



## IMPORTANT NOTICE

This document is copyrighted by EVER Company. It is supplied to the user with the understanding that it will not be reproduced, duplicated, or disclosed in whole or in part without the express written permission of EVER Company.

*EVER co. reserves the right to make changes without further notice to any products herein to improve reliability, function or design without warning or the obligation of adjournment of the manufactures and preceding handbooks. EVER co. does not assume any liability arising out of the application or use of any product or circuit described herein.*



### EVER Elettronica

VIA DEL Commercio , 2/4 Loc. S. Grato Z.I.

26900 – LODI - ITALY

Tel. ++39(0)371412318 Fax ++39(0)371412367

E-mail: [infoever@everelettronica.it](mailto:infoever@everelettronica.it)

Web: [www.everelettronica.com](http://www.everelettronica.com)



### EVER Elettronica

Technologiezentrum – Europaplatz

D – 52068 Aachen – GERMANY

Tel. ++49(0)2419631836 Fax ++49(0)2419631835

| Ver.     | Verify | FA | Date |
|----------|--------|----|------|
| 0.1      |        |    |      |
| 0.2      |        |    |      |
| 0.3      |        |    |      |
| Approval |        |    |      |

|       |  |    |
|-------|--|----|
| 1     | INTRODUCTION.....                                  | 5  |
| 1.1   | Driving system parts.....                          | 5  |
| 1.2   | SDMWD180 description.....                          | 6  |
| 1.3   | Basic Drive block diagram.....                     | 6  |
| 1.4   | Drive use limits, risks and warnings.....          | 7  |
| 1.5   | Warranty.....                                      | 8  |
| 1.6   | In this manual.....                                | 9  |
| 2     | SPECIFICATIONS.....                                | 10 |
| 2.1   | Mechanical.....                                    | 10 |
| 2.2   | Electrical.....                                    | 11 |
| 2.2.1 | Power supply ratings.....                          | 11 |
| 2.2.2 | I/O electrical specifications.....                 | 11 |
| 2.2.3 | CAN Bus interface.....                             | 19 |
| 2.2.4 | RS232 and RS485 interface.....                     | 20 |
| 3     | DRIVE INSTALLATION.....                            | 21 |
| 3.1   | Unpacking, Inspecting and Storing.....             | 21 |
| 3.2   | Selecting Motors and Options.....                  | 21 |
| 3.3   | User adjustments: Dip-switch settings.....         | 22 |
| 3.4   | User adjustments: Jumper settings.....             | 23 |
| 3.5   | Installing and Using the Unit Safely.....          | 24 |
| 3.6   | Mounting the Drive.....                            | 25 |
| 3.7   | Connecting to the Drive.....                       | 27 |
| 3.7.1 | CN5: Connecting to Earth Ground (EG).....          | 29 |
| 3.7.2 | CN5: DC Supply Input (PS).....                     | 30 |
| 3.7.3 | CN6: Connecting to Stepper Motor Output (SM).....  | 32 |
| 3.7.4 | CN3: Connecting to drive Inputs.....               | 34 |
| 3.7.5 | CN4: Connecting to drive Outputs.....              | 35 |
| 3.7.6 | CN2: Connecting to the drive Analog Inputs.....    | 39 |
| 3.7.7 | CN1: Connecting to CANbus.....                     | 41 |
| 3.7.8 | CN1: Connecting to RS232 and RS485 interfaces..... | 43 |
| 4     | STARTING THE SDMWD180 DRIVE.....                   | 45 |
| 4.1   | Testing the Installation.....                      | 45 |
| 4.2   | Maintaining.....                                   | 45 |
| 4.3   | Drive operating condition monitoring.....          | 46 |
| 4.3.1 | Troubleshooting Table.....                         | 50 |
| 5     | SDMWD180 VERSIONS AND SPECIFICATIONS.....          | 52 |
| 5.1   | Drive Coding and Ordering Information.....         | 52 |
| 5.2   | Table of SDMWD180Vxxxx available versions.....     | 52 |
| 5.3   | SDMWD180vA123 Basic Drive (C0300).....             | 53 |
| 5.3.1 | Electrical specifications.....                     | 53 |
| 5.3.2 | Dip switch settings.....                           | 55 |
| 5.4   | SDMWD180vA133 Basic Drive (C0400).....             | 57 |
| 5.4.1 | Electrical specifications.....                     | 57 |
| 5.4.2 | Dip switch settings.....                           | 59 |
| A.1   | Factory and user dip-switch setting.....           | 61 |
| A.2   | Power Supply.....                                  | 63 |

User Notes :

---

# 1 INTRODUCTION

---

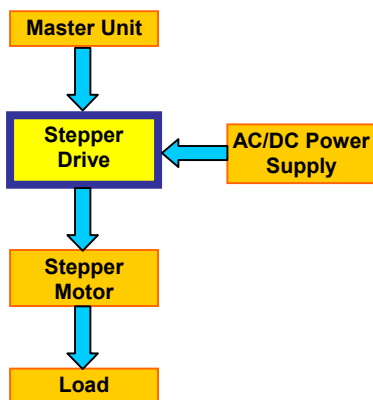
**This section** introduces the main characteristics of the SDMWD180Vxxxx drive as a part of a step motor driving system.

## 1.1 Driving system parts

---

Parts to provide a stepper with for motion system completion

**Block diagram**



### **Motion system design steps:**

1. Driving requirements definition (load torque, RPM, positioning precision, acceleration and speed ratings, etc.);
2. Motor selection according to the previous step ratings;
3. Drive characteristics selection to meet:
  - a. Motor power ratings
  - b. Motion control commands mastering (Step / direction, serial communication links, etc.)
  - c. Additional features (User I/O, encoder interface, etc.)
4. DC power supply sizing according to motion profile, motor power, drive supply ratings;
5. Drive heat dissipation capability provision;

**Sizing tools** Refer to [support@everelettronica.it](mailto:support@everelettronica.it) service for system parts sizing (motor, drive and power supply).



Refer to section A.2 for optional cooling devices.  
Refer to section A.2 for power supply sizing information.

## 1.2 SDMWD180 description

- The SDMWD180 has been designed to drive a step motor in 2 phases on bipolar chopper mode through step/direction inputs. The basic drive is compliant with the EN61800-3 and 60204-1 standards. The additional steps user must take to ensure a complete compliance are: earth connection of drive and motor, proper installation, ac mains filter, EMC compliant cabling of motor and drive.

## 1.3 Basic Drive block diagram

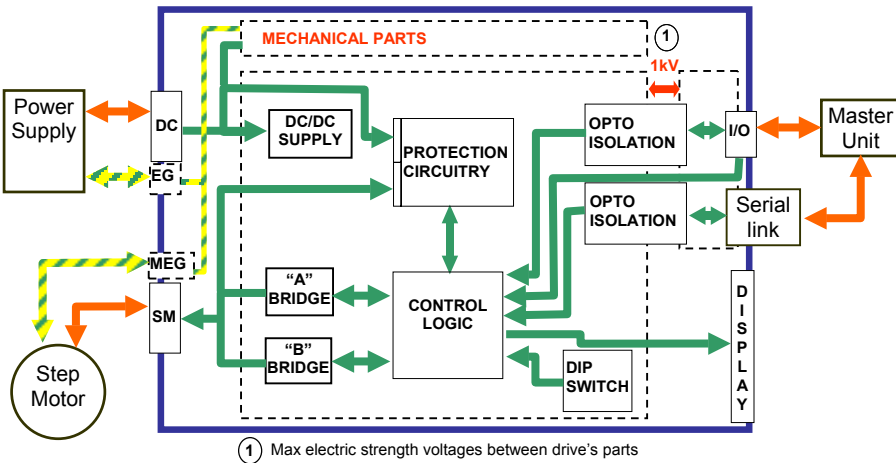
The figure in the following shows the block diagram of a SDMWD180Vxxxx unit: a step & direction controlled device that can drive a two-phase motor in the bipolar chopper mode. The motor can have 4, 6 or 8 leads as well. Thanks to the output stages voltage and current ratings, a wide range of motors can be driven by the drive.



**Motor features must be compatible with the output ratings of the drive.**

The drive is provided with:

- Micro-stepping for high resolution and smooth stepper operation;
- Winding current waveforms sinusoidal shaping to optimize motor performances;
- Over/Under voltage, Thermal and Over Current protections, with monitoring, to prevent the electronics from damaging.
- Motor steps ramps generation capability



This manual contains mainly information and procedures to install, set-up and troubleshoot the unit. Several functions of the device depend on the version of the same.

## 1.4 Drive use limits, risks and warnings

---



- The planning of the installation must be compliant with the prescriptions in this manual.
- EVER ELETTRONICA is in no way responsible for damages to persons or to things caused by an improper use of the equipment.
- The system is actually an internal part of switchboard: it is responsibility of the planner of the SDMWD180 installation to meet a proper working environment providing at least the essential duty of the current standard.
- This manual is only for the planner of the SDLWD180 installation and not like support documentation for user.



The installation of the unit as well as of the accessories is only permissible by qualified personnel. A safe and trouble-free operation is only possible when the valid regulations according to EN 60204-1, EN61800-3 as well as the relevant regulations for end user's area are observed.



The opening of the drive's external enclosure is forbidden: inside it there are parts at high temperature. After any working section, wait some minutes before operating on the device so that the temperature of heat sink and the capacitors voltage go down to not dangerous values. Pay attention to the DC supply and motor cables connections: when the motor connector is unplugged and the SDMWD180 is powered dangerous voltages can be present on motor connector pins.



Making high pot tests on a machine including the SDMWD180 drive, be sure not to exceed the maximum insulation ratings of the unit.



The unit can cause surrounding pollution if removal standard requirements are not met at casting off.

## 1.5 Warranty

---

Ever Electronica warrants its motors and controllers to the original purchaser (end users, original equipment manufacturers or distributors), to be free from defects in material and workmanship and to be made in accordance with customer's specifications which have been accepted in writing with Ever.

Ever Elettronica's products are warranted for one year from date of manufacture as determined by the date code on the drive label.

In no event, however, shall EVER be liable or have any responsibility under such warranty if the product has been improperly stored, installed, used or maintained, or if the customer allows any unauthorized modifications, adjustment and/or repairs to such product.

EVER's obligation hereunder is limited solely to repairing ( or replacing at its option), at its factory any product, or parts, which prove to EVER's satisfaction to be defective as a result of defective materials or workmanship, in accordance whit EVER's stated warranty.

The contents of this manual are believed to be correct at the time of printing. To allow continuous development and improvement of manufactures, EVER co. reserves the right to change the specifications, characteristics and performances of the product and the contents of this manual without notice.

EVER co. does not recommend the use of its products in life support applications wherein a failure or malfunction of the products may directly threaten life or injury. The user of EVER co. products in life support applications assumes all risks of such use and indemnifies EVER co. against all damages.

## 1.6 In this manual

---

The icons used in this Manual have the following meanings:



**Danger  
Warning  
Caution**

Used when life or health of the user are exposed to **danger** or when **severe damage** to materials can occur.



**Attention**

**Special instruction** for a safe and trouble-free operation.



**Tip  
Help  
Information**

Used to mark **additional important information**.

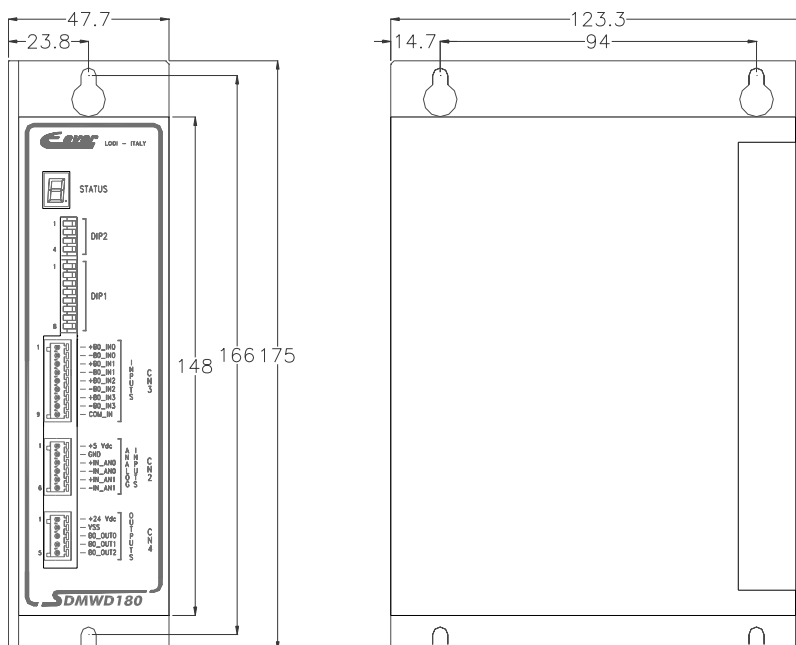


An essential element to meet the limit **values specified in the EMC directives** is, apart from the use of filters and chokes, the installation of the device following the EMC standards requirements.

## 2 SPECIFICATIONS

### 2.1 Mechanical

Dimensions Unit: mm



As drive mounting parts the user must be provided with:

- #2 or #4 MA4 screws for unit A or B mounting style;
- #1 5-pins 1754504 PHOENIX COMBICON 5mm pitch setting female connector for motor connection;
- #1 3-pins 1754465 PHOENIX COMBICON 5mm pitch setting female connector for power supply and earth ground connection;
- #1 9-pins 1881396 PHOENIX MICRO-COMBICON 2.5mm pitch setting female connector for Digital Inputs connection;
- #1 5-pins 1881354 PHOENIX MICRO-COMBICON 2.5mm pitch setting female connector for Digital Outputs connection;
- #1 6-pins 1881367 PHOENIX MICRO-COMBICON 2.5mm pitch setting female connector for Digital Outputs connection;
- Dimensions 175(H) x 47.7(W) x 124(D) mm
- Weight 1500 g
- Protection class IP 20
- Storage temperature from - 25° C to +55° C
- Operating ambient temperature from 5 to 50° C
- Humidity 5% to 85% not condensing
- Maximum working altitude 1000 m.

## 2.2 Electrical



The **electrical specifications** tolerances, when not differently indicated, are **according** to EN 60204 standard requirements.  
Some ratings depend on the actual drive version.

### 2.2.1 Power supply ratings

Refer to **section 5.0** for the electrical specifications and **voltage ratings of power supply** of the actual **drive version**.

### 2.2.2 I/O electrical specifications

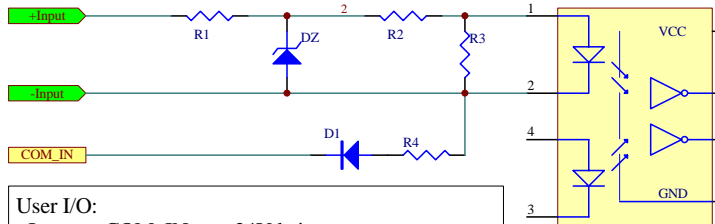
#### Digital Inputs

can be used as real time, opto-isolated, 200kHz, 5Vdc line driver and 24Vdc PNP/ Push-Pull type.



Digital inputs cannot work at the same time as 5Vdc or 24Vdc

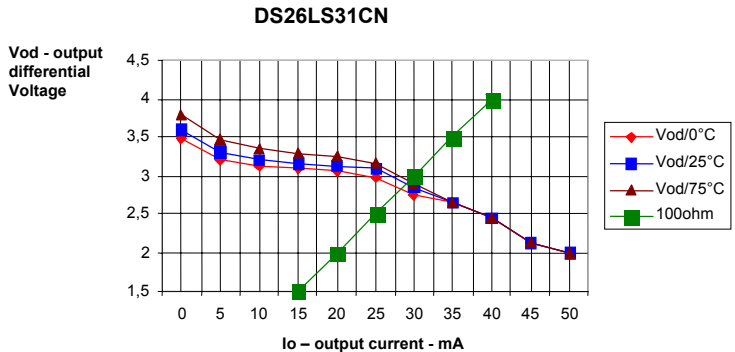
#### Digital Inputs Schematic



User I/O:  
+Input vs COM\_IN => 24Vdc input  
+Input vs -Input => 5Vdc Line-Driver

#### Ratings

The line driver inputs are designed to be driven through devices having the following V-A output characteristic.





To prevent input circuitry from improper functioning and damaging do not exceed the inputs maximum ratings listed in the following table.

| Digital Input    |        |  |          |         |          |
|------------------|--------|--|----------|---------|----------|
| Rated Voltage    | Limits | State 0                                |          | State 1 |          |
|                  |        | UL<br>V                                | IL<br>mA | UH<br>V | IH<br>mA |
| 5 Vdc ± 5%       | Max.   | 1.5                                    | ND       | 5       | 17       |
|                  | Min.   | 0                                      | ND       | 2       | 3        |
| 24 Vdc ± 20%     | Max.   | ND                                     | ND       | 19.2    | 7        |
|                  | Min.   | ND                                     | ND       | 28.8    | 12       |
| f <sub>MAX</sub> |        | 200kHz                                 |          |         |          |
| Protection       |        | Against wrong control voltage polarity |          |         |          |



The devices connected to the drive inputs must be powered through a dedicated power supply.

### Inputs Electrical Driving Guidelines

Inputs controlling devices with an output voltage  $V_o$  (Volt) exceeding the Line Driver's ratings must be connected to the basic drive inputs through a series resistor  $R_s$  rated the following way ( $V_o$  is assumed greater than 10 Vdc):

$$R_s = [V_o * 125 - 220] \Omega \quad \text{with a power rating}$$

$$P_D = [(V_o / (R_s + 220))^2 * R_s] W$$

For instance:

#### Assuming $V_{cc} = 24Vdc \pm 15\%$

$$R_s = (24 * 125) - 220 \approx 2780 \Omega$$

$$P_D = (24 / (2700 + 220))^2 * 2700 \approx 0.18W \quad (0.25W @ V_o+15\%)$$

**A 2.7k $\Omega$  - ½ W rated external series resistor** can be a proper choice.

#### Assuming $V_{cc} = 12Vdc \pm 15\%$

$$R_s = (12 * 125) - 220 \approx 1280 \Omega$$

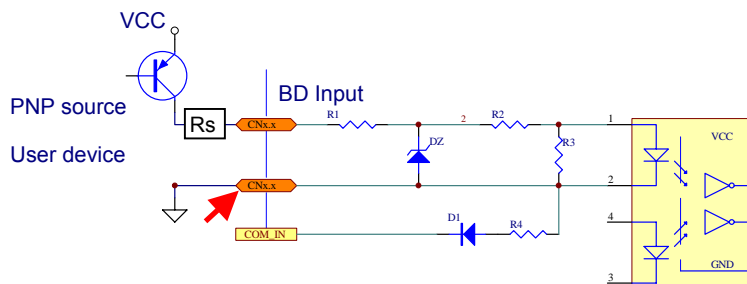
$$P_D = (12 / (1200 + 220))^2 * 1200 \approx 0.086W \quad (0.12W @ V_o+15\%)$$

**A 1.2k $\Omega$  - ½ W rated external series resistor** can be an effective choice

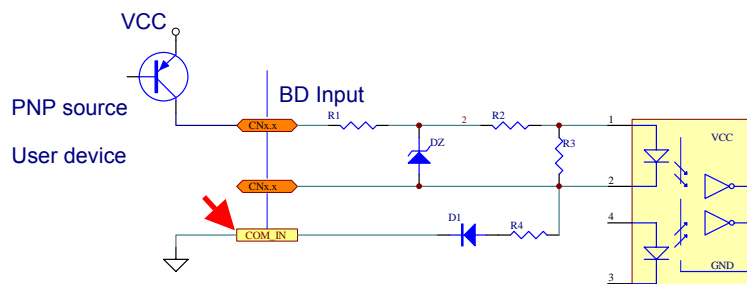
**Connection guidelines** versus input driving device output style.

**PNP source**

**VCC = 5 Vdc**



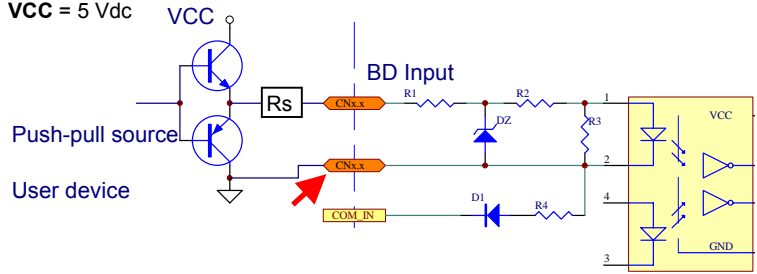
**VCC = 24 Vdc**



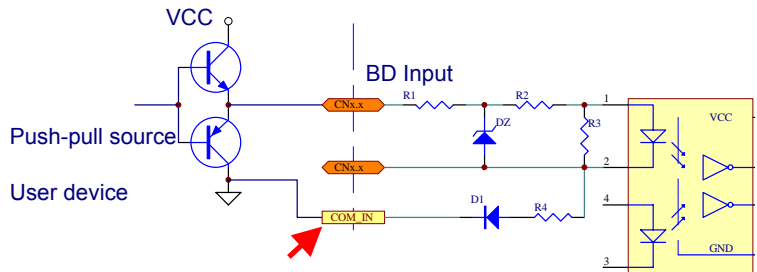


### Push-Pull source

VCC = 5 Vdc

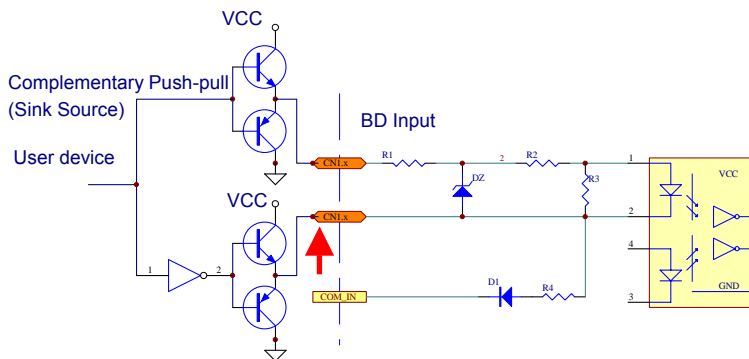


VCC = 24 Vdc

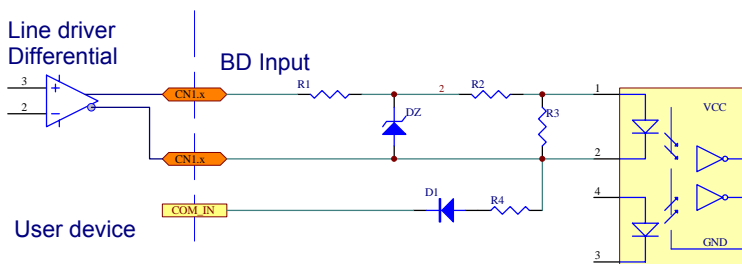


## Push-pull sink-source

VCC = 5 Vdc



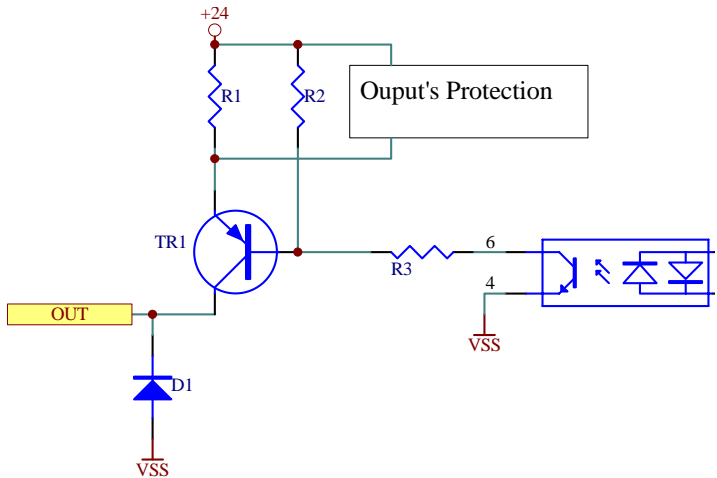
## - Line-Driver differential 5 Vdc



**Digital Outputs**

are optoisolated, short circuit protected, 24Vdc PNP type.

| Output electrical specification               |                   |                            |
|---|-------------------|----------------------------|
| Rated current (state 1)                       | $I_n$ (A)         | 0.1                        |
| Max current (state 1)                         | Max (A)           | 0.11                       |
| N° output                                     | N°                | 2                          |
| Voltage drop (state 1)                        | Max (V)           | 3                          |
| Rated voltage                                 | $V_{nom}$         | 24Vdc                      |
| Min voltage output                            | $V_{min}$         | 19Vdc                      |
| Max voltage output                            | $V_{max}$         | 28.8Vdc                    |
| Type  | PNP               | current source             |
| Max frequency output                          | f                 | 1kHz                       |
| Protection                                    | Short circuit     |                            |
| Overload & short circuit threshold protection | I (over-current)  | > 0.11A min<br>= 0.22A max |
| Protection intervention delay                 | $t_{short_{MAX}}$ | 2 $\mu$ s                  |



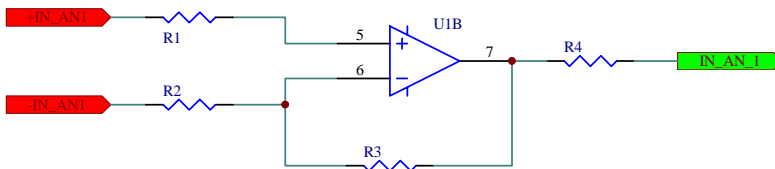
## Analog Inputs

+/-10Vdc CEI EN 61131-2 type, not isolated.

| CEI EN 61131-2 compliant analog inputs    |   |
|---|---|
| Input voltage range                       | $\pm 10\text{Vdc}$                                |
| Input impedance limits                    | $\geq 10\text{Kohm}$                              |
| Reading resolution                        | 30mV  |
| Maximum error over full temperature range | $\pm 8\%$ of full range                           |
| Maximum overload                          | $V_{in} = 57\text{Vdc}$<br>$I_{max} = 2\text{mA}$ |
| Input reading at overload condition       | +10,99Vdc ► ADC1023<br>-11,83 ► ADC69             |
| Type of input                             | Differential not isolated                         |
| Input sampling time                       | $T_{SAMPLE} = 1\text{ms}$                         |
| Sampling repetition time                  | $T = 1\text{ms}$                                  |
| Input filtering characteristics           | No low pass filtering                             |
| Protection type                           | None  |
| Conversion method                         | Sample & Hold                                     |
| Operating mode                            | Self-scan   |

## Analog

### Inputs schematic



## 2.2.3 CAN Bus interface

---

**Introduction** The CAN Bus interface provides a multipoint connection according to the ISO 11898 standard.

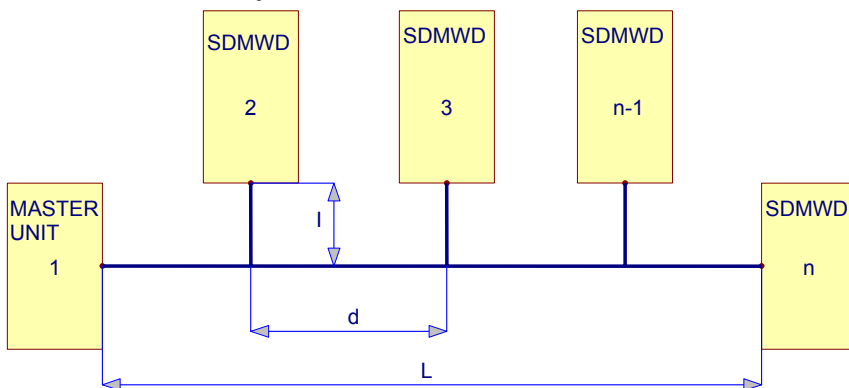
The isolated interface is powered by an internal isolated DC/DC converter, no external power supply is required.



**Refer to section 5** for information about available device's versions.

**Refer to software manual** for information about the can bus interface operating modes.

### Network connection style



| Network paths length |          |      |       |      |      |                        |
|----------------------|----------|------|-------|------|------|------------------------|
| Path                 | Notation | Unit | Value |      |      | Condition              |
|                      |          |      | Min.  | Nom. | Max. |                        |
| Bus                  | L        | m    | 0     |      | 40   |                        |
| Cable stub           | I        | m    | 0     |      | 0.3  | Bit rate:<br>1Mbit/sec |
| Node distance        | D        | m    | 0.1   |      | 40   |                        |

| Max baudrate [kbit/s] vs bus length |          |
|-------------------------------------|----------|
| 500                                 | < 100 m  |
| 250                                 | < 250 m  |
| 125                                 | < 500 m  |
| 50                                  | < 1000 m |
| 20                                  | < 2500 m |

## 2.2.4 RS232 and RS485 interface

**Introduction** The RS232 interface provide a point to point connection and the RS485 a multipoint connection (RS485) link according to the EIA/TIA232E CCIT V.28 and RS-485 CCITT V.11 X.27 international standards.

The isolated interface is powered by an internal isolated DC/DC converter, no external power supply is required.



Refer to **section 5** for more information about available device's versions.



Refer to software manual for information about the serial interfaces operating modes.

**Cable requirements** Use 0.5 mm<sup>2</sup> (#20 AWG) or 0.25mm<sup>2</sup> (#23AWG) cross section leads for the RS232 and RS485 paths cabling.

# 3 DRIVE INSTALLATION

---

**This section** explains how to install the step motor drive. Covered topics are:



- Unpacking and inspecting the furnishings;
- Selecting motor and optional drive's parts;
- Setting user's adjustments;
- Installing and using the unit safely;
- Mounting the drive;
- Connecting to the drive.

Refer to system diagram in **section 1.3**.

## 3.1 Unpacking, Inspecting and Storing

---



**Check** the item(s) against the packing-list. A label located on the drive's housing identifies the unit by model version, serial number and manufacture date.

**Inspect** the unit: any transportation damages must be submitted by the buyer to the carrier.

**Store** the SDMWD180 unit in a place meeting the specified conditions.

## 3.2 Selecting Motors and Options

---

**Selecting a motor**



The SDMWD180 drive is designed for use with EVER's line of step motors or most other brands two phases step motors. The motor's ratings must be compatible with the output configuration and ratings of the drive. Refer to the Torque/Speed Curves in the "EVER ELETTRONICA Motors Catalogues" or call EVER sales dept. or your local distributor for motor sizing and drive-motor compatibility planning.

**Selecting Options**

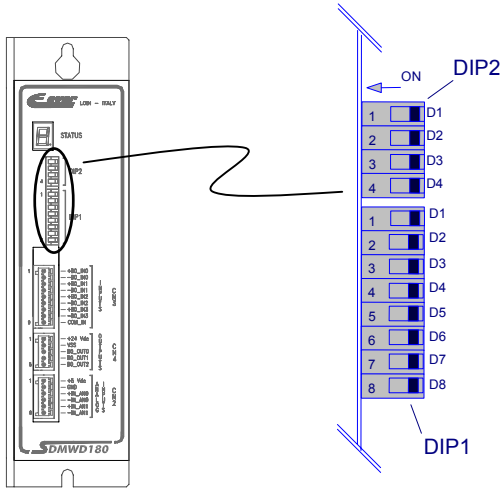
Refer to "EVER ELETTRONICA Drives Catalogue" for drive options planning or call EVER Co. sales dept. or refer to [www.everelettronica.it](http://www.everelettronica.it)

### 3.3 User adjustments: Dip-switch settings

Dip-switch  
Location

DIP1 and DIP2 are for user adjustments as for instance:

- Bus node identification
- Baud rate setting
- User functioning modes setting



Some parts inside the SDMWD180 housing can be a potential source of **electric shock**.

To avoid electric shock, prior to DIP-SWITCH handling, switch power off and wait until all the leds of 7 segment display on drive front panel are off.



Refer to **section 5** for **dip-switch function tables** in your unit version.

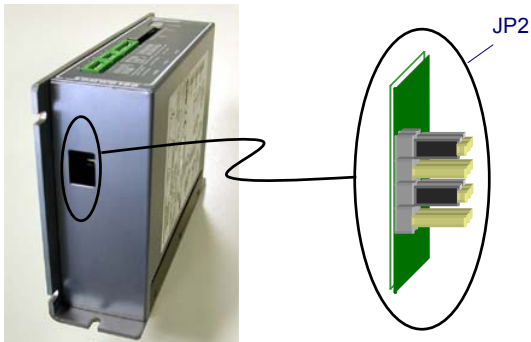
### 3.4 User adjustments: Jumper settings

---

Jumper JP2 are for user adjustments as for instance:

**Location**

- Analog inputs  $\pm 10V_{dc}$  setting
- Potentiometers setting



*Some parts inside the SDMWD180 housing can be a potential source of **electric shock**.*

*To avoid electric shock, prior to JUMPER handling, switch power off and wait until all the leds of 7 segment display on drive front panel are off.*



*Refer to **section 5** for **jumper function tables** in your unit version.*

## 3.5 Installing and Using the Unit Safely

---

**Guidelines** Only qualified personnel should install the SDMWD180 unit, after first completely reading and understanding the information in this manual. The installation instructions should be followed and approved. Any question or doubt should be clarified with the supplier of the drive before its use.



*In no event will EVER co. accept **liability** for indirect or consequential damage and consequences resulting from inappropriate, negligent or incorrect installation or modification of the drive or from any incorrect connection to the SDMWD180 drive.*



*The power supply cables, the motor output cables and some parts of the SDMWD180 unit are a potential source of severe **electric shock**. Follow the safety guidelines to avoid danger.*

To avoid possible personal injury whenever you are working with SDMWD180 unit:

- Do not operate the drive without the motor case and the system enclosure connected to ground;
- The protective earth (PE) impedance must conform to the requirements of local regulations;
- Do not make any connections to the system internal circuitry;
- Always turn power supply off before making or removing connections from the unit;
- When the power supply fails the drive cannot hold the load: do not use system if that can result in a dangerous situation; provide the motor with a suitable blocking device if necessary.



Before handling or operating maintenance actions on the SDMWD180 unit, be sure the power supply has been switched off.

- Be careful of the motor connector terminals when disconnected from the motor. With the motor disconnected and power applied to the unit, these terminals can have high voltage rise.
- Do not use software working program stop as safety shutdown. Always remove power from the drive for a safe shutdown.
- Take into account the heat dissipation of some parts the SDMWD180 unit: using the device in heavy application, some enclosure surfaces can have high temperature rise. Before unplugging the drive from the installation wait a proper time for its cooling.

### 3.6 Mounting the Drive

**Environment** The drive should be installed in dust, corrosive vapors, gases and liquids free environment. Avoid environments allowing condensation of vaporized liquids, including atmospheric moisture.



Installing the drive inside a cabinet, be sure that the air flow openings or the cabinet cooling system do not allow the internal temperature rise to exceed the maximum ambient temperature ratings of the device.

*Besides above topics any local safety regulations concerning the installation of motor drives has to be carefully considered while planning the location of the drive.*

**Mounting Guidelines**

Your installation should at least meet the following general guidelines:

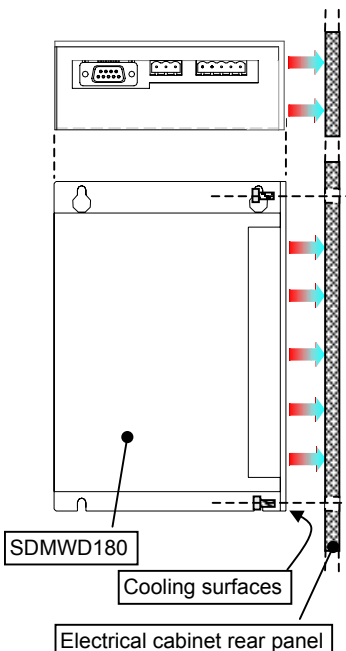


- Keep vertical orientation of the device;
- Avoid excessive vibration or shock;
- Provide some free space for air flow below and above the housing.

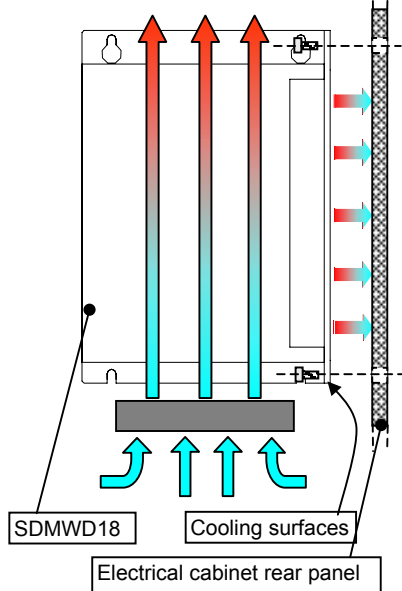
**Cooling**

The SDMWD180 unit has surfaces providing the cooling of the internal circuitry through their heat dissipation capability. Optimize the thermal flow between the unit cooling surfaces and the ambient according to the 'worst case' power dissipated in your application.

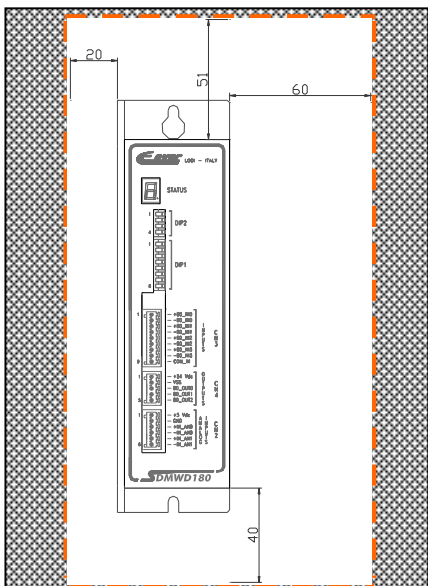
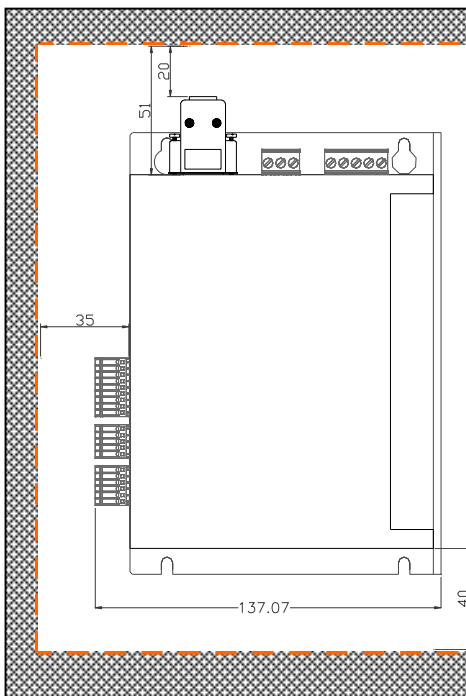
**Dissipation through the fixing surface**



**Dissipation through a forced air flow**



## Minimum installation distance



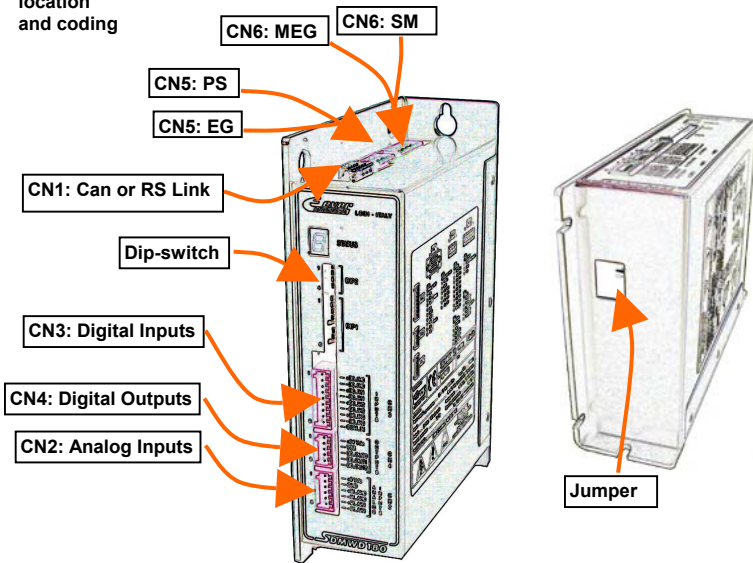
### 3.7 Connecting to the Drive

**Introduction** The drive input / output connectors are:

- EG - Earth Ground
- MEG - Motor Earth Ground
- PS - DC Supply Input
- SM - Step Motor Output
- I/O - Digital Inputs/Outputs
- CAN\* - CAN bus
- RS\* - RS232 and RS485 Interfaces

(\*) available on different drive versions

**Connectors location and coding**



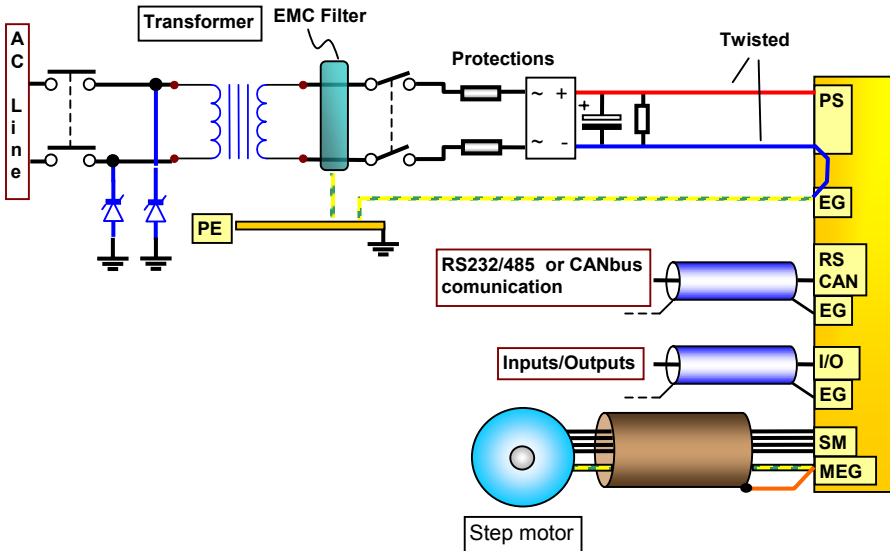
**Cabling** through the common wiring practices and grounding / shielding techniques described in the following sections should satisfy most of the applications. Optimum protection is provided by twisted and shielded cables and by separate laying of signal and power lines.



*Non-standard applications, local electrical regulations, special operating conditions, and system configuration wiring needs have precedence over the information herein.*

The Power Supply must be close to the drive to protect it against inductive-bunched interference voltages. **The DC power Supply is referred to earth ground** through a connection between the negative side of DC power supply and drive's internal Earth Ground.

Overall drive Connection Diagram



### 3.7.1 CN5: Connecting to Earth Ground (EG)

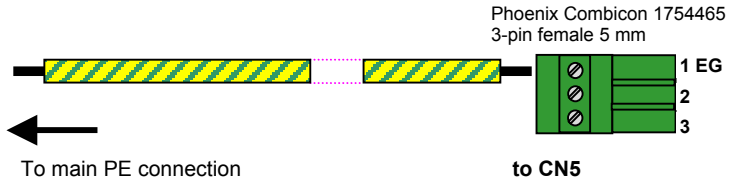


Earth Ground connection to PE **before any other connection** is mandatory (see §5.3.5.1).

**Cable Requirements** Use 1.5 mm<sup>2</sup> (#16 AWG) or heavier wire for EG cable. Moreover EG wire cross section must be at least as large as Vdc wires section.

*The EG connection must conform to the requirements of local industry regulations.*

**Earth Ground** **EG terminal** mates to a 1757255 3-pins male PHOENIX COMBICON cable.



| <b>Input</b> | <b>Pin</b> | <b>Description</b> |
|--------------|------------|--------------------|
| <b>PE</b>    | CN5.1      | Earth Ground       |
| <b>GND</b>   | CN5.2      | DC Bus -side       |
| <b>VIN</b>   | CN5.3      | DC Bus +side       |

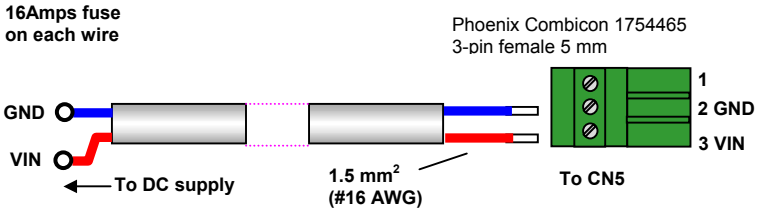
### 3.7.2 CN5: DC Supply Input (PS)

**Introduction** PS connector connects the SDMWD180 drive to DC supply.

**Power Supply PS connector** mates to a 1757255 3-pins male PHOENIX COMBICON cable connector.

| Input | Pin   | Description   |
|-------|-------|---------------|
| PE    | CN5.1 | Earth Ground  |
| GND   | CN5.2 | DC Bus -side  |
| VIN   | CN5.3 | DC Bus + side |

The cable to PS links the BDM to DC supply line

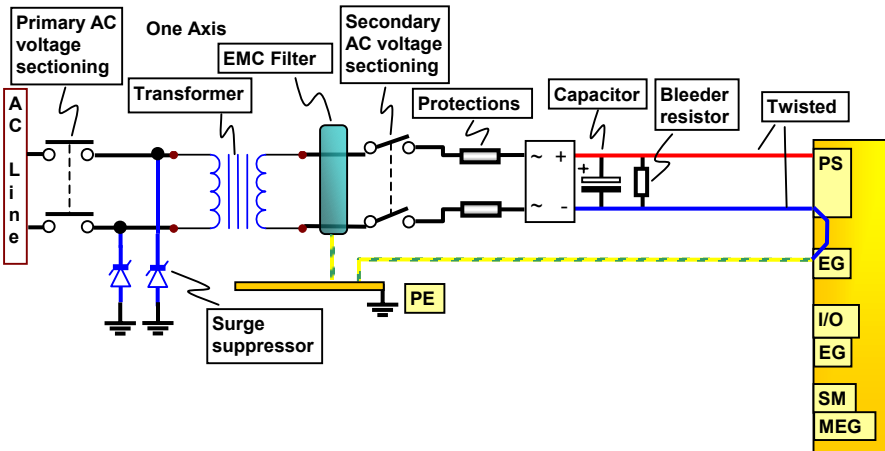


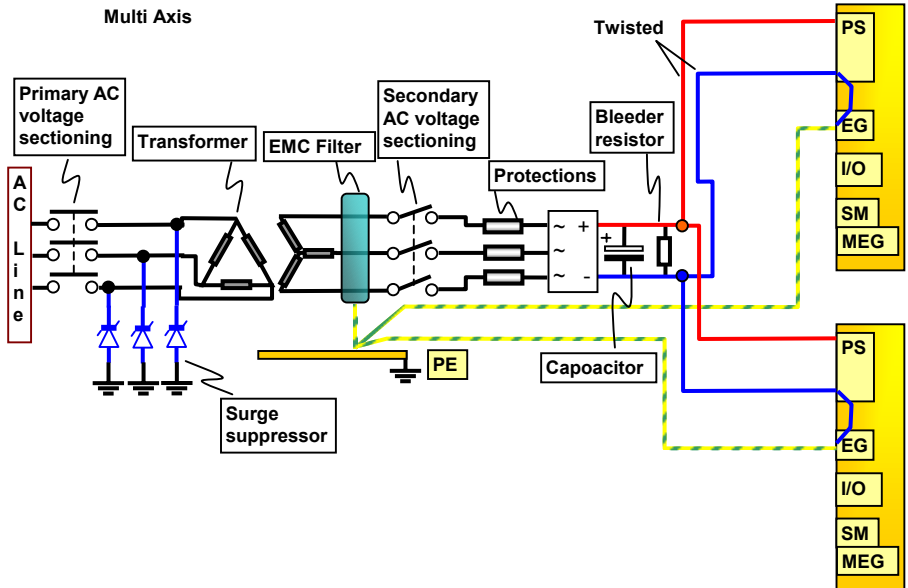
EG and GND are shared to the drive internal circuitry.



**Do not solder** the tips of the cable before insertion into the connector. Solder can contract and cause a **loose connection over time**.

Connection Diagram





Refer to **section A.3** for more information about the power supply sizing.

**Protections**

by AC 16A rated fuses on AC bus or by a protection switch.

**Sectioning**

the ac voltage on primary side is a good safety practice.



The DC supply voltage must never exceed the Vdc rating of your unit version.



Refer to **section 5.0** for more information about the unit version power supply ratings.

**Cabling Requirements**

Use 1.5 mm<sup>2</sup> (#16 AWG) or heavier to make your own power supply cable

### 3.7.3 CN6: Connecting to Stepper Motor Output (SM)

**SM** connector connects the device power stage to motor.

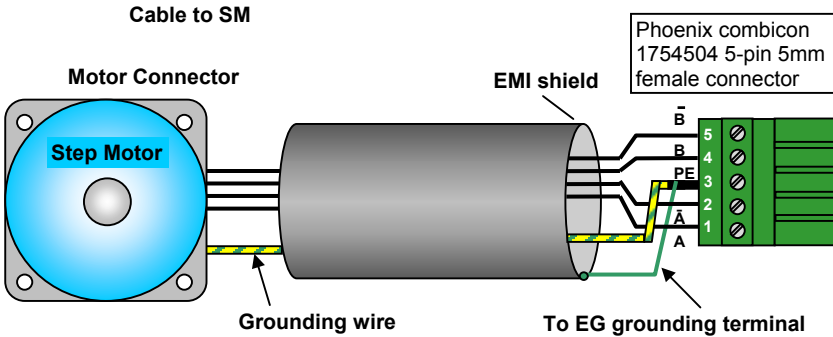
**Cabling Diagram** We suggest to follow the following guidelines while cabling a motor connection. Always ground the motor case through a wire to a specific grounding terminal. Grounding motor case simply by fixing it to a grounded part of a machine is not a practice assuring a good impedance of earth ground connecting path.



**Refer** to motor specifications in the motor catalogue to determine the motor connections as required.

**Step Motor** **SM connector** mates to a 1757271 5-pins male PHOENIX COMBICON cable connector

| Pin   | Description              |
|-------|--------------------------|
| CN6.5 | Motor phase (B*)         |
| CN6.4 | Motor phase (B)          |
| CN6.3 | Motor Earth Ground (MEG) |
| CN6.2 | Motor phase (A*)         |
| CN6.1 | Motor phase (A)          |



*Paired-twisted cables protect against inductive-bunched interference voltage. Optimum protection is provided by twisted and shielded cables and separate laying of signal and power lines.*



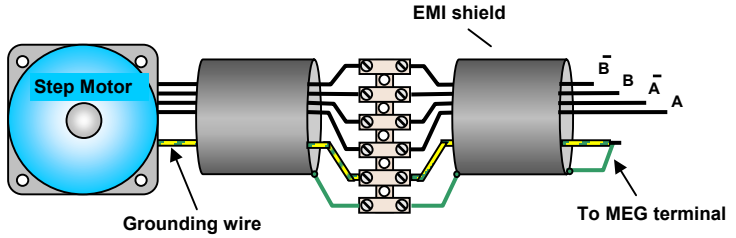
**Do not solder** the tips of the cables before insertion into the connector. Solder can contract and cause a **loose connection over time**.

**Cable Requirements**

Use #10 to #24 AWG wire.  
The following table of cable sizes vs. motor winding current can be a practical solution:

| Motor current (A)                      | Section (mm <sup>2</sup> ) | AWG |
|--|----------------------------|-----|
| $I_{\text{PHASE}} \leq 5 \text{ Arms}$ | 1                          | 18  |

**Cable** It's good practice, when needed, interrupting the motor cable only through connectors or clamps, isolated from chassis or any mechanical parts, in order the motor windings, motor's shielded cable and motor's protection ground wire keep well separated. Avoid using switches or circuit breakers on motor phases.



### 3.7.4 CN3: Connecting to drive Inputs

**Inputs:** optically isolated 5 Vdc Line Driver, PNP, NPN, Push-Pull, Complementary Push-Pull and 24 Vdc PNP/Push-Pull input terminals are provided on the CN3 drive edge connector.

**Inputs Connector** mates to a 1881516 9-pins male PHOENIX MICRO-COMBICON cable connector.

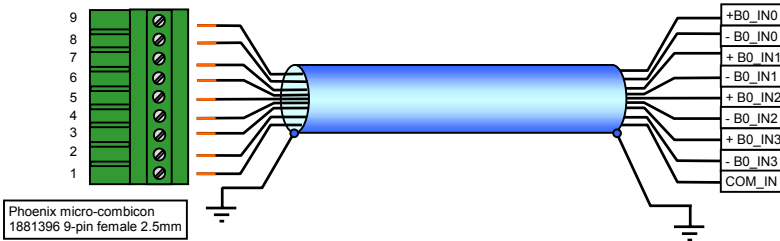
| Pin   | Description | Functioning                 |
|-------|-------------|-----------------------------|
| CN3.1 | +B0_IN0     | Depending on user's program |
| CN3.2 | -B0_IN0     |                             |
| CN3.3 | +B0_IN1     |                             |
| CN3.4 | -B0_IN1     |                             |
| CN3.5 | +B0_IN2     |                             |
| CN3.6 | -B0_IN2     |                             |
| CN3.7 | +B0_IN3     |                             |
| CN3.8 | -B0_IN3     |                             |
| CN3.9 | COM_IN      | Inputs common (- side)      |



Refer to section 5.3.3 for inputs/outputs function in a unit version.

#### Cable to I/O

Making the connections to Inputs use a shielded cable with 1 mm<sup>2</sup> (#18 AWG) or 0.5 mm<sup>2</sup> (#20 AWG) wires cross section.



Using **NPN style connection**, random input wire grounding can result in **unwanted actuating** of the drive.

### 3.7.5 CN4: Connecting to drive Outputs

Outputs are optically isolated 24 Vdc PNP type.

**Output Connector** mates to a 1881477 5-pins female PHOENIX MICRO-COMBICON cable connector.

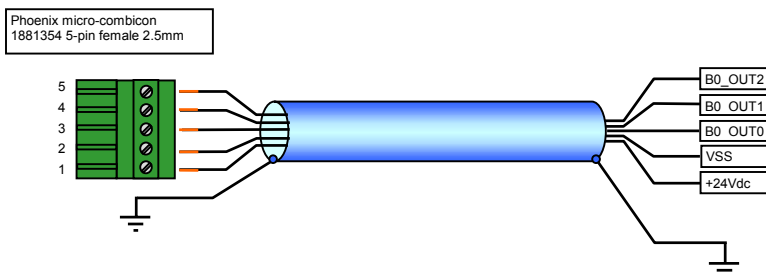
| Pin   | Description | Function                      |
|-------|-------------|-------------------------------|
| CN4.1 | +24Vdc      | Digital outputs supply + side |
| CN4.2 | VSS         | Digital outputs supply - side |
| CN4.3 | B0_OUT0     | Depending on user's program   |
| CN4.4 | B0_OUT1     |                               |
| CN4.5 | B0_OUT2     |                               |



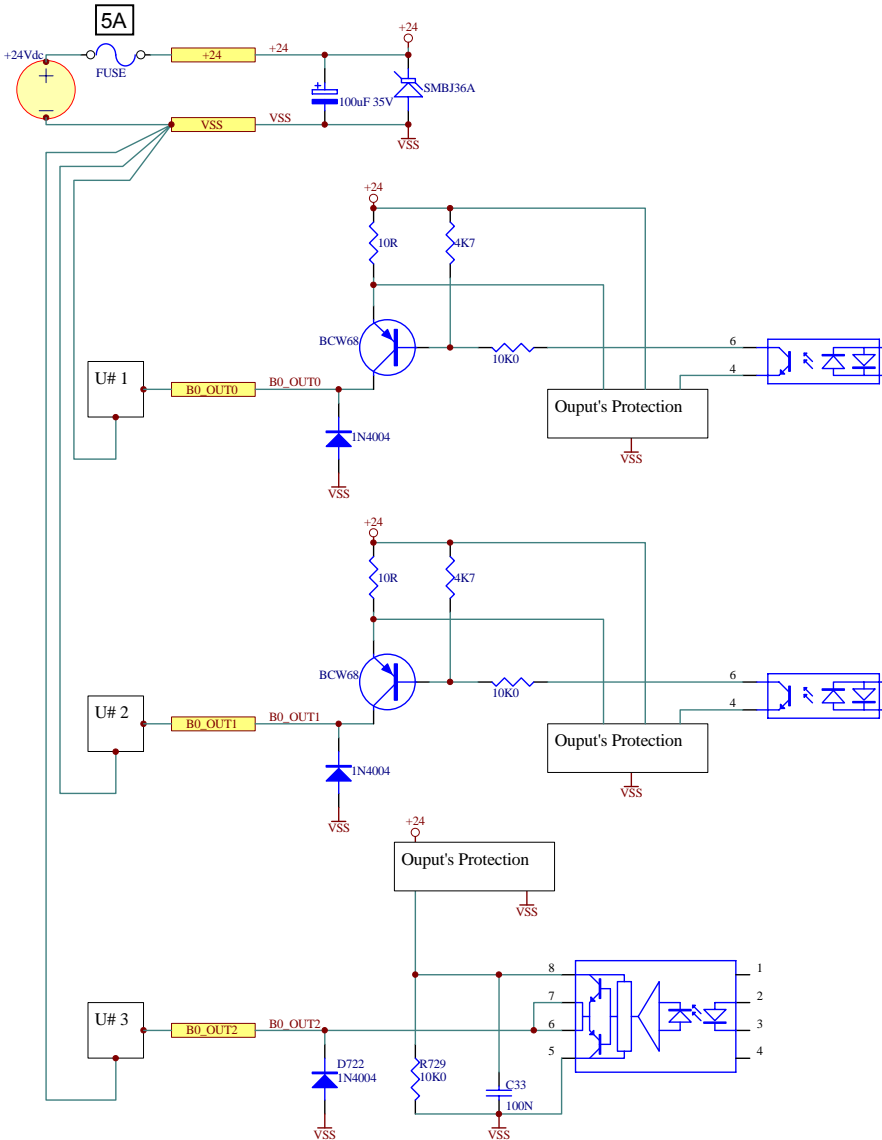
Refer to section 5.3.3 for inputs/outputs function in a unit version.

#### Cable to I/O

Making the connections to outputs use a shielded cable with 1 mm<sup>2</sup> (#18 AWG) or 0.5 mm<sup>2</sup> (#20 AWG) wires' cross section.

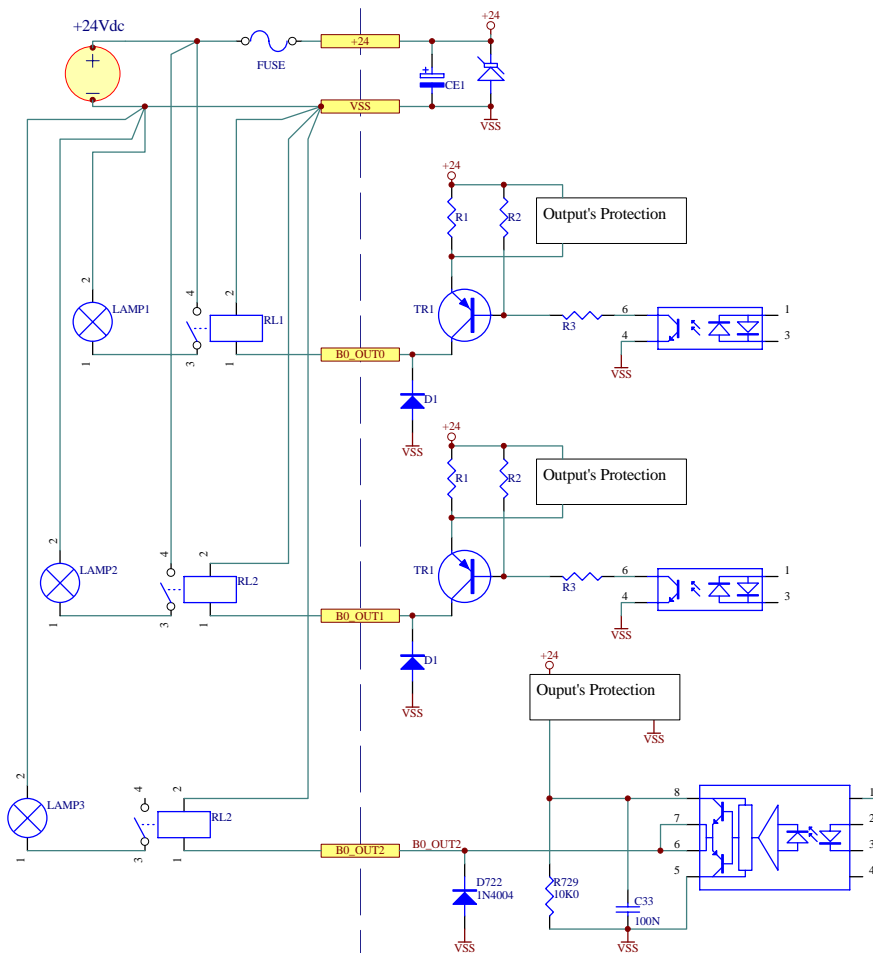


## Outputs schematics and connections



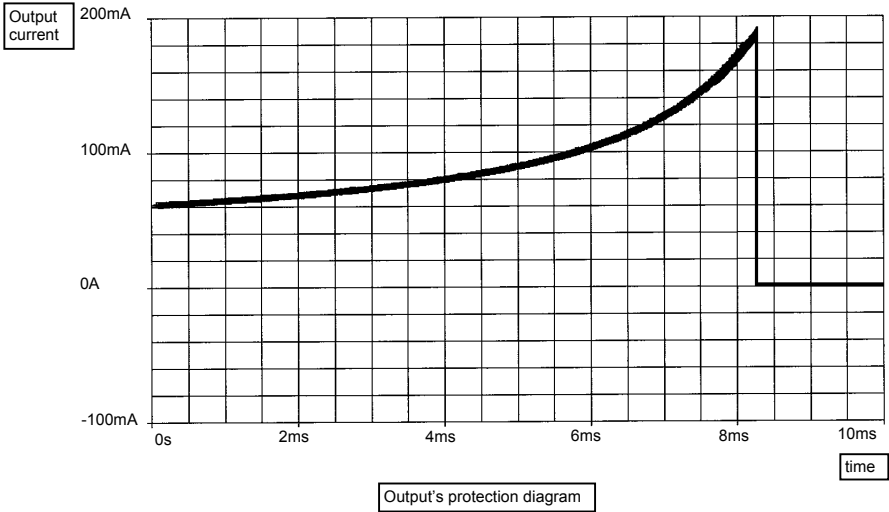


The digital outputs cannot drive lamps (light bulb): use a relay on digital outputs if necessary.





Output protection status is not displayed on the 7 segment display.



### 3.7.6 CN2: Connecting to the drive Analog Inputs

**Inputs:** not isolated  $\pm 10\text{Vdc}$  input terminals are provided on the CN2 drive edge connector.

**Inputs Connector** mates to a 1881480 6-pins male PHOENIX MICRO-COMBICON cable connector.

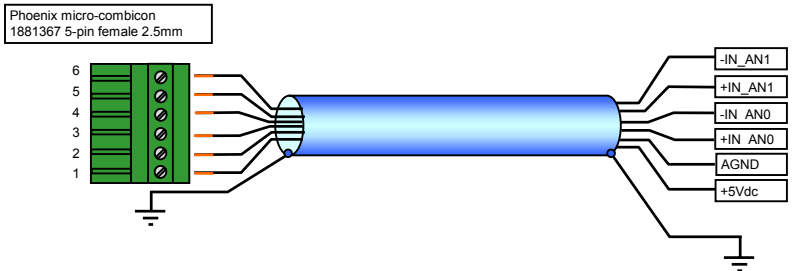
| Pin   | Description | Function                      |
|-------|-------------|-------------------------------|
| CN2.1 | +5Vdc       | Digital outputs supply + side |
| CN2.2 | AGND        | Digital outputs supply - side |
| CN2.3 | +IN_AN0     | Depending on user's program   |
| CN2.4 | -IN_AN0     |                               |
| CN2.5 | +IN_AN1     |                               |
| CN2.6 | -IN_AN1     |                               |



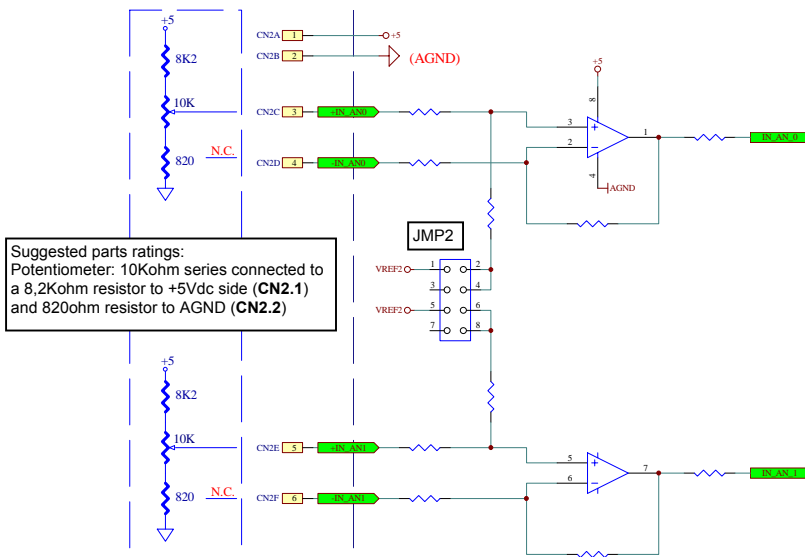
Refer to section 5.3.3 for inputs/outputs function in a unit version.

#### Cable to I/O

Making the connections to outputs use a shielded cable with  $1\text{ mm}^2$  (#18 AWG) or  $0.5\text{ mm}^2$  (#20 AWG) wires' cross section.



## Inputs schematics and connections



Using modes:

$\pm 10\text{Vdc}$  inputs: close JMP2 1-2 (In0) and 5-6 (In1) pins;

External potentiometer driven inputs: close JMP2 3-4 (In0) and 7-8 (In1) pins.

### 3.7.7 CN1: Connecting to CANbus

**Can Bus** CN1 connector mates to a SUB-D 9-pin male connector.



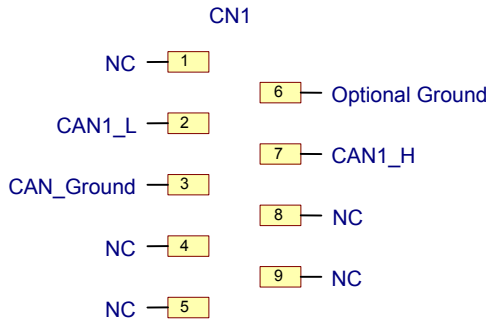
Refer to drive software manual for CAN bus operating information.

#### Connections table

| Signals  | Pin   | Functions       |
|----------|-------|-----------------|
| N.C.     | CN1.1 | N.C.            |
| CAN_L    | CN1.2 | CAN_L signal    |
| 0_CAN    | CN1.3 | Can_Ground      |
| Reserved | CN1.4 | Not used        |
| Reserved | CN1.5 | Not used        |
| 0_CAN    | CN1.6 | Optional_Ground |
| CAN_H    | CN1.7 | CAN_H signal    |
| Reserved | CN1.8 | Not used        |
| N.C.     | CN1.9 | N.C.            |

**Cable requirements** Use 0.5 mm<sup>2</sup> (#20AWG) or 0,25mm<sup>2</sup> (#23 AWG) cross section shielded twisted pair for CANbus connection.

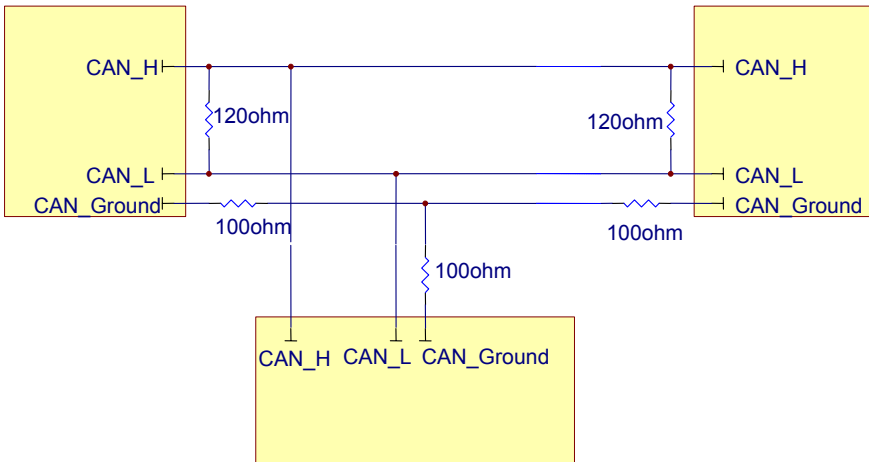
#### Pin-Out of the CAN-bus connector



## CANbus schematics

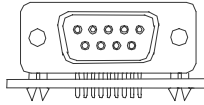
For proper can bus working a termination resistor must be inserted between the input terminals of the first and the last device in the net.

CAN\_Ground wiring is optional



### 3.7.8 CN1: Connecting to RS232 and RS485 interfaces.

RS232 and RS485 connector is a 9 pins male SUB-D connector.



Refer to drive software manual for serial link operating.

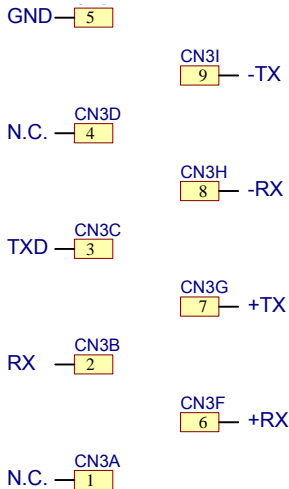
Connections  
table

| Signals | Pin   | Function                         |
|---------|-------|----------------------------------|
| N.C.    | CN1.1 | N.C.                             |
| Rx      | CN1.2 | RS232 receiver input             |
| Tx      | CN1.3 | RS232 transmitter output         |
| DTR     | CN1.4 | N.C.                             |
| GND     | CN1.5 | RS232 Interface Signal ground    |
| +Rx     | CN1.6 | RS485 receiver +side (input)     |
| +Tx     | CN1.7 | RS485 transmitter +side (output) |
| -Rx     | CN1.8 | RS485 receiver -side (input)     |
| -Tx     | CN1.9 | RS485 transmitter -side (output) |

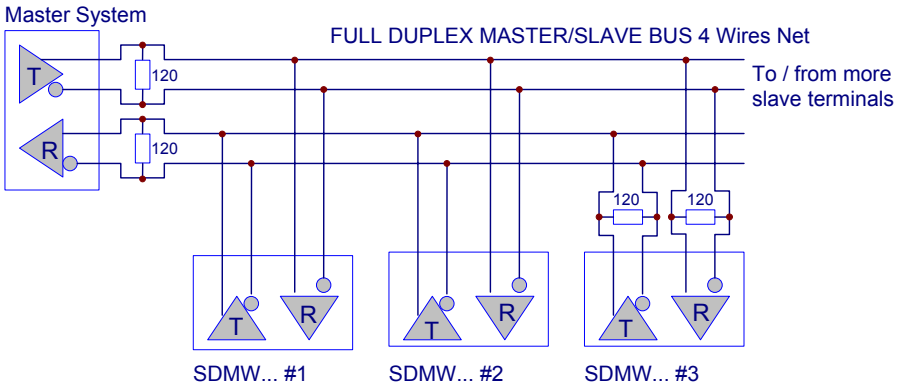
**Cable:**

**requirements** Use 0.5 mm<sup>2</sup> (#20 AWG) or 0.25mm<sup>2</sup> (#23 AWG) cross section shielded twisted pair for RS232 and RS485 serial interfaces cabling.

Connector  
pin-out



## RS485 bus schematic



For proper RS485 net operating two termination resistors must be inserted between the terminals of the first and the last device in the net



The dot led on the drive front panel 7 segment display is lighted while the RS485 interface is enabled (connected to the net).

## 4 STARTING THE SDMWD180 DRIVE

---

**This section** explains how to power the SDMWD180 unit after installation. Topics covered are:

- Testing the installation
- Maintaining and troubleshooting the SDMWD180 unit

### 4.1 Testing the Installation

---

**Before first Powering up**

- Check if the device is exactly the version you need (**Refer** to section 5.0). Improper DC input voltage or motor current setting could result in irreparable unit's or motor's damages.
- Check that all settings are as you need in your application.
- Check wiring and mounting to verify the proper installation and integrity of the unit.

**First Power up Procedure**



*Perform the first unit powering with the **motor shaft disconnected from the load** as improper wiring or undiscovered shipping damages could result in undesired motor motion.*

### 4.2 Maintaining

---

**Procedure** The SDMWD180 unit is designed for a minimum maintenance. Remove superficial dust and dirt from the unit using only clean, dry and low pressure air.

### 4.3 Drive operating condition monitoring

---

|                                |   |
|--------------------------------|---|
| <b>Drive Status Monitoring</b> | The SDMWD180 actual working condition is monitored on the 7 segment light emitting diodes (leds) display.<br>The drive operation modes are displayed as:  |
| <b>“b”</b>                     | Boot program running: at early drive powering on to state that the boot program is properly working;  |
| <b>“I”</b>                     | Initialization: the drive is running the start-up procedure (for about 6 seconds from drive firmware working start-up);   |
| <b>“S”</b>                     | drive firmware running situation: <ul style="list-style-type: none"><li>- <b>“S”</b> proper running;</li><li>- <b>“S”+“F”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Warning:</b> Missing <math>I_{nominal}</math>;</li><li><b>Limits:</b> see current settings table;</li><li><b>Action:</b> set motor current;</li><li><b>Resuming:</b> automatic at current setting;</li></ul></li><li>- <b>“S”+“1”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Warning:</b> dc bus Voltage close to max limit;</li><li><b>Limits:</b> <math>24Vdc \leq Vbus \leq 70Vdc</math>;</li><li><b>Action:</b> correct the DC power supply voltage to ensure that <math>24Vdc \leq Vbus \leq 70Vdc</math>;</li><li><b>Resuming:</b> automatic if <math>24Vdc \leq Vbus \leq 70Vdc</math>;</li></ul></li><li>- <b>“S”+“3”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Warning:</b> drive temperature rise near limit;</li><li><b>Limits:</b> <math>70^{\circ}C \leq T_{sink} \leq 76^{\circ}C</math>;</li><li><b>Action:</b> improve drive cooling;</li><li><b>Resuming:</b> automatic if <math>T_{sink} \leq 70^{\circ}C</math>;</li></ul></li><li>- <b>“S”+“6”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Warning:</b> regulation parameters overflow;</li><li><b>Limits:</b> not significant;</li><li><b>Action:</b> check drive and motor matching;</li><li><b>Resuming:</b> automatic;</li></ul></li></ul> |
| <b>“L”</b>                     | Missing Operating System: no working software is actually inside the drive;   |
| <b>“U”</b>                     | Firmware upgrading: new software downloading in progress;   |
| <b>“E”</b>                     | General error: some error has been detected by the real time internal supervisor firmware;  |
| <b>“P”</b>                     | Protection status: a protection intervention condition has been detected; <ul style="list-style-type: none"><li>- <b>“P”+“0”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Protection:</b> motor phase open;</li><li><b>Limits:</b> not significant;</li><li><b>Action:</b> check motor connections;</li><li><b>Resuming:</b> Switch power OFF to restore from a latched protection;</li></ul></li><li>- <b>“P”+“1”</b> characters alternating blinking:<ul style="list-style-type: none"><li><b>Protection:</b> over/under voltage;</li><li><b>Limits:</b> <math>DC\ bus &lt; 21Vdc</math> and <math>DC\ bus &gt; 80Vdc</math>;</li><li><b>Action:</b> correct the DC power supply voltage to proper values;</li><li><b>Resuming:</b> automatic if <math>24Vdc \leq Vbus \leq 70Vdc</math>;</li></ul></li></ul>   |

- “P”+“2” characters alternating blinking:  
**Protection:** over current;  
**Limits:** see current settings table;  
**Action:** check motor cable and motor for shorts between wires or to motor case;  
**Resuming:** Switch power OFF to restore from a latched protection;
- “P”+“3” characters alternating blinking:  
**Protection:** drive over temperature;  
**Limits:** Heatsink drive temperature > 75°C;  
**Action:** Improve drive cooling;  
**Resuming:** automatic when drive temperature ≤75°C;

- “F” fault: a Software Error inside the drive occurred;
- “F”+“0” characters alternating blinking:  
**Fault:** Watchdog protection intervention;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;
  - “F”+“1” characters alternating blinking:  
**Fault:** Internal Software Error;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;
  - “F”+“2” characters alternating blinking:  
**Fault:** Missing calibration;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;
  - “F”+“3” characters alternating blinking:  
**Fault:** Internal Hardware Error;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;
  - “F”+“4” characters alternating blinking:  
**Fault:** EEPROM Failure;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;
  - “F”+“6” characters alternating blinking:  
**Fault:** Missing Setup;  
**Action:** refer to Troubleshooting Table at 4.3.1 section;

**Power ON Sequence** Through the 7 segment leds display the drive powering on sequence can be watched:

“b” ⇒ “I” ⇒ “S” : correct powering on sequence.  
 ⇒ “S”+“5” “1” “3” “6”: warning condition.

“b” ⇒ “I” ⇒ “P”+ “0” “1” “2” “3”: power on followed by a protection intervention.

“b” ⇒ “I” ⇒ “F”+“0” “1” “2” “3” “4” “6”: internal software error after power on.

“b” ⇒ “I” ⇒ “E” : power on followed by an user program error.

“b” ⇒ “L” : power followed by missing operating system.

“b” ⇒ “I” ⇒ “H” : power on followed by missing user program.

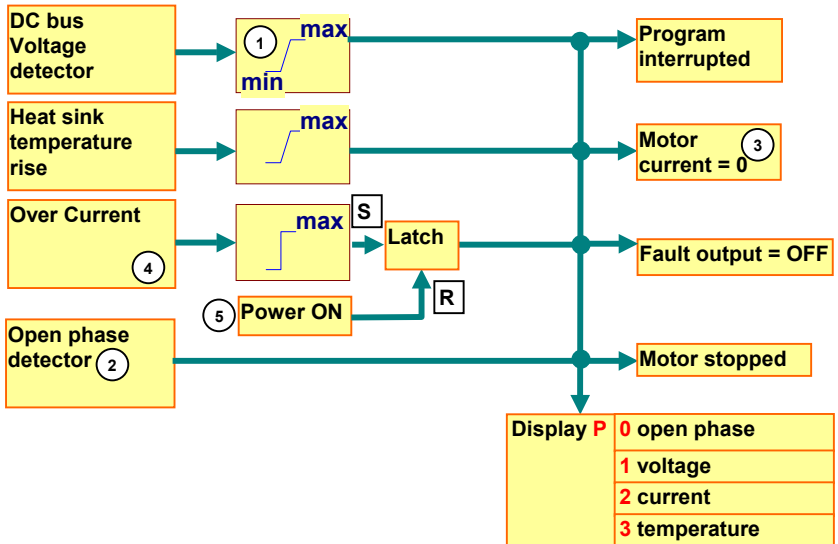
Each protection intervention has a dedicated error message transmission on the communication link if present:

- **OVER TEMPERATURE:** an overheating of the power stages was detected and the "thermal monitoring circuitry" switched the drive's power stages off;
- **OVER/UNDER VOLTAGE:** the unit is actually powered with a voltage out of the operating range and the "voltage monitoring circuitry" disabled the drive's power stages;
- **OVER CURRENT:** a motor output overloading was detected and the "current protection" disabled the drive's power stages;
- **OPEN PHASE:** intervention halted the drive functioning;
- 



The protections previously described are hardware failures.

## Fault Conditions Diagram



### Note:

- ① The dc bus voltage out of range condition is defined as:
- under voltage: DC bus < 24Vdc
  - over voltage: DC bus > 70Vdc
  - Dc bus voltage ripple > 10% ( $V_{\text{ripple-pp}} > \text{Rated Vdc} / 10$ )

- ② Open phase: the winding current cannot meet the setting;



- ③ When the **SDMW180** switches to the "fault" status, the power stage is disabled and the **motor loses the holding torque**. The installation's planner must provide a safety device to prevent any damage to things or persons if the load drags the motor in such condition



- ④ After an **over current** protection intervention switch the drive off and fix the problem before powering the device on again.



- ⑤ Switch power off to **restore from a latched current protection** intervention.

### 4.3.1 Troubleshooting Table

| SYMPTOM  | ACTION   |
|--|--|
| <b>No effect on the unit at power supply switching on.</b> | Check the power supply cabling and fuses, if ok, check if the supply voltage (on power connector by a voltage-meter) meets the drive's ratings.  |
| <b>Over current protection "on"</b>                        | Be sure that motor connections have been made according to the wiring diagrams in the EVER's motors catalogue.<br><br>Check the motor cable and the motor for shorts between wires or motor case.  |
| <b>The motor produces no torque</b>                        | Check if the motor cable is correctly wired and properly plugged to the drive.   |
| <b>The motor produces torque but does not turn.</b>        | Check if the I/O cable is correctly wired and properly plugged to the drive.   |
| <b>The motor rotates a wrong direction.</b>                | Reverse A and $\bar{A}$ motor leads.   |
| <b>The motor does not reach the target position.</b>       | Verify that the motor does not stall. If it does:<br>1 Verify motor sizing. Be sure that the power supply voltage and/or motor current setting is as required by the reference motor's torque vs. speed curve.<br>2 Use a smaller step size to avoid low-speed resonance problems. |



Use emergency diagram and the **troubleshooting table** in the following page to fix and correct most of problems. Being unable to restore proper drive's operation please call EVER' s co. Support dept.



Suspecting the **SDMWD180 system has been damaged**, before replacing it by a new unit check that the installation and the power supply design meet all the drive's requirements. Tentative fault corrections by simply replacing a SDMWD180 unit are not a good troubleshooting practice.



The power supply cables, the motor output and some parts of the SDMWD180 unit are a potential source of **electric shock**. To avoid dangers follow the safety guidelines in section 1.3 and 3.5 of this unit manual.



Recovering to normal working conditions, after a protection or a working section abortion ,use a working restart cycle to avoid dangerous situations.

Being unable to correct the problem while thinking the system is not faulty, call EVER co. for technical support or send a message including the following information:

Unit code (SDMWD180Vyyyy) and serial number as printed in the label on the unit chassis.

An as complete as possible description of the problem and the condition where it occurs.

A description of the unit settings in your application (Current, step type, waveform type, operation mode, etc.)

The Ever co. part number of the motor.

The DC power supply bus voltage ratings and characteristics (ripple....).

A description of power supply and control signals, cabling and other installation topics.

A description of your application (motor movements, load, speed, etc.).

**Return  
procedure**

To return a defective drive to EVER co. for repair or replacement:

- 1) Possibly pack the unit in its original packing.  
[EVER co. is not responsible or liable for damage resulting from improper packaging or shipment].  
Including a sheet reporting a complete description of the problem or the damage of the device in the return packing can be useful while repairing the unit.
- 2) Ship the goods to:

EVER Elettronica  
Via del Commercio 2/4  
Zona Industriale Loc. San Grato  
26900 - LODI - ITALY  
Attn: AS Dept.  
Email: [repations@everelettronica.it](mailto:repations@everelettronica.it)



*EVER co. is used sending to customers a **repair costs estimation offer before repairing** the unit.*

*All shipment costs are charged to customer.*

# 5 SDMWD180 VERSIONS AND SPECIFICATIONS

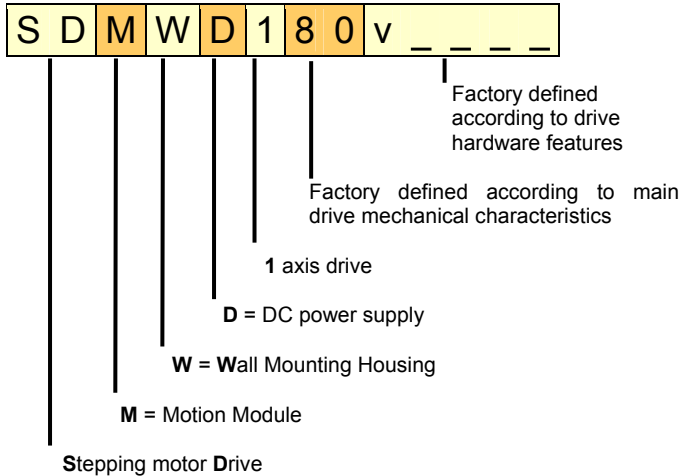
This section describes the specific features of the available versions of SDMWD180 drive.



The **information herein** overcomes the general SDMWD180 specification in the previous sections.

## 5.1 Drive Coding and Ordering Information

To order the SDMWD180 drive version you want please use the following model number:



Specifications on drive housing front panel:

**BDM** (Basic Drive Module) with DC supply, working as motion control module. The unit after receiving the working program at the installation will work as a stepping motor controlled drive.

## 5.2 Table of SDMWD180Vxxxx available versions

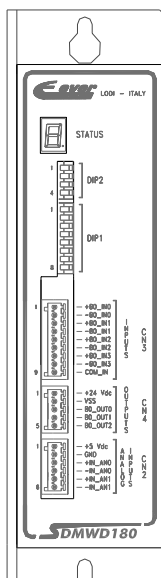
| SDMWD180 | Vdc   | Inputs<br>(1) | Outputs<br>(2) | Analog<br>Inputs<br>(3) | Firmware | Bus Link        | Connector kit code |
|----------|-------|---------------|----------------|-------------------------|----------|-----------------|--------------------|
| VA123    | 24-70 | 4             | 3              | 2                       | C0300    | CANbus          | SDMWD180VA123C     |
| VA133    |       | 4             | 3              | 2                       | C0400    | RS232 and RS485 | SDMWD180VA133C     |

- (1) 5 Vdc Line Driver and 24Vdc PNP and NPN;
- (2) 24Vdc @ 100mA;
- (3) +- 10 Vdc

## 5.3 SDMWD180vA123 Basic Drive (C0300)

**Performances** available by this version: the SDMWD180 is a step motor motion module and drive implemented through a new generation DIGITAL SIGNAL PROCESSOR CONTROLLER. In a wall mounting housing the unit integrates a microstepping drive able to move the motor according to motion profiling commands mastered by a PLC or by a PC. The connection to the master unit is made through a CAN link or by #4 optoisolated (5Vdc Line-driver and 24Vdc PNP/Push-Pull) 200kHz digital inputs, #3 optoisolated (24Vdc@100mA PNP) outputs and #2 ±10Vdc inputs. All the digital inputs and outputs are optoisolated. Dip-switches are available to user settings and for the identification of the unit in a CANbus network. The unit drives the stepping motor according to a user program, while running a real time checking of the critical working parameters as temperature rise, voltages and currents. The device is powered through one DC bus and can drive the stepper motor in open or closed velocity & position loops.

### 5.3.1 Electrical specifications



- **DC voltage** range (24+70) Vdc;
- **Bipolar chopper** "H" power bridges;
- **Switching frequency:** 40 kHz;
- **Phase current ratings:** 0.5÷5Arms (7Apeak);
- **Step angle:** from full to 1/128 step sinusoidal current waveforms;
- **Display:** 7 segment led display monitoring of drive working status;
- **Dip switches** for user functions setting;
- **Unit Protection circuitry** against:
  - Voltage out of operating range **(1)**
  - Over temperature : T<sub>sink</sub> >= 75°C ±5°C
  - Over current due to:
    - motor windings short circuit
    - phase and ground short circuit
    - wrong motor windings connection
    - motor phase open

**(1)** the voltage out of operating range condition is defined as:

- under voltage: DC bus < 24Vdc
- over voltage: DC bus > 70Vdc
- ripple > 10% (V<sub>ripple-pp</sub> > Rated Vdc / 10)

- **User's adjustments:**

**Motor Current:** 0.5 to 5 Arms sinusoidal winding currents.  
Software selectable

**Micro-stepping:** software selectable

**Idle current reduction:** software selectable

**Boost current:** software selectable

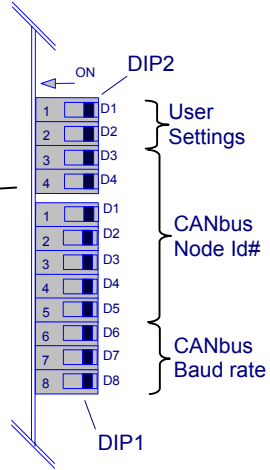
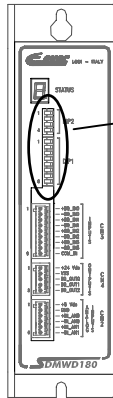
- **User's responsibility boosting the current:** the BDM maximum current rating cannot be exceeded.



**After idle current nulling** the motor loses the holding torque. The user must provide a safety device to prevent any damage to things or persons if the load drags the motor.

### 5.3.2 Dip switch settings

Location



| DIP2                    |    |                        |     | DIP1 |     |     |     |                  |     |     |     |
|-------------------------|----|------------------------|-----|------|-----|-----|-----|------------------|-----|-----|-----|
| D1                      | D2 | D3                     | D4  | D1   | D2  | D3  | D4  | D5               | D6  | D7  | D8  |
| U1                      | U2 | ID6                    | ID5 | ID4  | ID3 | ID2 | ID1 | ID0              | BD2 | BD1 | BD0 |
| Free for User Settings. |    | CANbus Node Identifier |     |      |     |     |     | CANbus Baud rate |     |     |     |



Some parts inside the SDMWD180 unit housing can be a potential source of **electric shock**.

To avoid electric shock, before DIP-SWITCH handling switch power off and wait until the 7 segment display leds on drive front panel are off.

**CANbus Baud Rate Selection table**

| B2  | B1  | B0  | Baud Rate (Kbit/s) |
|-----|-----|-----|--------------------|
| OFF | OFF | OFF | 1000               |
| OFF | OFF | ON  | 500                |
| OFF | ON  | OFF | 250                |
| OFF | ON  | ON  | 125                |
| ON  | OFF | OFF | 100                |
| ON  | OFF | ON  | 50                 |
| ON  | ON  | OFF | 20                 |
| ON  | ON  | ON  | 10                 |



Refer to drive software manual for information about operating modes.

### CANBus Node Identifiers table

| Node | I6  | I5  | I4  | I3  | I2  | I1  | I0  | Node | I6 | I5  | I4  | I3  | I2  | I1  | I0  |
|------|-----|-----|-----|-----|-----|-----|-----|------|----|-----|-----|-----|-----|-----|-----|
| //   | OFF | OFF | OFF | OFF | OFF | OFF | OFF | 64   | ON | OFF | OFF | OFF | OFF | OFF | OFF |
| 1    | OFF | OFF | OFF | OFF | OFF | OFF | ON  | 65   | ON | OFF | OFF | OFF | OFF | OFF | ON  |
| 2    | OFF | OFF | OFF | OFF | OFF | ON  | OFF | 66   | ON | OFF | OFF | OFF | OFF | ON  | OFF |
| 3    | OFF | OFF | OFF | OFF | OFF | ON  | ON  | 67   | ON | OFF | OFF | OFF | OFF | ON  | ON  |
| 4    | OFF | OFF | OFF | OFF | ON  | OFF | OFF | 68   | ON | OFF | OFF | OFF | ON  | OFF | OFF |
| 5    | OFF | OFF | OFF | OFF | ON  | OFF | ON  | 69   | ON | OFF | OFF | OFF | ON  | OFF | ON  |
| 6    | OFF | OFF | OFF | OFF | ON  | ON  | OFF | 70   | ON | OFF | OFF | OFF | ON  | ON  | OFF |
| 7    | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 71   | ON | OFF | OFF | OFF | ON  | ON  | ON  |
| 8    | OFF | OFF | OFF | ON  | OFF | OFF | OFF | 72   | ON | OFF | OFF | ON  | OFF | OFF | OFF |
| 9    | OFF | OFF | OFF | ON  | OFF | OFF | ON  | 73   | ON | OFF | OFF | ON  | OFF | OFF | ON  |
| 10   | OFF | OFF | OFF | ON  | OFF | ON  | OFF | 74   | ON | OFF | OFF | ON  | OFF | ON  | OFF |
| 11   | OFF | OFF | OFF | ON  | OFF | ON  | ON  | 75   | ON | OFF | OFF | ON  | OFF | ON  | ON  |
| 12   | OFF | OFF | OFF | ON  | ON  | OFF | OFF | 76   | ON | OFF | OFF | ON  | ON  | OFF | OFF |
| 13   | OFF | OFF | OFF | ON  | ON  | OFF | ON  | 77   | ON | OFF | OFF | ON  | ON  | OFF | ON  |
| 14   | OFF | OFF | OFF | ON  | ON  | ON  | OFF | 78   | ON | OFF | OFF | ON  | ON  | ON  | OFF |
| 15   | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 79   | ON | OFF | OFF | ON  | ON  | ON  | ON  |
| 16   | OFF | OFF | ON  | OFF | OFF | OFF | OFF | 80   | ON | OFF | ON  | OFF | OFF | OFF | OFF |
| 17   | OFF | OFF | ON  | OFF | OFF | OFF | ON  | 81   | ON | OFF | ON  | OFF | OFF | OFF | ON  |
| 18   | OFF | OFF | ON  | OFF | OFF | ON  | OFF | 82   | ON | OFF | ON  | OFF | OFF | ON  | OFF |
| 19   | OFF | OFF | ON  | OFF | OFF | ON  | ON  | 83   | ON | OFF | ON  | OFF | OFF | ON  | ON  |
| 20   | OFF | OFF | ON  | OFF | ON  | OFF | OFF | 84   | ON | OFF | ON  | OFF | ON  | OFF | OFF |
| 21   | OFF | OFF | ON  | OFF | ON  | OFF | ON  | 85   | ON | OFF | ON  | OFF | ON  | OFF | ON  |
| 22   | OFF | OFF | ON  | OFF | ON  | ON  | OFF | 86   | ON | OFF | ON  | OFF | ON  | ON  | OFF |
| 23   | OFF | OFF | ON  | OFF | ON  | ON  | ON  | 87   | ON | OFF | ON  | OFF | ON  | ON  | ON  |
| 24   | OFF | OFF | ON  | ON  | OFF | OFF | OFF | 88   | ON | OFF | ON  | ON  | OFF | OFF | OFF |
| 25   | OFF | OFF | ON  | ON  | OFF | OFF | ON  | 89   | ON | OFF | ON  | ON  | OFF | OFF | ON  |
| 26   | OFF | OFF | ON  | ON  | OFF | ON  | OFF | 90   | ON | OFF | ON  | ON  | OFF | ON  | OFF |
| 27   | OFF | OFF | ON  | ON  | OFF | ON  | ON  | 91   | ON | OFF | ON  | ON  | OFF | ON  | ON  |
| 28   | OFF | OFF | ON  | ON  | ON  | OFF | OFF | 92   | ON | OFF | ON  | ON  | ON  | OFF | OFF |
| 29   | OFF | OFF | ON  | ON  | ON  | OFF | ON  | 93   | ON | OFF | ON  | ON  | ON  | OFF | ON  |
| 30   | OFF | OFF | ON  | ON  | ON  | ON  | OFF | 94   | ON | OFF | ON  | ON  | ON  | ON  | OFF |
| 31   | OFF | OFF | ON  | ON  | ON  | ON  | ON  | 95   | ON | OFF | ON  | ON  | ON  | ON  | ON  |
| 32   | OFF | ON  | OFF | OFF | OFF | OFF | OFF | 96   | ON | ON  | OFF | OFF | OFF | OFF | OFF |
| 33   | OFF | ON  | OFF | OFF | OFF | OFF | ON  | 97   | ON | ON  | OFF | OFF | OFF | OFF | ON  |
| 34   | OFF | ON  | OFF | OFF | OFF | ON  | OFF | 98   | ON | ON  | OFF | OFF | OFF | ON  | OFF |
| 35   | OFF | ON  | OFF | OFF | OFF | ON  | ON  | 99   | ON | ON  | OFF | OFF | OFF | ON  | ON  |
| 36   | OFF | ON  | OFF | OFF | ON  | OFF | OFF | 100  | ON | ON  | OFF | OFF | ON  | OFF | OFF |
| 37   | OFF | ON  | OFF | OFF | ON  | OFF | ON  | 101  | ON | ON  | OFF | OFF | ON  | OFF | ON  |
| 38   | OFF | ON  | OFF | OFF | ON  | ON  | OFF | 102  | ON | ON  | OFF | OFF | ON  | ON  | OFF |
| 39   | OFF | ON  | OFF | OFF | ON  | ON  | ON  | 103  | ON | ON  | OFF | OFF | ON  | ON  | ON  |
| 40   | OFF | ON  | OFF | ON  | OFF | OFF | OFF | 104  | ON | ON  | OFF | ON  | OFF | OFF | OFF |
| 41   | OFF | ON  | OFF | ON  | OFF | OFF | ON  | 105  | ON | ON  | OFF | ON  | OFF | OFF | ON  |
| 42   | OFF | ON  | OFF | ON  | OFF | ON  | OFF | 106  | ON | ON  | OFF | ON  | OFF | ON  | OFF |
| 43   | OFF | ON  | OFF | ON  | OFF | ON  | ON  | 107  | ON | ON  | OFF | ON  | OFF | ON  | ON  |
| 44   | OFF | ON  | OFF | ON  | ON  | OFF | OFF | 108  | ON | ON  | OFF | ON  | ON  | OFF | OFF |
| 45   | OFF | ON  | OFF | ON  | ON  | OFF | ON  | 109  | ON | ON  | OFF | ON  | ON  | OFF | ON  |
| 46   | OFF | ON  | OFF | ON  | ON  | ON  | OFF | 110  | ON | ON  | OFF | ON  | ON  | ON  | OFF |
| 47   | OFF | ON  | OFF | ON  | ON  | ON  | ON  | 111  | ON | ON  | OFF | ON  | ON  | ON  | ON  |
| 48   | OFF | ON  | ON  | OFF | OFF | OFF | OFF | 112  | ON | ON  | ON  | OFF | OFF | OFF | OFF |
| 49   | OFF | ON  | ON  | OFF | OFF | OFF | ON  | 113  | ON | ON  | ON  | OFF | OFF | OFF | ON  |
| 50   | OFF | ON  | ON  | OFF | OFF | ON  | OFF | 114  | ON | ON  | ON  | OFF | OFF | ON  | OFF |
| 51   | OFF | ON  | ON  | OFF | OFF | ON  | ON  | 115  | ON | ON  | ON  | OFF | OFF | ON  | ON  |
| 52   | OFF | ON  | ON  | OFF | ON  | OFF | OFF | 116  | ON | ON  | ON  | OFF | ON  | OFF | OFF |
| 53   | OFF | ON  | ON  | OFF | ON  | OFF | ON  | 117  | ON | ON  | ON  | OFF | ON  | OFF | ON  |
| 54   | OFF | ON  | ON  | OFF | ON  | ON  | OFF | 118  | ON | ON  | ON  | OFF | ON  | ON  | OFF |
| 55   | OFF | ON  | ON  | OFF | ON  | ON  | ON  | 119  | ON | ON  | ON  | OFF | ON  | ON  | ON  |
| 56   | OFF | ON  | ON  | ON  | OFF | OFF | OFF | 120  | ON | ON  | ON  | ON  | OFF | OFF | OFF |
| 57   | OFF | ON  | ON  | ON  | OFF | OFF | ON  | 121  | ON | ON  | ON  | ON  | OFF | OFF | ON  |
| 58   | OFF | ON  | ON  | ON  | OFF | ON  | OFF | 122  | ON | ON  | ON  | ON  | OFF | ON  | OFF |
| 59   | OFF | ON  | ON  | ON  | OFF | ON  | ON  | 123  | ON | ON  | ON  | ON  | OFF | ON  | ON  |
| 60   | OFF | ON  | ON  | ON  | ON  | OFF | OFF | 124  | ON | ON  | ON  | ON  | ON  | OFF | OFF |
| 61   | OFF | ON  | ON  | ON  | ON  | OFF | ON  | 125  | ON | ON  | ON  | ON  | ON  | OFF | ON  |
| 62   | OFF | ON  | ON  | ON  | ON  | ON  | OFF | 126  | ON | ON  | ON  | ON  | ON  | ON  | OFF |
| 63   | OFF | ON  | ON  | ON  | ON  | ON  | ON  | 127  | ON | ON  | ON  | ON  | ON  | ON  | ON  |



**Motor Current:** 0.5 to 5 Arms sinusoidal winding currents.

**Micro-stepping:** software selectable

**Idle current reduction:** software selectable

**Boost current:** software selectable

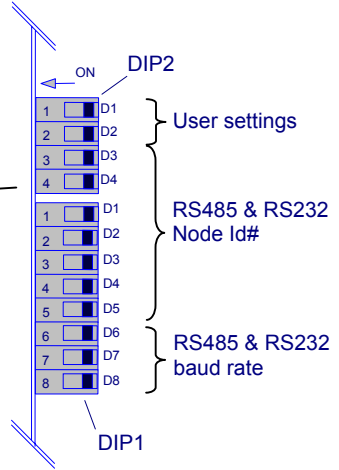
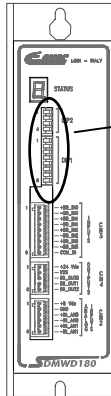
- **User's responsibility:** boosting the current the BD maximum current rating cannot be exceeded.



**After the idle current nulling** the motor loses the holding torque. The user must provide a safety device to prevent any damage to things or persons if the load drags the motor.

## 5.4.2 Dip switch settings

Location



| DIP2                    |    |     |                               | DIP1 |     |     |     |                         |     |     |     |
|-------------------------|----|-----|-------------------------------|------|-----|-----|-----|-------------------------|-----|-----|-----|
| D1                      | D2 | D3  | D4                            | D1   | D2  | D3  | D4  | D5                      | D6  | D7  | D8  |
| U1                      | U2 | ID6 | ID5                           | ID4  | ID3 | ID2 | ID1 | ID0                     | BD2 | BD1 | BD0 |
| Free for User settings. |    |     | RS485 & RS232 Node Identifier |      |     |     |     | RS485 & RS232 Baud rate |     |     |     |



Some parts inside the SDMWD180 unit housing can be a potential source of **electric shock**.

To avoid electric shock, before DIP-SWITCH handling switch power off and wait until the 7 segment display leds on drive front panel are off.

### Baud rate table

Rs232 and RS485 Baud Rate table

| BD2 | BD1 | BD0 | Baud Rate (Kbit/s) |
|-----|-----|-----|--------------------|
| OFF | OFF | OFF | reserved           |
| OFF | OFF | ON  | 57600              |
| OFF | ON  | OFF | 38400              |
| OFF | ON  | ON  | 19200              |
| ON  | OFF | OFF | 9600               |
| ON  | OFF | ON  | 4800               |
| ON  | ON  | OFF | 2400               |
| ON  | ON  | ON  | 1200               |



Refer to drive software manual for information about operating modes.

## RS485 and RS232 Node Identifiers table

| Node | ID6 | ID5 | ID4 | ID3 | ID2 | ID1 | ID0 | Node | ID6 | ID5 | ID4 | ID3 | ID2 | ID1 | ID0 |
|------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|
| //   | OFF | OFF | OFF | OFF | OFF | OFF | OFF | 64   | ON  | OFF | OFF | OFF | OFF | OFF | OFF |
| 1    | OFF | OFF | OFF | OFF | OFF | OFF | ON  | 65   | ON  | OFF | OFF | OFF | OFF | OFF | ON  |
| 2    | OFF | OFF | OFF | OFF | OFF | ON  | OFF | 66   | ON  | OFF | OFF | OFF | OFF | ON  | OFF |
| 3    | OFF | OFF | OFF | OFF | OFF | ON  | ON  | 67   | ON  | OFF | OFF | OFF | OFF | ON  | ON  |
| 4    | OFF | OFF | OFF | OFF | ON  | OFF | OFF | 68   | ON  | OFF | OFF | OFF | ON  | OFF | OFF |
| 5    | OFF | OFF | OFF | OFF | ON  | OFF | ON  | 69   | ON  | OFF | OFF | OFF | ON  | OFF | ON  |
| 6    | OFF | OFF | OFF | OFF | ON  | ON  | OFF | 70   | ON  | OFF | OFF | OFF | ON  | ON  | OFF |
| 7    | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 71   | ON  | OFF | OFF | OFF | ON  | ON  | ON  |
| 8    | OFF | OFF | OFF | ON  | OFF | OFF | OFF | 72   | ON  | OFF | OFF | ON  | OFF | OFF | OFF |
| 9    | OFF | OFF | OFF | ON  | OFF | OFF | ON  | 73   | ON  | OFF | OFF | ON  | OFF | OFF | ON  |
| 10   | OFF | OFF | OFF | ON  | OFF | ON  | OFF | 74   | ON  | OFF | OFF | ON  | OFF | ON  | OFF |
| 11   | OFF | OFF | OFF | ON  | OFF | ON  | ON  | 75   | ON  | OFF | OFF | ON  | OFF | ON  | ON  |
| 12   | OFF | OFF | OFF | ON  | ON  | OFF | OFF | 76   | ON  | OFF | OFF | ON  | ON  | OFF | OFF |
| 13   | OFF | OFF | OFF | ON  | ON  | OFF | ON  | 77   | ON  | OFF | OFF | ON  | ON  | OFF | ON  |
| 14   | OFF | OFF | OFF | ON  | ON  | ON  | OFF | 78   | ON  | OFF | OFF | ON  | ON  | ON  | OFF |
| 15   | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 79   | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 16   | OFF | OFF | ON  | OFF | OFF | OFF | OFF | 80   | ON  | OFF | ON  | OFF | OFF | OFF | OFF |
| 17   | OFF | OFF | ON  | OFF | OFF | OFF | ON  | 81   | ON  | OFF | ON  | OFF | OFF | OFF | ON  |
| 18   | OFF | OFF | ON  | OFF | OFF | ON  | OFF | 82   | ON  | OFF | ON  | OFF | OFF | ON  | OFF |
| 19   | OFF | OFF | ON  | OFF | OFF | ON  | ON  | 83   | ON  | OFF | ON  | OFF | OFF | ON  | ON  |
| 20   | OFF | OFF | ON  | OFF | ON  | OFF | OFF | 84   | ON  | OFF | ON  | OFF | ON  | OFF | OFF |
| 21   | OFF | OFF | ON  | OFF | ON  | OFF | ON  | 85   | ON  | OFF | ON  | OFF | ON  | OFF | ON  |
| 22   | OFF | OFF | ON  | OFF | ON  | ON  | OFF | 86   | ON  | OFF | ON  | OFF | ON  | ON  | OFF |
| 23   | OFF | OFF | ON  | OFF | ON  | ON  | ON  | 87   | ON  | OFF | ON  | OFF | ON  | ON  | ON  |
| 24   | OFF | OFF | ON  | ON  | OFF | OFF | OFF | 88   | ON  | OFF | ON  | ON  | OFF | OFF | OFF |
| 25   | OFF | OFF | ON  | ON  | OFF | OFF | ON  | 89   | ON  | OFF | ON  | ON  | OFF | OFF | ON  |
| 26   | OFF | OFF | ON  | ON  | OFF | ON  | OFF | 90   | ON  | OFF | ON  | ON  | OFF | ON  | OFF |
| 27   | OFF | OFF | ON  | ON  | OFF | ON  | ON  | 91   | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 28   | OFF | OFF | ON  | ON  | ON  | OFF | OFF | 92   | ON  | OFF | ON  | ON  | ON  | OFF | OFF |
| 29   | OFF | OFF | ON  | ON  | ON  | OFF | ON  | 93   | ON  | OFF | ON  | ON  | ON  | OFF | ON  |
| 30   | OFF | OFF | ON  | ON  | ON  | ON  | OFF | 94   | ON  | OFF | ON  | ON  | ON  | ON  | OFF |
| 31   | OFF | OFF | ON  | ON  | ON  | ON  | ON  | 95   | ON  | OFF | ON  | ON  | ON  | ON  | ON  |
| 32   | OFF | ON  | OFF | OFF | OFF | OFF | OFF | 96   | ON  | ON  | OFF | OFF | OFF | OFF | OFF |
| 33   | OFF | ON  | OFF | OFF | OFF | OFF | ON  | 97   | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| 34   | OFF | ON  | OFF | OFF | OFF | ON  | OFF | 98   | ON  | ON  | OFF | OFF | OFF | ON  | OFF |
| 35   | OFF | ON  | OFF | OFF | OFF | ON  | ON  | 99   | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 36   | OFF | ON  | OFF | OFF | ON  | OFF | OFF | 100  | ON  | ON  | OFF | OFF | ON  | OFF | OFF |
| 37   | OFF | ON  | OFF | OFF | ON  | OFF | ON  | 101  | ON  | ON  | OFF | OFF | ON  | OFF | ON  |
| 38   | OFF | ON  | OFF | OFF | ON  | ON  | OFF | 102  | ON  | ON  | OFF | OFF | ON  | ON  | OFF |
| 39   | OFF | ON  | OFF | OFF | ON  | ON  | ON  | 103  | ON  | ON  | OFF | OFF | ON  | ON  | ON  |
| 40   | OFF | ON  | OFF | ON  | OFF | OFF | OFF | 104  | ON  | ON  | OFF | ON  | OFF | OFF | OFF |
| 41   | OFF | ON  | OFF | ON  | OFF | OFF | ON  | 105  | ON  | ON  | OFF | ON  | OFF | OFF | ON  |
| 42   | OFF | ON  | OFF | ON  | OFF | ON  | OFF | 106  | ON  | ON  | OFF | ON  | OFF | ON  | OFF |
| 43   | OFF | ON  | OFF | ON  | OFF | ON  | ON  | 107  | ON  | ON  | OFF | ON  | OFF | ON  | ON  |
| 44   | OFF | ON  | OFF | ON  | ON  | OFF | OFF | 108  | ON  | ON  | OFF | ON  | ON  | OFF | OFF |
| 45   | OFF | ON  | OFF | ON  | ON  | OFF | ON  | 109  | ON  | ON  | OFF | ON  | ON  | OFF | ON  |
| 46   | OFF | ON  | OFF | ON  | ON  | ON  | OFF | 110  | ON  | ON  | OFF | ON  | ON  | ON  | OFF |
| 47   | OFF | ON  | OFF | ON  | ON  | ON  | ON  | 111  | ON  | ON  | OFF | ON  | ON  | ON  | ON  |
| 48   | OFF | ON  | ON  | OFF | OFF | OFF | OFF | 112  | ON  | ON  | ON  | OFF | OFF | OFF | OFF |
| 49   | OFF | ON  | ON  | OFF | OFF | OFF | ON  | 113  | ON  | ON  | ON  | OFF | OFF | OFF | ON  |
| 50   | OFF | ON  | ON  | OFF | OFF | ON  | OFF | 114  | ON  | ON  | ON  | OFF | OFF | ON  | OFF |
| 51   | OFF | ON  | ON  | OFF | OFF | ON  | ON  | 115  | ON  | ON  | ON  | OFF | OFF | ON  | ON  |
| 52   | OFF | ON  | ON  | OFF | ON  | OFF | OFF | 116  | ON  | ON  | ON  | OFF | ON  | OFF | OFF |
| 53   | OFF | ON  | ON  | OFF | ON  | OFF | ON  | 117  | ON  | ON  | ON  | OFF | ON  | OFF | ON  |
| 54   | OFF | ON  | ON  | OFF | ON  | ON  | OFF | 118  | ON  | ON  | ON  | OFF | ON  | ON  | OFF |
| 55   | OFF | ON  | ON  | OFF | ON  | ON  | ON  | 119  | ON  | ON  | ON  | OFF | ON  | ON  | ON  |
| 56   | OFF | ON  | ON  | ON  | OFF | OFF | OFF | 120  | ON  | ON  | ON  | ON  | OFF | OFF | OFF |
| 57   | OFF | ON  | ON  | ON  | OFF | OFF | ON  | 121  | ON  | ON  | ON  | ON  | OFF | OFF | ON  |
| 58   | OFF | ON  | ON  | ON  | OFF | ON  | OFF | 122  | ON  | ON  | ON  | ON  | OFF | ON  | OFF |
| 59   | OFF | ON  | ON  | ON  | OFF | ON  | ON  | 123  | ON  | ON  | ON  | ON  | OFF | ON  | ON  |
| 60   | OFF | ON  | ON  | ON  | ON  | OFF | OFF | 124  | ON  | ON  | ON  | ON  | ON  | OFF | OFF |
| 61   | OFF | ON  | ON  | ON  | ON  | OFF | ON  | 125  | ON  | ON  | ON  | ON  | ON  | OFF | ON  |
| 62   | OFF | ON  | ON  | ON  | ON  | ON  | OFF | 126  | ON  | ON  | ON  | ON  | ON  | ON  | OFF |
| 63   | OFF | ON  | ON  | ON  | ON  | ON  | ON  | 127  | ON  | ON  | ON  | ON  | ON  | ON  | ON  |



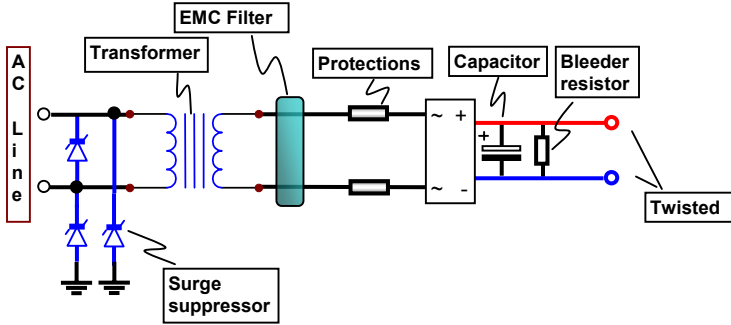
## USER CONNECTIONS

| SDMWD180  |   | Working Mode  |               |  |  |  |  |
|-----------|---|---------------|---------------|--|--|--|--|
| Connector |   | C0300         | C0400         |  |  |  |  |
| CN1       | 1 | Not available | Not available |  |  |  |  |
|           | 2 | CAN_L signal  | RS232 Rx      |  |  |  |  |
|           | 3 | CAN Ground    | RS232 Tx      |  |  |  |  |
|           | 4 | Not available | Not available |  |  |  |  |
|           | 5 | Not available | RS232 Ground  |  |  |  |  |
|           | 6 | Not available | RS485 +RX     |  |  |  |  |
|           | 7 | CAN_H signal  | RS485 +TX     |  |  |  |  |
|           | 8 | Not available | RS485 -RX     |  |  |  |  |
|           | 9 | Not available | RS485 -TX     |  |  |  |  |
| CN2       | 1 | +5Vdc         |               |  |  |  |  |
|           | 2 | AGND          |               |  |  |  |  |
|           | 3 | +IN_AN0       |               |  |  |  |  |
|           | 4 | -IN_AN0       |               |  |  |  |  |
|           | 5 | +IN_AN1       |               |  |  |  |  |
|           | 6 | -IN_AN1       |               |  |  |  |  |
| CN3       | 1 | +B0_IN0       |               |  |  |  |  |
|           | 2 | -B0_IN0       |               |  |  |  |  |
|           | 3 | +B0_IN1       |               |  |  |  |  |
|           | 4 | -B0_IN1       |               |  |  |  |  |
|           | 5 | +B0_IN2       |               |  |  |  |  |
|           | 6 | -B0_IN2       |               |  |  |  |  |
|           | 7 | +B0_IN3       |               |  |  |  |  |
|           | 8 | -B0_IN3       |               |  |  |  |  |
|           | 9 | COM_IN        |               |  |  |  |  |
| CN4       | 1 | +24Vdc        |               |  |  |  |  |
|           | 2 | VSS           |               |  |  |  |  |
|           | 3 | B0_OUT0       |               |  |  |  |  |
|           | 4 | B0_OUT1       |               |  |  |  |  |
|           | 5 | B0_OUT2       |               |  |  |  |  |
| CN5       | 1 | EG            |               |  |  |  |  |
|           | 2 | -DC           |               |  |  |  |  |
|           | 3 | +DC           |               |  |  |  |  |
| CN6       | 1 | A             |               |  |  |  |  |
|           | 2 | A*            |               |  |  |  |  |
|           | 3 | MEG           |               |  |  |  |  |
|           | 4 | B             |               |  |  |  |  |
|           | 5 | B*            |               |  |  |  |  |

## A.2 Power Supply

### Connection Diagrams

#### One Axis



**Surge Suppressors** on primary circuit to protects the drive against line surge spikes.

**Transformer** Be sure that the transformer primary voltage can withstand the power line peak voltage. The secondary bus peak voltage is approximately equal to 1.41 \* Actual secondary rms voltage.



*The DC supply voltage must never exceed the Vdc rating of your unit version.*

Transformer VA ratings depend on motor power ratings: defining the transformer the user can make reference to [support@everelettronica.it](mailto:support@everelettronica.it) service for the motion control system parts definition (motor and power supply sizing). The following procedure can also be used to make an approximated estimation of the power supply features:

1. Power at each axis shaft (watts) =  $\pi * N * T / 30$  where N=[RPM], T=[Nm];
2. Total\_power (watts) = summ of simultaneously moving axes power;
3. Transformer\_power (watts) = 2 \* total\_power (efficiency = 0.5)
4. Transformer\_power (VA) = Transformer\_power [watts] divided by 0,7 (single phase ac) or 0,8 (three phases ac);
5. To define the transformer losses assume an 8% Load Regulation (the secondary voltage can exceed the rated value of 8% when the load current is reduced from maximum to zero);

An easy and fast solution allows to calculate Transformer VA ratings: as Power(VA) =  $\sqrt{2} * V_{dcBUS} * I_{maxPHASE}$

**Power rectifier: Bridge** assume a 15 Arms as worst case rectifier current rating.

**Capacitor** 4400uF capacitor (85°C) is needed at maximum drive current. The capacitor's working voltage rating must withstand the maximum dc bus voltage with a safety margin.

**An EMC Filter** is generally necessary to meet the requirements of the EMC emissions regulating standards. A filter is recommended when a sensitive circuit is powered by the drive ac line.

Looking for a commerc line filter consider the total continuous RMS lcurrent of the motion control system..

The supply line filter should be inserted between the ac mains and the transformer if this is near the drive or in the same cabinet, between the transformer and the rectifier bridge in the other cases, keeping the rectifier bridge as close to the drive as possible and the connection between the filter and the transformer as short as possible.

Refer to the filter manufacturer installing instructions for an effective reduction most of conducted emissions.

**Protections** use 16A rated fuses on AC bus or a safety switch.