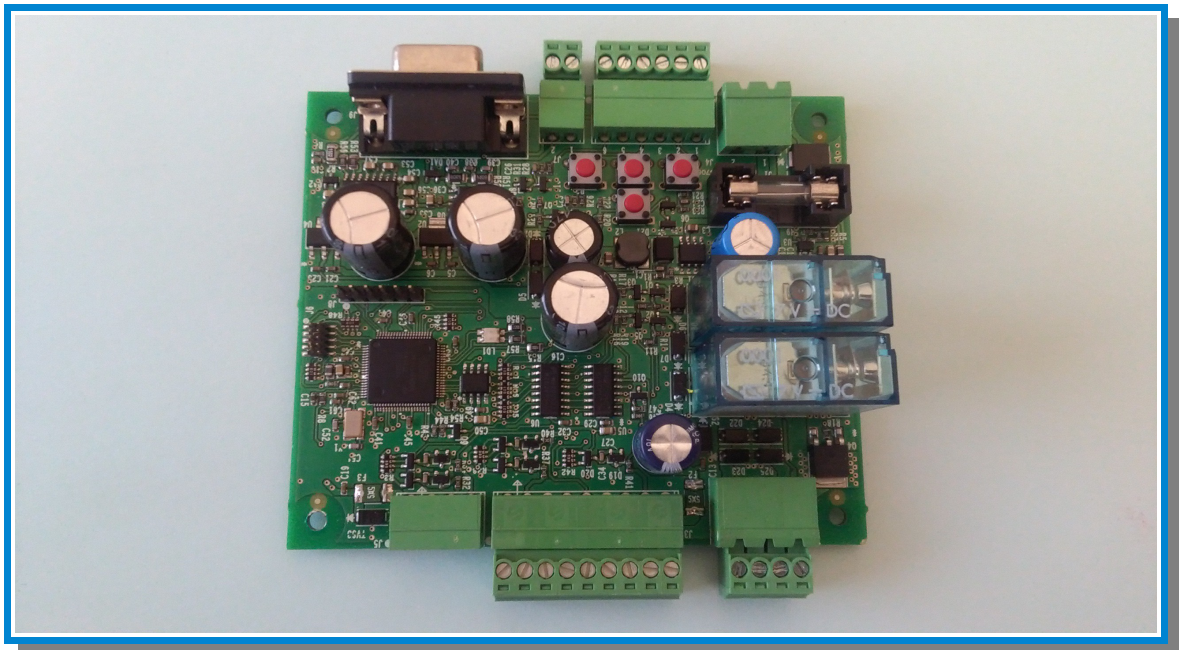




MOVEMENT ENGINEERING

# Radia System SMC

## Control system for brushed motor



# Instructions for use

## v. 1.0

Original instructions



**WARNING!** Before to use device read instructions include in this document

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RADIA S.r.l.  
Via Marconi, 65/A  
10040 Piobesi Torinese (TO)  
Italia  
inforadia@radiamotion.com  
www.radiamotion.com  
+39 011 9936019

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## Assistance

### Customer service

RADIA S.r.l.  
Via Marconi, 65/A  
10040 Piobesi Torinese (TO) - Italia  
Tel: +39 011 9936019  
Fax: +39 011 9936021  
e-mail: [inforadia@radiamotion.com](mailto:inforadia@radiamotion.com)  
sito: [www.radiamotion.com](http://www.radiamotion.com)

### Return

In the event of malfunction or failure, dispose of the appliance at its **own expense and in its original packaging** at the local distributor or directly at RADIA S.r.l. .

Local dealer	Manufacturer
<i>Dealer name:</i>	RADIA S.r.l. Via Marconi, 65/A 10040 Piobesi Torinese (TO) Italia <a href="mailto:inforadia@radiamotion.com">inforadia@radiamotion.com</a> <a href="http://www.radiamotion.com">www.radiamotion.com</a> +39 011 9936019

## Warranty

### Terms

RADIA S.r.l. Guarantees the product from defects in materials or manufacture for a period of **one year from purchase date**

If during this period there are defects in materials or workmanship, RADIA S.r.l. Will repair or replace defective components in the terms and conditions below, without charging labor or spare parts. The Customer charges the card shipping charges to Customer Service.

Note: The warranty is valid only if the defect is filed within the terms indicated.

### Exclusions

- Periodic maintenance
- Damage resulting from improper use, including but not limited to:

- not correct power supply
- Use of the product for purposes other than those intended
- Repair work performed by unauthorized personnel or by the Customer themself
- Defects resulting from modifications, adjustments or repairs made to the product by the Customer or unauthorized person
- accidental events, such as dropping and liquid infiltration
- Natural events and wicked or colpose actions

## Post warranty assistance

After the warranty period passed, the service will be provided by RADIA S.r.l. With charge of the replaced parts and labor and transport costs in force at the moment.

## Fall warranty




*NOTICE: The warranty will immediately expire if the model or serial number indicated on the product has been modified, deleted, removed or otherwise made illegible.*

## Compliance

Note: for updated device compliance information, contact Customer Service. See "Assistance" on page 1.

## Declaration of compliance

Manufacturer	RADIA S.r.l. Via Marconi, 65/A 10040 Piobesi Torinese (TO) Italia
Device	SMC1CH Smart Motor Controller
Compliance	
Directive	Directives list for which the appliance declares itself compliant: <ul style="list-style-type: none"> <li>▪ 2014/35/UE (low voltage)</li> <li>▪ 2014/30/UE (EMC)</li> </ul>

## Safety signals

### Safety warnings

In this manual situations that endanger the safety of the user of the appliance are reported in this way:



**WARNING!** Indicates a dangerous situation that, if not avoided, can cause minor injuries.

### Other warnings

Other indications are reported in this way:



**NOTICE:** Indicates obligations that if not met may cause damage to the appliance.



Indicates obligations that if not met may cause pollution.



# 1. Introduction

---

## Manual finality

This manual guides users to install and use the Radia SMC System, made up of :

- SMC1CH Smart Motor Controller: control drive for brushed motor
- Radia SMC: software and driver configuration SMC

## Contents

This section includes the following topics:

Documents information.....	6
----------------------------	---

## Manual use



**NOTICE:** This manual is an integral part of the appliance and must be kept for the rest of your life. It must be consulted for all situations related to the life cycle of the appliance from the time it is received until it is discharged. It must be kept so that it is accessible to operators, in a clean place and maintained in good condition.

In the event of loss or damage to the manual contact Customer Service. Always attach the manual to the device.

## General warnings



**WARNING!** Live parts .Mild burn. Installation and connection to external devices must be carried out by qualified personnel.



**NOTICE:** for repairs contact the local dealer or directly RADIA S.r.l ..



**Sensitive ESD device:** Touch the card only if equipped with antistatic equipment.  
Touch the board only on the edges to minimize the risk of electrostatic discharge damage.

## Intended use

The product may be installed and used only as described in this manual and for the purposes described in the commercial materials distributed by RADIA Srl. It may be connected to the equipment, components and devices of other manufacturers only as recommended and permitted in this manual or by RADIA Srl directly.

The product has been designed, manufactured and tested to conform to the stated safety standards. If the instructions in this manual are followed during use, the appliance will not endanger people or persons.

## Manual target

The appliance has been designed for the following professional figures:

User	Description
Installer/ Maintenance	<p>Equipped with technical know-how in the electrical, electronic and mechanical fields, it is the only one that can:</p> <ul style="list-style-type: none"> <li>▪ Perform electrical wiring</li> <li>▪ System setting</li> <li>▪ Install the system in the final environment</li> </ul>

# Document informations

## Manual

Title: Instructions for use

Release v. 1.0

Month/year: MAR 2016

Manual type: original instruction

Devices: SMC1CH Smart Motor Controller and Radia SMC

## Manual updates

Updates list:

Publication date	Code	Description
MAR 2016	v. 1.0	First pubblication



## 2. Receipt, handling and storage

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### Contents

This section include topics in the following:

Identification.....	9
Handling and storage.....	10

## Identification

### Manufacturer identification data

RADIA S.r.l.  
 Via Marconi, 65/A  
 10040 Piobesi Torinese (TO)  
 Italia  
 inforadia@radiamotion.com  
 www.radiamotion.com  
 +39 011 9936019

### Contents of the pack

Below are the items provided in the sales package

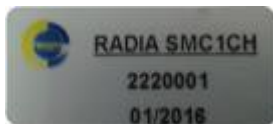
- SMC1CH Smart Motor Controller board
- (option) Case with clip for fixing on DIN rail



Dispose of packing with separate collection through the collection facilities indicated by the government or local public bodies.

### Board identification

To identify the board, refer to the label on the top of the case. The following is an example:



Elements	Description
RADIA SMC1CH	Product name
2220001	Product code
01/2016	Month/year of production

## Firmware identification

Note: To identify the firmware version, you must install the Radia SMC software (see "Downloading and Starting the Configuration Software" on page 17)

Identification :

1. Turn the board
2. Connect the card to the PC using a serial cable or serial-USB adapter
3. Start Radia SMC software
4. Click on Select COM, select the correct port, and click Connect

:



## Version Radia SMC identification:

The firmware version showed on the main page :



## Handling and storage:

### Transport warning



NOTICE: bumps, pressures, bends. Damage to the appliance. Only operate the machine in its original packaging and handle it with care.

### Ambient condition for storage

Store the card in the original box in the enclosure and away from:

- Heat sources
- Direct sunlight
- Intense electromagnetic fields

For technical details, see "Specifications of the Card" on page 37.







## 3. Device description

---

### Contents

This section includes the following topics :

General description.....	14
Availables functionality in reference to motor.....	15
Module description.....	15
Status led on board.....	16

# General description

## What board needs

SMC1CH Smart Motor Controller monitors actuators and gear motors manufactured by RADIA. In particular, it simplifies advanced control by providing different functionality to the operator.

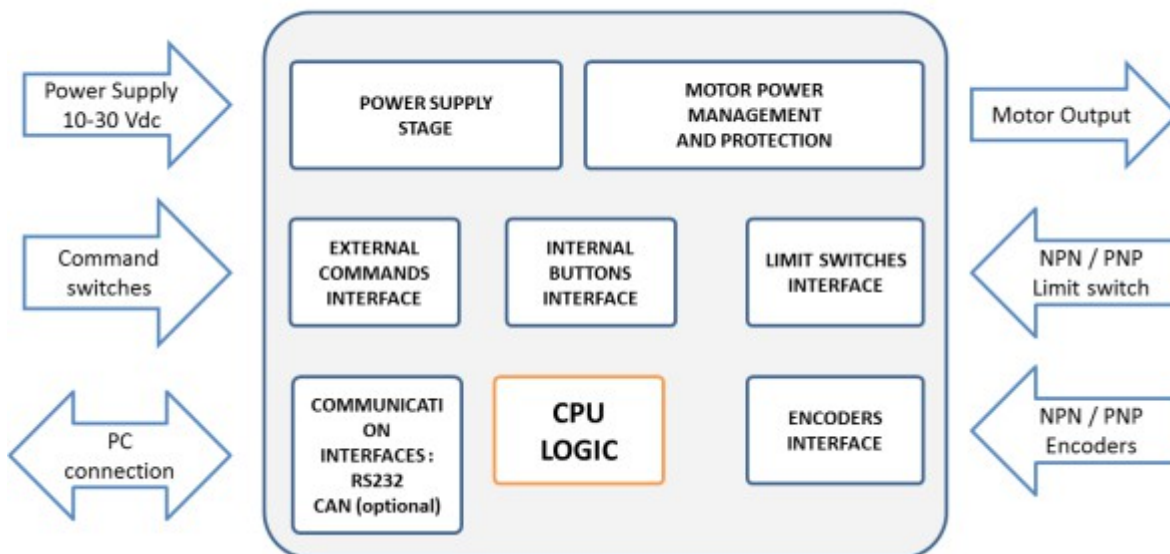
Compatible with all RADIA series of LAT and LATT families.

## Modality motor control

La scheda può comandare il motore in una delle seguenti modalità:

- **manual** "man's switch" operations, the motor stops releasing the control buttons .
- **semiautomatic** user commands the motor start, which moves automatically until a limit switch is reached.

## Logical diagram



## Availables functionality in reference to motor

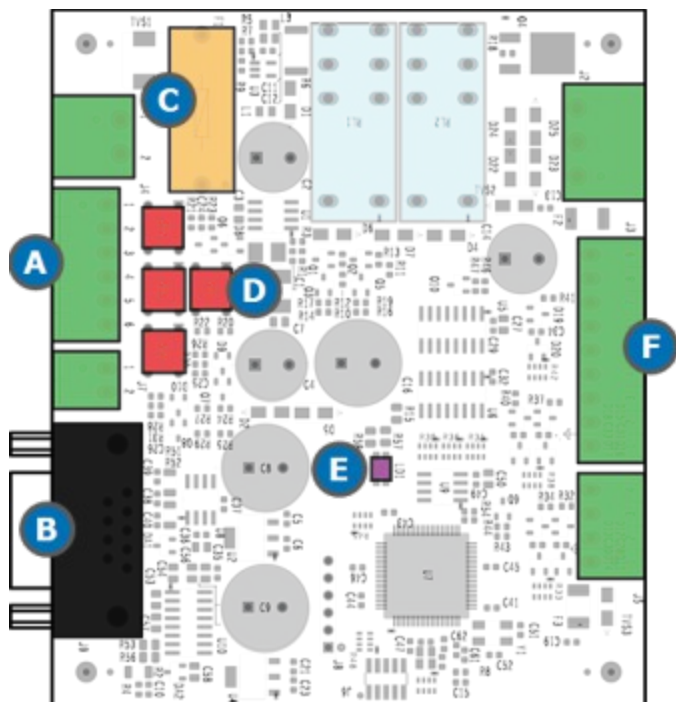
Different functions available depending on the type of motor to be controlled in the following:

:

	Standard motor with microswitches	Motor with single hall sensor	Motor with double hall sensor
Check motor direction of rotation	x	x	x
Control in manual or semi-automatic mode to the limit switches	x	x	x
Set the percentage power (PWM) sent to motor	x	x	x
Configuration motor acceleration	x	x	x
Read and setting motor max.speed	-	x	x
Read and setting switches position (encoder position)	-	-	x
Read and setting motor position	-	-	x

## Board description

### Components description

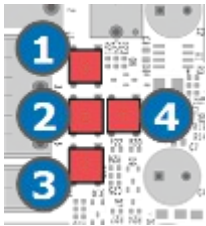


Part	Description
A, F	Input and output terminals

Part	Description
B	RS232 input
C	Protection fuse (reverse polarity, overvoltage, high absorption)
D	Motor control buttons and end position stroke storage
E	Status LED

## Buttons description

Buttons description on board:



Indicator	Denomination	Description
1	SW2	Moving back
2	SW3	Moving towards intermediate position
3	SW4	Moving forward
4	SW1	Motion selection button (or factory reset at startup)

## Status LED

There is an LED on the board for signaling the faults, which occurs in parallel with the signaling on the Radia SMC configuration software.

Here are the possible LED states:

Color	LED flashing	Description
Green	Fix	Limitswitch stored or reset board completed
Green	Two flashing	"Heart-Beat" sequence. Regular operation.
Rosso	From one to eight flashing	Anomaly Note: For a full description of the faults, see "Fault messages" on page 43.

## 4. Installation and Connections

---

### Contents

This section include topics in the following:

Typical configuration.....	18
<a href="#">Download and configuration software.....</a>	18
<a href="#">Connection,starting and first configuration.....</a>	18
<a href="#">Installation on final environment.....</a>	20

## Typical configuration

Steps of a typical SMC1CH Smart Motor Controller configuration in the following:

Step	Description
1	Evaluation of the scope of use and desired behavior <ul style="list-style-type: none"><li>▪ "Available functionality in reference to motor" page 14</li><li>▪ "General description" page 14</li></ul>
2	Radia SMC installation <ul style="list-style-type: none"><li>▪ "Download and configurations software" page 18</li></ul>
3	Cabling and manual operating simulation (bench) <ul style="list-style-type: none"><li>▪ Connections, Power on and First Configuration " page 19</li></ul>
4	Configuration by software for motor parameters (bench) <ul style="list-style-type: none"><li>▪ "Motor characteristics" page <small>Errore: sorgente del riferimento non trovata</small></li></ul>
5	Configuration by software of operating parameters (bench) <ul style="list-style-type: none"><li>▪ "Operating Parameters " page <small>Errore: sorgente del riferimento non trovata</small></li><li>▪ (optional) "Protect your board configuration with password " page 32</li></ul>
6	Installation in the final environment <ul style="list-style-type: none"><li>▪ "Installation in the final environment" page 20</li></ul>

## Download and start up the configuration software

### Requirements

To use the Radia SMC configuration software, you must have a computer running Windows XP or later.

### Download and start Radia SMC

For download and start Radia SMC:

1. Download software available in website [www.radiamotion.com](http://www.radiamotion.com)
2. Double-click icon

Note: Future releases of the software will be available in the same download section of [www.radiamotion.com](http://www.radiamotion.com). To upgrade the software, replace the executable with the latest version.

## Connections, power on and first configuration



NOTICE: We recommend that you carry out the following bank steps and postpone the installation of the device later in the final environment.

## Installation notes



**WARNING!** Live parts. Mild burn. The installation is reserved for the electric maintenance worker.



**NOTICE:** voltage surges. Damage to the appliance. Install the necessary protections.

## Electical connections:

see "Connection" page 39 and "Typical connection diagrams " page 41.

## Check board operation

After powering up the board, verify that it is working properly, ensuring that the on-board LED flashes with "Heart Beat" sequence (two fast green flashes).



If the LED is not lit, please contact RADIA.

## Connect board to PC

For connect board to PC:

1. Obtain a male-female RS232 cable or an RS232-USB adapter if the computer is not equipped with an RS232 serial port (DB9 male)
2. Install the drivers needed to operate the USB Adapter if you are using the PC

Note: Drivers are generally supplied in the adapter sales package or are available on the manufacturer's website.

3. Connect SMC1CH Smart Motor Controller to PC
4. Turn on board
5. Start the Radia SMC configuration software
6. Select the serial port in COM box

Note: The menu shows all available COM ports on your computer. If you are using an RS232-USB adapter, refer to the "Device Manager" section of Windows to identify which COM port is added to the list after you insert the adapter.

7. click to **Connect**

## First configuration ( bench)



**NOTICE:** overcurrent. Damage the motor. Refer to the technical data sheet for the correct operating parameter setting.

It is recommended that you simulate the behavior you want with a first bench configuration, following this order:



1. First manual configuration using the commands available on board (see "Set end positions" page 30 e "Azionare il motore" page 30)
2. Configurazione più precisa attraverso l'interfaccia software di Radia SMC (vedi "Pagina Parameters" a pagina 24)

## Installation in the final environment

### Installation notes



**WARNING!** Live parts. Mild burn. The installation is reserved for the electric maintenance worker.



**NOTICE:** voltage surges. Damage to the appliance. Install the necessary protections.

### Installation environment

- The installation environment must ensure the mechanical and electrical protection of the board.
- The ambient temperature, humidity, and vibration values must be guaranteed (see "Technical specifications of the card" on page 38).

### Installation conditions

Use nylon or metal spacers M3 of a height not less than 5 mm.

Note: For metal spacers, the maximum support diameter of the spacer and the head of the corresponding screw is 8 mm.



**NOTICE:** bending. Damage to SMD (Surface Mount Technology) components. The surface must have a maximum flexion of 500  $\mu\text{m}$  / meter.



**NOTICE:** short circuits. Electrical damage to the board. Spacer and screw should not touch the electronic components on the board.

# 5. Software configuration description

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## Contents

This sections include topics in the following:

Main page.....	22
Parameters page.....	24

# Main page

## Premise

The main page allows you to:

- Read data from board in real time
- Operate the motor connected to the board
- Access to operating parameters page
- Protect the writing of the parameters on board

## How it looks

main page Radia SMC :



Area	Description
A	Operations data
B	Counters and alerts
C	Connection and configuration buttons
D	Command buttons

## Operations data

Data are read in real time :


Tag	Description	U.M.
Supply Voltage [V]	Input supply	V
Motor Current	Current absorbed to motor	A

Tag	Description	U.M.
[A]		
Motor Speed [rpm]	Motor speed	rpm
Actual Power [%]	Power PWM sent to motor. Percentage of input voltage available.	%
Position (*)	Motor position.  <b>Note:</b> By setting the Hall sensors parameter to None or Single (see "Page Parameters" on page 24), the reported position is not the starting zero but the last detected position.  <b>Note:</b> In the event of power loss, the board keeps the last detected position until the next power-on is re-ignited.	Motor speed
Motor Mode	Command Mode. See "General Description" on page for a description of the operating modes 14.	-
Limit Switches	Limit switches status	-
Commands	Buttons status	-

(\*) = Reading only available in the presence of a double Hall sensor

## Counters and alerts

Description for available counters:

Tag	Description
Power On	<ul style="list-style-type: none"> <li><b>counts:</b> board ignitions</li> <li><b>min:</b> Time in minutes when the card is switched on</li> </ul>
Motor On	<ul style="list-style-type: none"> <li><b>counts:</b> motor activations</li> <li><b>min:</b> Time in minutes when the board is switched on</li> </ul>
Relay FWD/REV	Pressing the "forward" and "backward" buttons (external pushbutton or pushbuttons  )
Power Fail / Current Fault	<ul style="list-style-type: none"> <li><b>Power Fail:</b> Accidental offsets with moving motor</li> <li><b>Current Fault:</b> type anomalies "Over-Current Error"</li> </ul> <p>Note: For the description of the fault messages, see "problems solving" on page 43</p>



Note: Counts are understood from the first power on and can not be reset, even with reset to factory settings.

## Connection buttons and configuration

Tag	Function
Select COM	Select the serial port for communication between board and PC
Connect Disconnect	Enables or disables the connection between the card and the computer
Change Password	Opens the window for an optional password setting to protect board configuration de

Tag	Function
Parameters	Opens the Parameter tab page

## Command buttons

Element	Function
 (*)	Stop teh motor
Move REV, Move MID, Move FWD (*)	its move the motor semi-automatically to the end positions <b>Position REV, Position MID, Position FWD</b> or towards the limit switches "back", "intermediate", "forward"
	its move the motor "back" and "forward" with function "man's switch"

(\*) = available only if **Motor Mode** is setting on **SemiAuto** (see "Parameters page" page 24)

## Parameters page

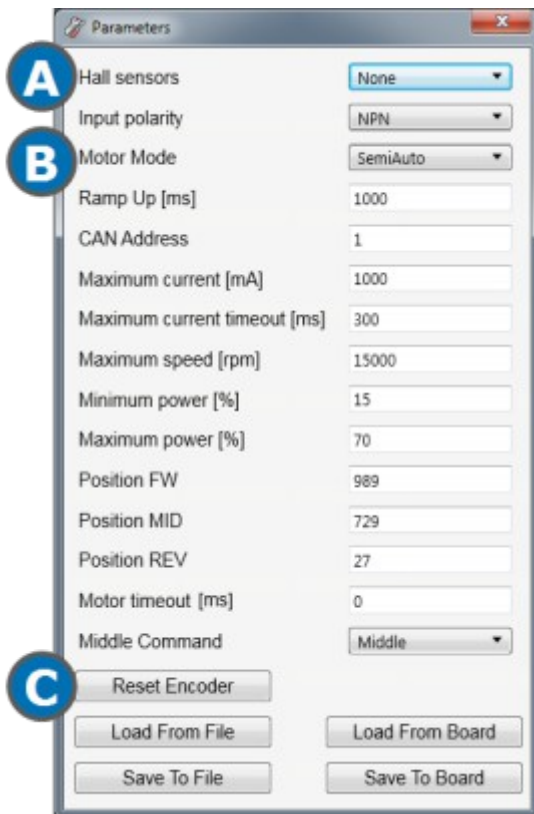
### Introduction

Parameters page allows to:

- Set parameters for the specific technical motor characteristics
- Setting wanted motor operation
- Save and load configurations on board or on external file

## How is showed

Below is an example how Parameters page is displayed :



Area	Description
A	Motor characteristics
B	Operating parameters
C	Data management buttons


**Note:** To know the engine data refer to the relevant product card or label applied to it.

**Note:** To return the parameters to factory settings, see "restored original settings" page 32.

## Motor characteristics

Tag	Description
Hall sensors	Hall Limit switches installed on motor: <ul style="list-style-type: none"> <li>▪ <b>None:</b> no switch</li> <li>▪ <b>Single:</b> one switch (reading of the single speed rotation)</li> <li>▪ <b>Dual:</b> quadrature encoder(reading speed and position)</li> </ul>
Input polarity	Limit switches polarity: <ul style="list-style-type: none"> <li>▪ <b>NPN</b></li> <li>▪ <b>PNP</b></li> </ul>

## Operating parameters

Tag	Description	Range value	U.M.
Motor Mode	Modality <ul style="list-style-type: none"> <li>▪ Manual</li> <li>▪ SemiAuto</li> </ul>	-	-
Ramp Up [ms]	Acceleration time desired to achieve the desired maximum power output (parameter <b>Maximum power [%]</b> )	0 - 99,999	ms
CAN Address	(option) CAN-Bus address / associated with board	1 - 999	-
Maximum current [mA]	Max current supplied  NOTICE: overcurrent. Damage to the engine. Set a value below the short-circuit current of the motor. Refer to the engine's technical data sheet.	0 - 9,999	mA
Maximum current timeout [ms]	Maximum running time of the maximum current  Note: If you supply the motor with the maximum current for a time equal to or greater than this value, the card forces an automatic lock.	0 - 9,999	ms
Maximum speed [rpm] (*)	Max .speed	0 - 99,999	rpm
Minimum power [%]	Minimum operating power required	0 - 100	%
Maximum power [%]	Maximun operating power required  <b>Note:</b> The value is ignored if the engine reaches the maximum speed with a lower power  <b>Note:</b> The motor may not be able to move if the set value is too low		
Position FWD (**)	"fwd" position switch	999,999,999 - 999,999,999	Motor speed
Position MID (**)	"mid" position switch		
Position REV (**)	"rev" position switch		
Motor timeout [ms]	Maximum time to reach a limit switch  Note: If "zero" is ignored	0 - 999,999	ms
Middle Command	Button operation mode <b>Move MID:</b> <ul style="list-style-type: none"> <li>▪ <b>Stop:</b> stop the motor</li> <li>▪ <b>Middle:</b> It moves the engine towards the intermediate limit switch</li> </ul>		-

Tag	Description	Range value	U.M.
	Note: If the <b>Hall sensors</b> parameter is set to <b>None or Single</b> and the intermediate limit switch is not physically connected, setting the parameter to <b>Middle</b> allows the motor control to "toggle". For details, see "Actuating the motor in" toggle "mode" page 31		

(\*) = available only if *Hall sensors* is set to *Dual*

(\*\*) = available only if *Hall sensors* is set to *Single o Dual*

## Management buttons

Button	Function
<b>Reset Encoder</b>	Reset the position recorded by the Hall sensor
<b>Load From File</b>	Reads parameters from an external file (.pa1 extension) previously saved
<b>Save To File</b>	Save parameters to an external file (.pa1 extension)
<b>Load From Board</b>	Reads the parameters currently set on the board
<b>Save To Board</b>	Set the parameters on the board





# 6. Use

---

## Contents

This section includes topics in the following:

Limit switches position set.....	30
Motor actuation.....	30
Restored original setting.....	32
Protect configuration with password.....	32

# Limit switches position set

## Premise

Radia SMC can be used with limit switches mounted on Radia actuators (available depending on the configuration chosen) and / or end positions set at the software level.

The limit stroke setting is only available if the engine has a dual Hall sensor.

Is possible set positions by:

- Parameters page (Radia SMC software)
- button on board

## Limit switches position set by software

Set parameters **Position FWD**, **Position MID** and **Position REV**. see "Parameters page" page 24.

## Limit switches position set by buttons

To store positions:

1. Move the motor manually and bring it to one of the desired end positions.
2. Hold down the corresponding button on board for about five seconds

Position	Button
FWD	SW4
MID	SW3
REV	SW2

**Note:** The board LED remains lit when the end position is memorized and the release button is released.



3. Repeat the two previous steps for each of the end positions.

# Motor actuation

## Motor actuation with manual modality

With this modality the motor moves with "present man" operation. In any case, it automatically stops at the end of a limit stop backwards or forwards.

To operate the engine simply press and hold the buttons:

- "forward" or "back" on external pushbutton (see "Connection, starting and first configuration " page 18)
-  and  on Radia SMC
- on board (forward SW1+SW4, back: SW1+SW2)

## Motor actuation with semi-automatic modality

In addition to motor actuation as in manual mode, you can start the engine and move it until you reach a limit switch or a racing position by pushbuttons Move FWD, Move MID e Move REV.

**Note:** with the **Hall sensors** parameter set to **None** or **Single**, only the **Move MID** command can be used immediately when one of the "forward" or "reverse" limit switches is active. In other cases, the engine can only be driven to the "forward" and "back" end positions.

## Motor actuation with "toggle" modality

With this modality, the operator manages the motor manually using the **Move MID** button only.

The motor can only be moved if it is in known positions (forwards or barck) and only towards the opposite limit switch. The motor stops automatically when the opposite limit switch is reached.

### Enable taggle modality

To enable the toggle modality is necessary:

- Disconnect the intermediate position limit switch from the board
- set **Hall sensors** on **None** or **Single**
- set **Motor Mode** on **SemiAuto**
- set **Middle Command** on **Middle**

# Restored original setting

## Procedure

For returns the parameters to factory settings :

1. with board "off", keep pressed the SW1 button
2. Continue to keep pressed the SW1 button and feed the board; The LED on board starts blinking fast (green light)
3. Continue to keep pressed the SW1 button until the LED stops blinking and remains lit with green light
4. Release the button: the LED blinks with "Heart-Beat" sequence and board automatically restarts with the factory settings.

# Protect configuration with password

## Password setting

Is possible protect with a password the board configuration. To set a password:

1. Turn the board and connect to Radia SMC
2. Access to main page Radia SMC
3. click **Change Password**: the window for entering the password opens
4. Enter password in the fields **Enter Password** and **Confirm Password**
5. click **OK**

**Nota:** password will be request only after next connection



**AVVISO:** in caso di smarrimento della password, effettuare il ripristino della scheda allo stato di fabbrica per poter impostare una nuova password o per impostare i parametri della scheda

## Password change

To change a previously set password :

1. Turn the board and connect to Radia SMC
2. Access to main page Radia SMC
3. click **Enter Password**: the window for entering the password opens
4. Enter the previously set password
5. click **OK**
6. click **Change Password**
7. Enter new password in the fields **Enter Password** and **Confirm Password**
8. click **OK**
9. To make the change effective click on **Disconnect**

**Note:** The new password will only be requested after the next connection

## Enable the configuration for a board protected with password

For enable the configuration for a board protected with password:

1. Turn the board and connect to Radia SMC
2. Access to main page RADIA SMC
3. click **Enter Password**: the window for entering the password opens
4. Enter password
5. click **OK**



# 7. Maintenance and assistance

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## Contents

This section includes topics in the following :

Maintenance operations.....	36
Customer service.....	36
Disposal.....	36



## Maintenance operations

### Replacing the fuse on board

The board has a built-in safety fuse, which interrupts the circuit in case of reversal of polarity, overvoltage or high absorption.

Replace the fuse burned with another ; type F10AL 250V (glass fuse 5x20 ).

## Customer service

### Contacts

In the event of irreparable damage or anomaly, do not use the card and contact RADIA Customer Service:

[inforadia@radiamotion.com](mailto:inforadia@radiamotion.com)

[www.radiamotion.com](http://www.radiamotion.com)

+39 011 9936019

## Disposal

### Disposal responsibility



Dispose of the appliance with separate collection through the collection facilities indicated by the government or the local public authorities.

Correct disposal and recycling will help to prevent potentially negative consequences for the environment and people.

## 8. Technical data

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### Contents

This section includes topics in the following :

<b>Board technical characteristics .....</b>	<b>38</b>
<b>Connections.....</b>	<b>39</b>

# Board technical characteristics

## Compatibility

RADIA linear actuators	<ul style="list-style-type: none"><li>▪ LAT</li><li>▪ LATT</li></ul>
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## Supply

Voltage (input)	10 - 30 Vdc
Current	0,2 - 6 A
Fuse	F10AL 250V

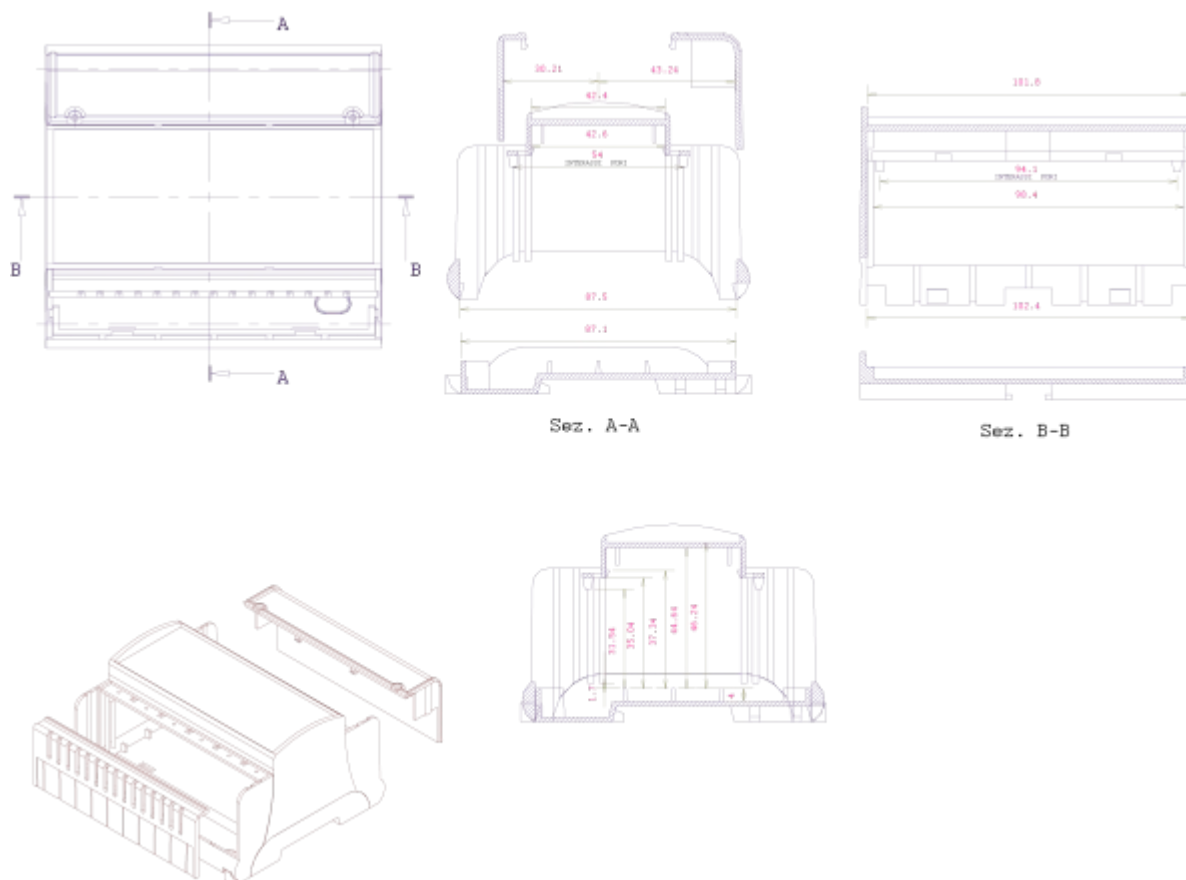
## Environmental conditions

Type of use	internal
Operating temperature	from 0 °C to +70 °C
Operating humidity	from 0 a +70 %
Operating vibrations	5,9 m/s <sup>2</sup> , 10 - 55 Hz

## Storage environmental conditions

Storage temperature	from -10 °C to +85 °C
Storage humidity	from 0 to +70 %

## Dimensions



## Connections



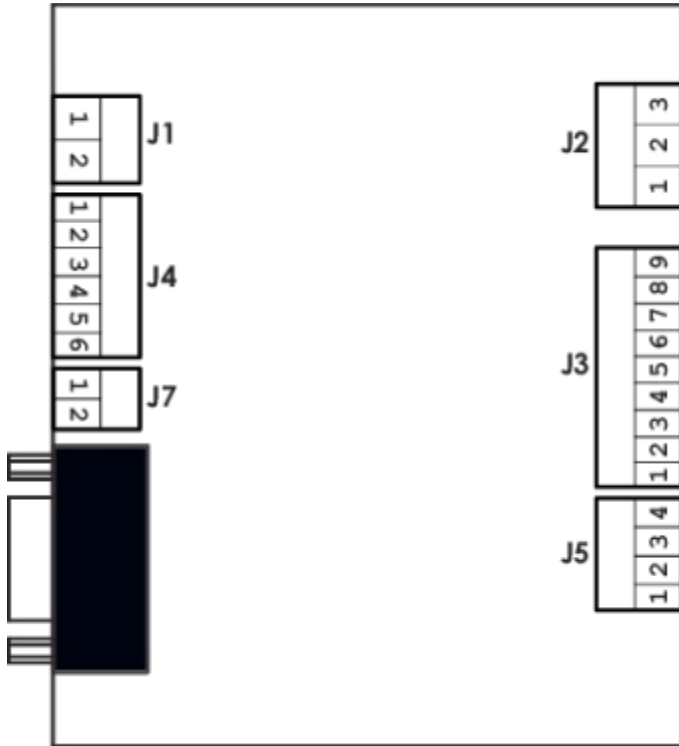
**WARNING!** Live parts. Mild burn. The installation is reserved for the electric maintenance worker.



**NOTICE:** voltage surges. Damage to the appliance. Install the necessary protections.

## Terminals and diagram

Below is the terminal block diagram and the color map for wiring. For a description of the most common connections see "Typical Connections" page 41.

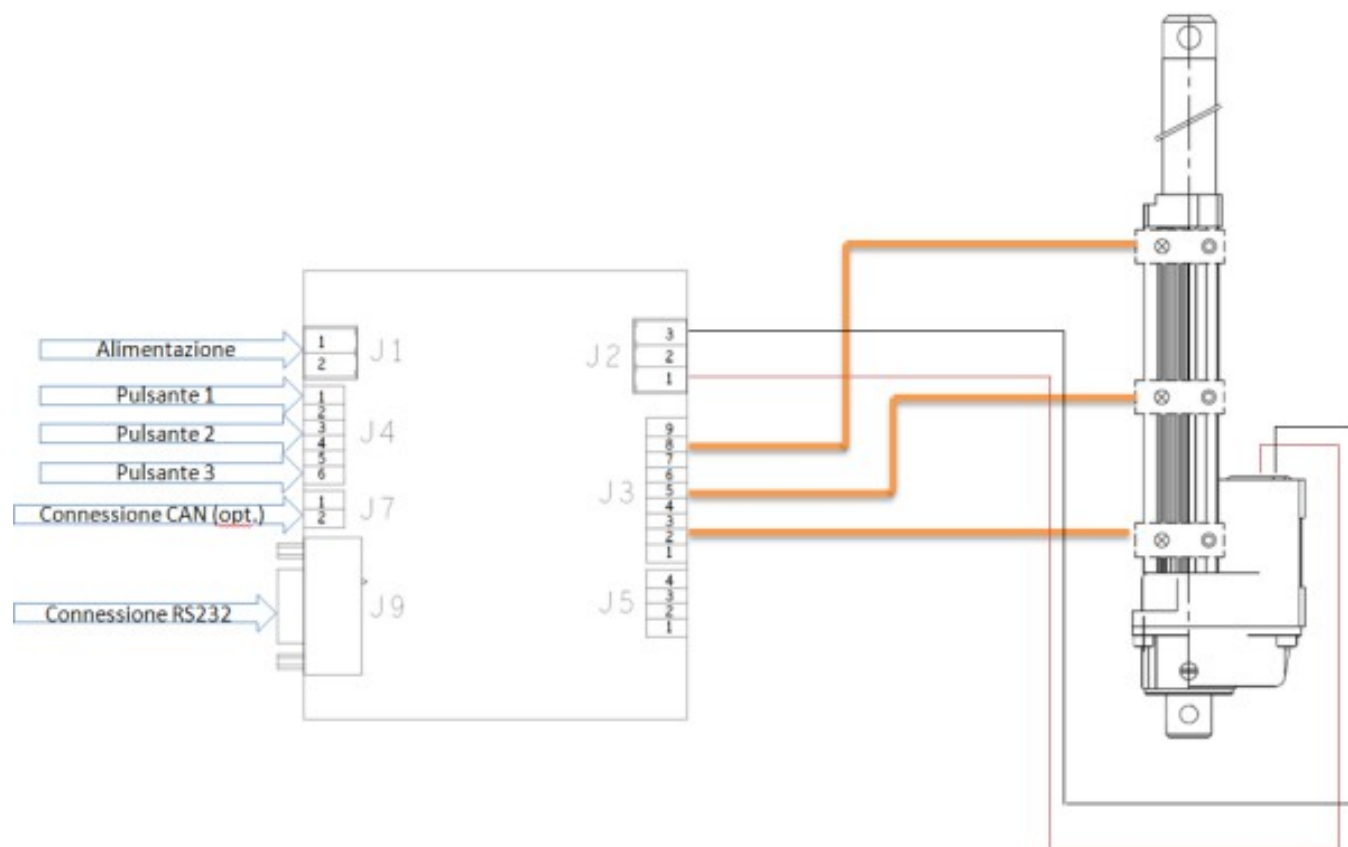


Terminals	PIN	Description	Color wire
<b>J1</b> (board supply)	1	+	---
	2	-	---
<b>J2</b> ( motor supply)	1	MOTOR	red
	2	N.C.	---
	3	MOTOR	black
<b>J3</b> (limit switches)	1	+	brown
	2	FW	green
	3	GND	white
	4	+	brown
	5	MID	green
	6	GND	white
	7	+	brown
	8	REV	green
	9	GND	white
<b>J4</b> (motor commands)	1	+	---
	2	FW	---
	3	+	---
	4	MID	---
	5	+	---
	6	REV	---
<b>J5</b> (Hall sensor / encoder)	1	+	brown
	2	GND	yellow
	3	HALL1	violet
	4	HALL2	blue
<b>J7</b> (CAN-Bus, optional)	1	CANH	---
	2	CANL	---

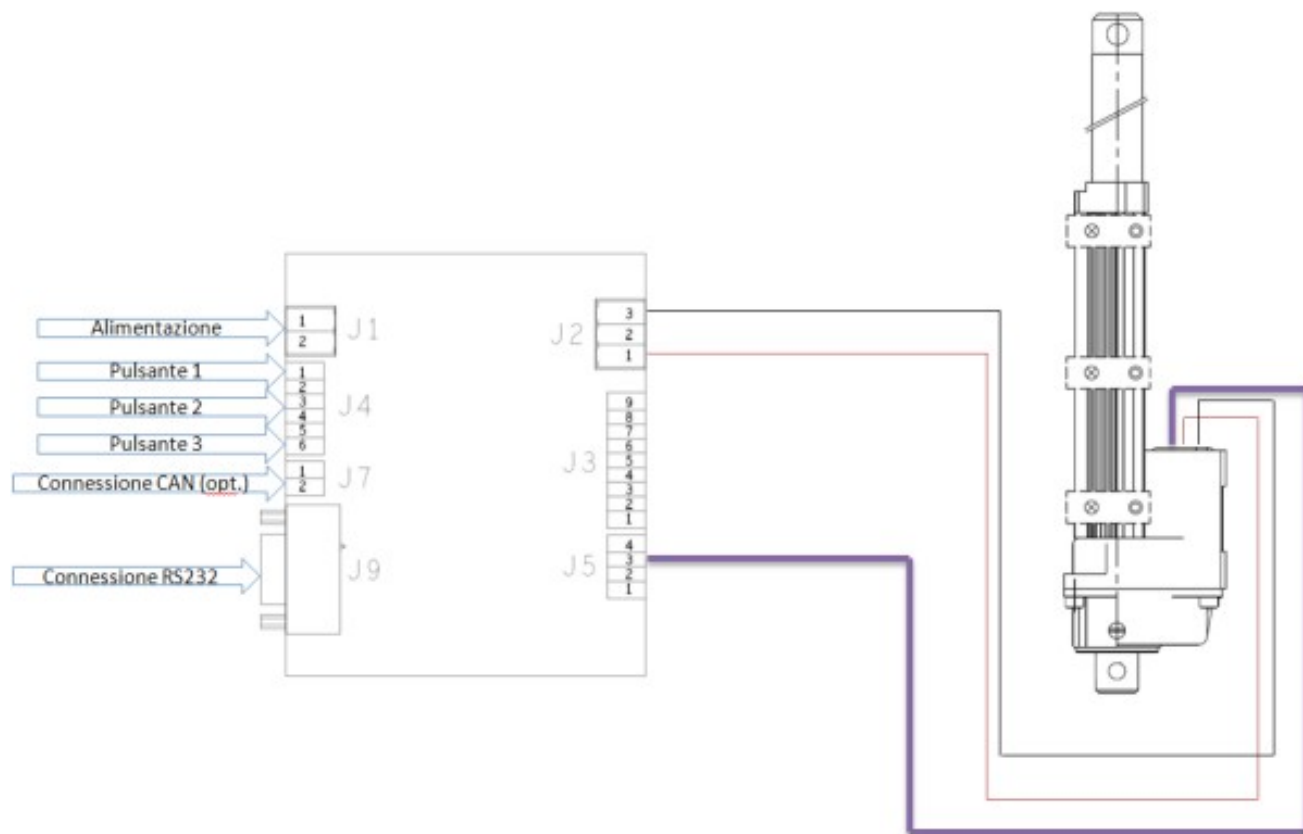
**Nota:** for encoder connections please see “encoder datasheet”

## Typical connection diagram

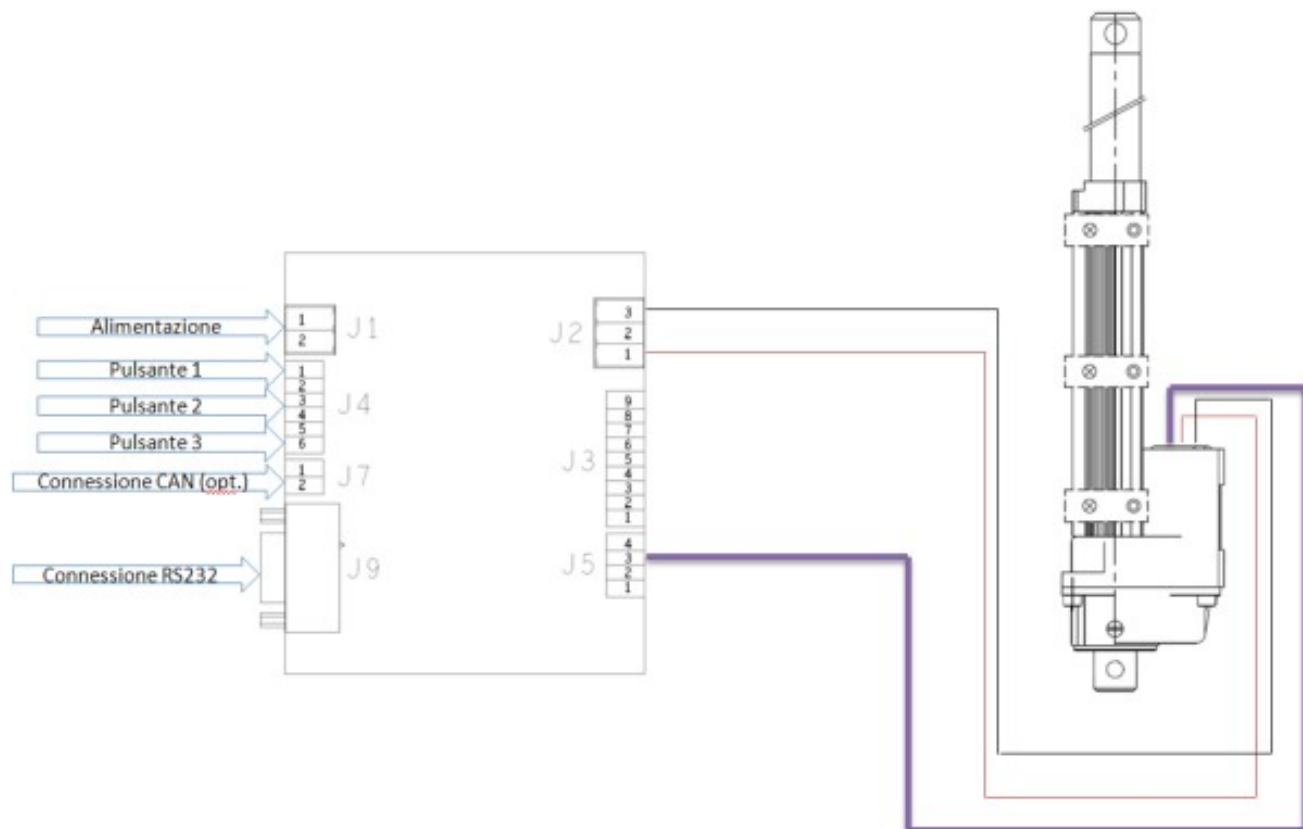
Limit switches only



## Limit switches and encoder




## Encoder only



## Problem solving

### Failure signals

In the event of a malfunction, the Radia SMC software displays an error message, accompanied by flashing LED on board. Below is a list of reported errors and necessary corrective actions.

Message	Description	LED flashings	Cause	Remedy
<b>Over-Current Error</b>	The motor has absorbed the maximum current set for longer than the timeout.	1	<ul style="list-style-type: none"> <li>▪ Motor mechanical stop</li> <li>▪ <b>Maximum current</b> value ,too low</li> <li>▪ <b>Maximum current timeout</b> value, too low</li> </ul>	Try to unlock the motor electrically by raising the maximum current and timeout values.   <b>NOTICE:</b> Operate in manual mode and set bearer values from the motor. Refer to the motor's technical data sheet.
<b>Limit Switches Error</b>	There are two active limit switches at the same time.	2	<ul style="list-style-type: none"> <li>▪ Improper connection of the limit switches</li> <li>▪ damaged limit switches</li> </ul>	Check the limit switches and / or replace the damaged limit switches
<b>Encoder Error</b>	For two seconds, the encoder did not read motor movements	3	<ul style="list-style-type: none"> <li>▪ Mistake connections</li> <li>▪ damaged encoder</li> </ul>	Check the encoder connections and / or replace the gearmotor
<b>Timeout Error</b>	The motor has not reach the desired position within the set maximum time	4	<ul style="list-style-type: none"> <li>▪ <b>Motor timeout</b> value too low</li> <li>▪ Damaged motor, blocked or not connect</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increase timeout value</li> <li>▪ check motor wires connections</li> <li>▪ try to unlock the motor</li> <li>▪ change motor</li> </ul>
<b>FW Command Error</b>	The motor can not run the command as it is already in the required position	5	<ul style="list-style-type: none"> <li>▪ Mistake on limit switches connections</li> </ul>	Check limit switches and encoder
<b>MID Command Error</b>		6	<ul style="list-style-type: none"> <li>▪ damaged limit switches</li> </ul>	
<b>REV Command Error</b>		7	<ul style="list-style-type: none"> <li>▪ Mistake on encoder connection</li> <li>▪ damaged encoder</li> </ul>	
<b>RAMPUP Error</b>	The motor fails to complete the acceleration ramp	8	The motor is too close to the position to be reached	<ul style="list-style-type: none"> <li>▪ Check acceleration ramp parameters</li> <li>▪ Check limit switches position</li> </ul>



Message	Description	LED flashings	Cause	Remedy
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SMC1CH Smart Motor Controller  
Instruction for use  
v. 1.0 ITA MAR 2016  
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**RADIA S.r.l.**  
Via Marconi, 65/A  
10040 Piobesi Torinese (TO)  
Italia

[www.radiamotion.com](http://www.radiamotion.com)  
[inforadia@radiamotion.com](mailto:inforadia@radiamotion.com)  
+39 011 9936019