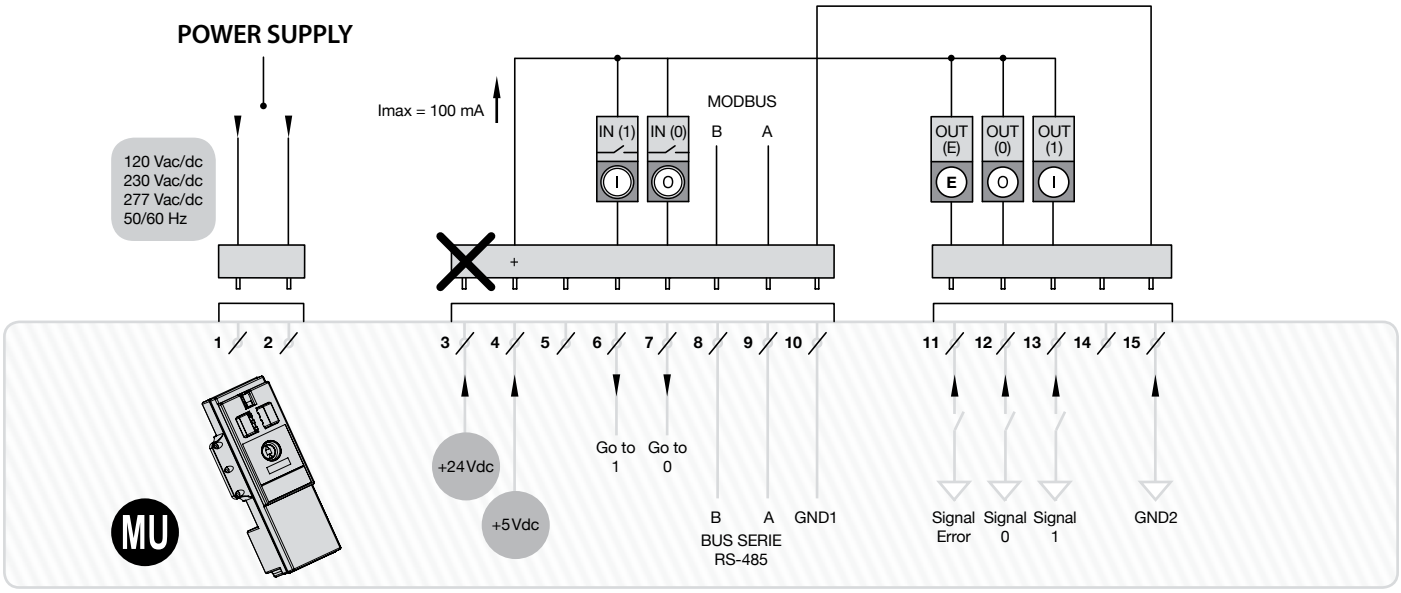


S5000 + MU (2000... 3150 A)



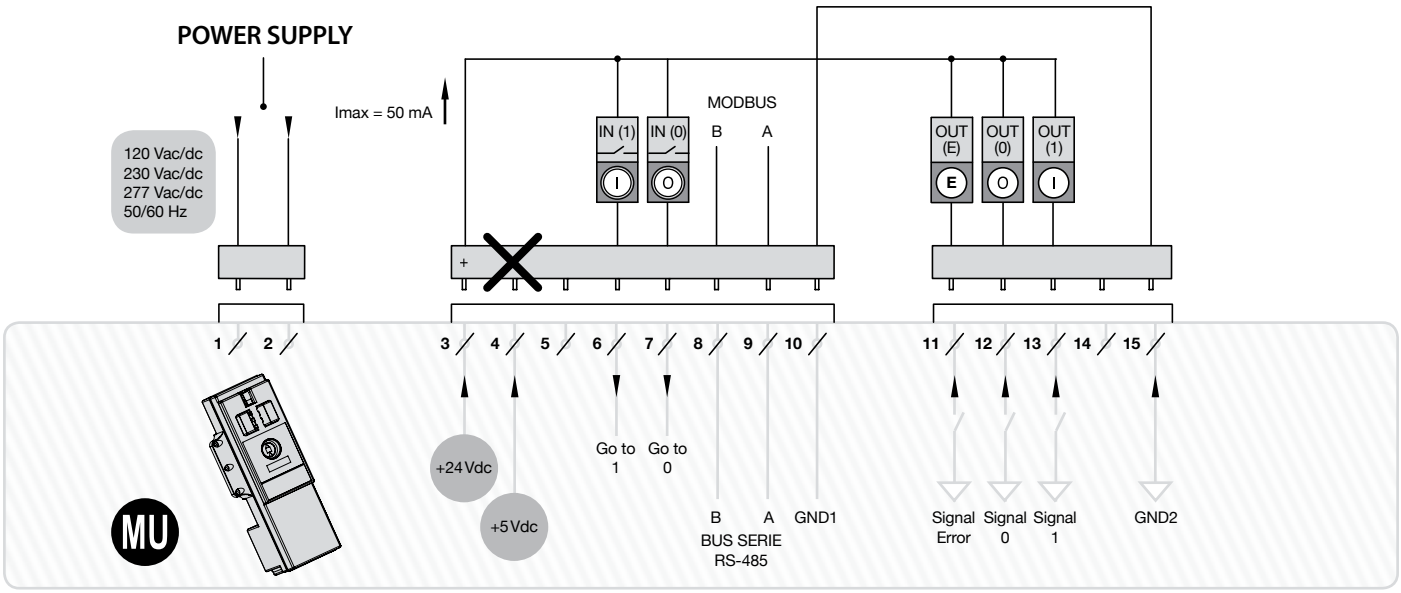
ELECTRIC DIAGRAM

INPUTS – OUTPUTS SUPPLY BY A INTERNAL SIGNAL +5 Vdc (TERMINAL 4)



Note: Indicative electric drawing.

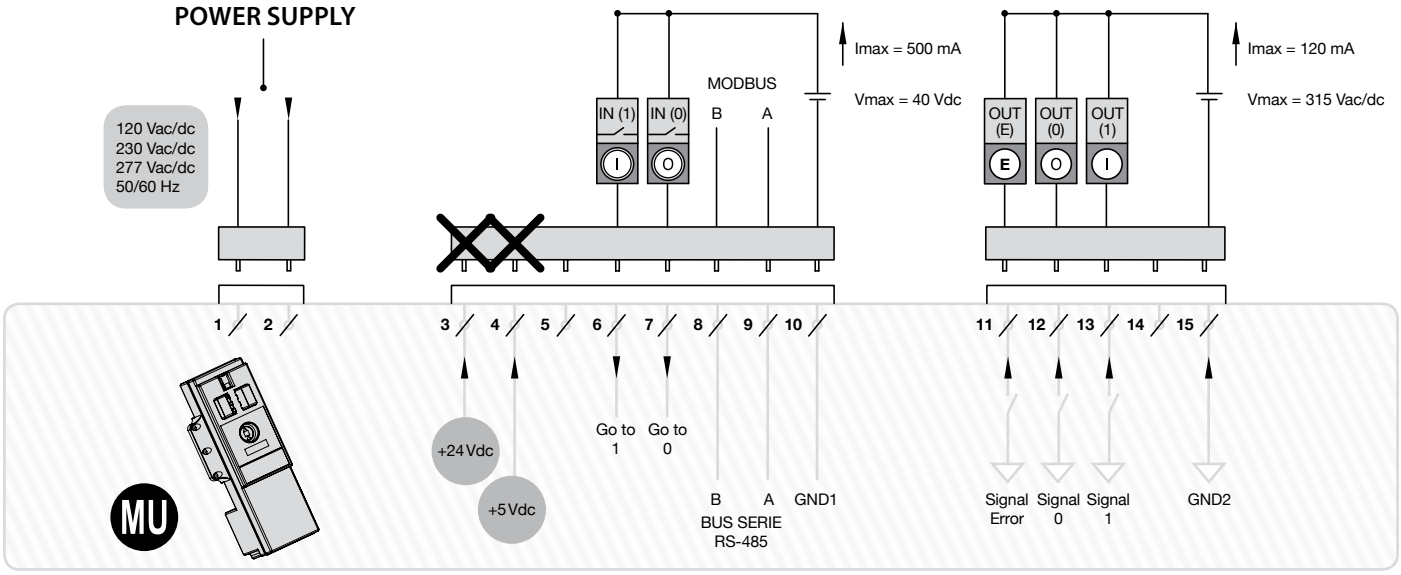
INPUTS – OUTPUTS SUPPLY BY A INTERNAL SIGNAL +24 Vdc (TERMINAL 3)



Note: Indicative electric drawing.

Annexe 3

INPUTS – OUTPUTS SUPPLY BY AN EXTERNAL SIGNAL



Note: Indicative electric drawing.

	Voltage supply			
AC	Phase 1	**DC**	+	1
	Neutral 2		-	2

Inputs
GO TO (0), GO TO (I). Two kinds of connections:

a) Using the auxiliary internal voltage.

The operation order is carried out by closing the circuit with a non voltage contact between the common (+24 Vdc, terminal 3 or +5 Vdc, terminal 4) and the terminals 6 (Go to 1) and 7 (Go to 0).

b) Using a external voltage.

A external voltage source (Vmax = 40 Vdc, Imax = 500 mA) can be connected between the terminals 7 (Go to 0), 6 (Go to 1) and GND1 (terminal 10).

Outputs
SIGNAL (0), SIGNAL (I) and SIGNAL ERROR. Two kinds of connection:

a) Using the auxiliary internal voltage.

Joining the terminals common (3 signal of +24 Vdc or 4 signal +5 Vdc) with terminals 11 (Error), 12 (position 0) and 13 (position 1).

Besides a connection jumper must be done between the terminals GND1 (10) and GND2 (15).

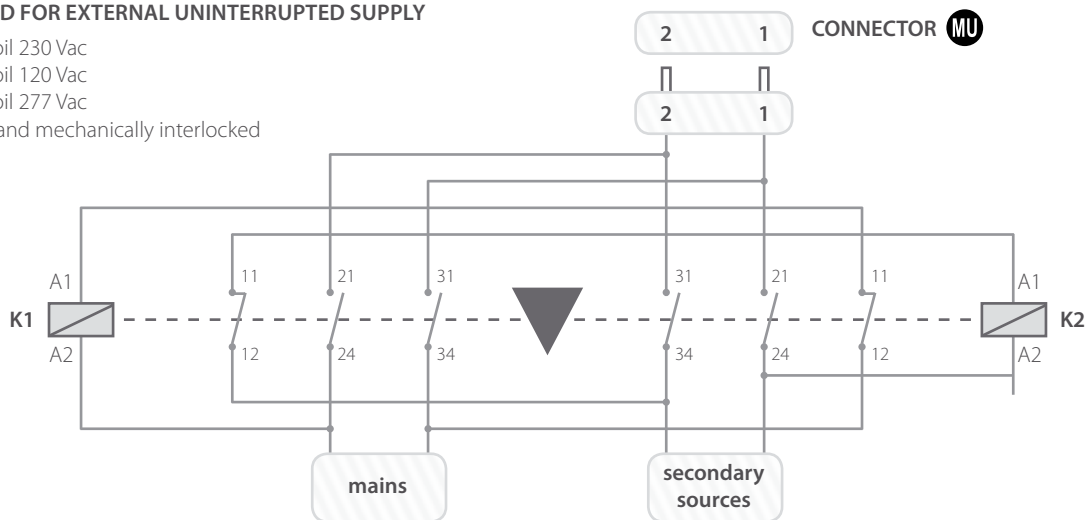
b) Using a external voltage.

A external supply can be connected between the terminals 11 (Error), 12 (position 0), 13 (position 1) and GND2 (15) Vmax: 315 Vdc/ac, Imax = 120mA.

Take into account the polarity.

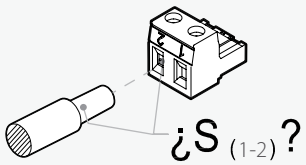
*** WIRING PROPOSED FOR EXTERNAL UNINTERRUPTED SUPPLY**

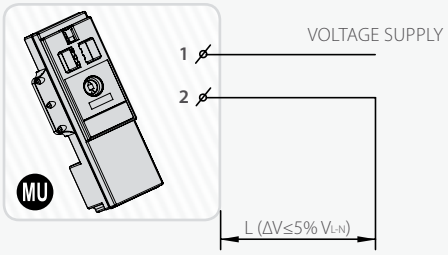
K1, K2 = 230 Vac = Coil 230 Vac
K1, K2 = 120 Vac = Coil 120 Vac
K1, K2 = 277 Vac = Coil 277 Vac
K1, K2 relays electric and mechanically interlocked



Annexe 4

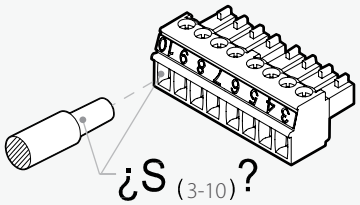
VOLTAGE DROPS IN THE WIRING

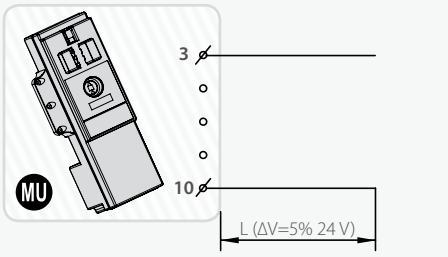


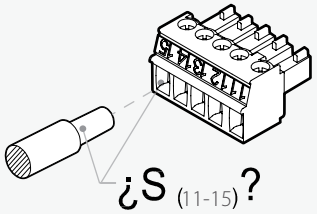


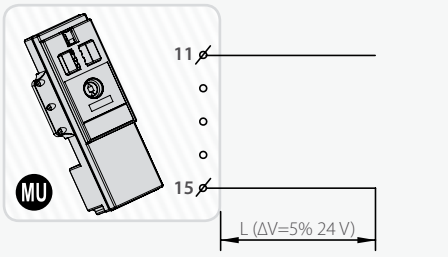
		S (Cu) (mm²)				
Vac / dc	**MU**	**1,5**	**2,5**	**4**	**MU**	**Vac / dc**
120	UM-C11120Z	264	440	700	UM-C15120Z	120
230	UM-C11230Z	670	1100	1800	UM-C15230Z	230
277	UM-C11277Z	940	1560	2000	UM-C15277Z	277
120	UM-C21120Z	75	125	200	UM-C25120Z	120
230	UM-C21230Z	250	420	675	UM-C25230Z	230
277	UM-C21277Z	380	635	1015	UM-C25277Z	277
120	UM-C31120Z	49	80	130	UM-C35120Z	120
230	UM-C31230Z	160	270	435	UM-C35230Z	230
277	UM-C31277Z	244	400	650	UM-C35277Z	277

Smax without terminal 4 mm² / Smax with terminal 2,5 mm².









S (3-5) = 1,5 mm² Cu max. => LMAX = 210 m => ΔV = 5% 24 V = 1,2 V.
S (8-9) = 1,5 mm² max. => LMAX = 1.000 m => Shielded stranded pair
Line impedance = 100 Ω

**** These values are orientate and can change depending the kind of installation. Each installation should be verified and adjusted so that the voltage supply that arrives to the MU input it is the right.***

Annexe 5

ELECTRICAL FEATURES

Voltage supply	Vac/dc	120 +/-15%	230 +/-15%	277 +/-15%
Frequency	Hz	50/60	50/60	50/60
Ambient temperature Un	ºC		-40º / +65º (²)	
Maximum load while transferring				
For switches ratings from 200 to 400A	A	1.025	0.695	0.595
For switches ratings from 630 to 800A	A	3.415	1.965	1.595
For switches ratings from 1000 to 1800A	A	5.325	3.075	2.475
Minimum idle load	A	0.225	0.225	0.225
Transfer time (maximum values)				
For switches ratings from 200 to 400A	s	0.208	0.192	0.200
For switches ratings from 630 to 800A	s	0.180	0.168	0.174
For switches ratings from 1000 to 1250A	s	0.166	0.148	0.154
For switches ratings from 1600 to 1800A	s	0,172	0,175	0,169
Maximum number of operations (¹)				
For switches from 200 to 400A		7000/10000	7000/10000	7000/10000
For switches from 500 to 630A		4000/10000	4000/10000	4000/10000
For switches of 800A		2500/10000	2500/10000	2500/10000
For switches from 1000 to 1800A		2500/7000	2500/7000	2500/7000
Maximum number of operations hour (¹)				
For switches from 200 to 400A		120/120	120/120	120/120
For switches from 500 to 630A		60/120	60/120	60/120
For switches from 800A		20/120	20/120	20/120
For switches from 1000 to 1800A		20/60	20/60	20/60

(¹) According to IEC-EN 60947-3 / Based in our own tests
(²) 90% Relative humidity

Annexe 6

EMC TABLE

Immunity	Standard	Criterion	Level	Characteristics
Electrostatic discharges	EN 61000-4-2	A	Special	± 8 kV air discharge ± 4 kV equipment discharge
Electromagnetic H.F. field	EN 61000-4-3	A	3	10 V/m
Fast transients (Burst)	EN 61000-4-4	A	4	± 4 kV power supply ± 2 kV signal supply
Fast transient (surge discharge)	EN 61000-4-5	A	Special	± 4 kV power supply L1-L2 Generator impedance 2Ω (wave 1.2/50µs)
Conducted disturbances	EN 61000-4-6	A	3	10 V supply and signal
Electromagnetic field, industrial frequency	EN 61000-4-8	A	4	Field intensity 30 A/m
Voltage dips, interruptions and voltage variations	EN 61000-4-11	A B	- -	60% Un - 1000 ms 95% Un - 5000 ms

Emission	Standard	Criterion	Level	Characteristics
Emission of harmonic current	EN 61000-3-2	- -	3 3	0,02 A total current (manual mode) 0,04 A total current (aut. mode)
Unwanted voltage	EN 55011	-	3	Qualified
Radiated emission	EN 55011		3	Qualified

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

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