

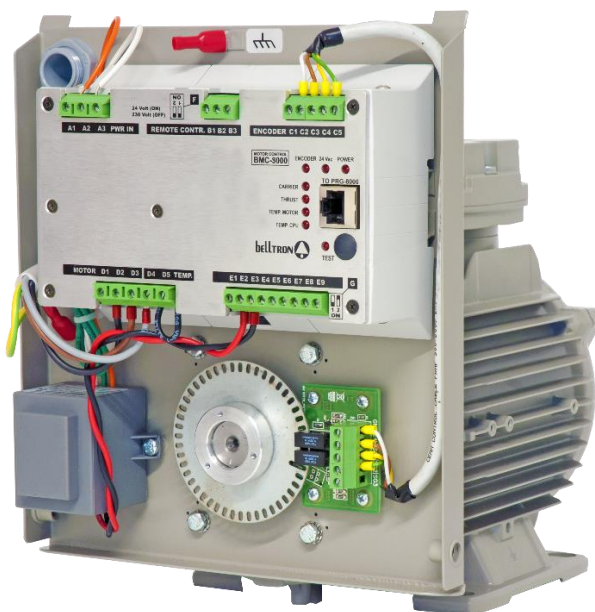


Instruction Manual

User manual Rel. 1.02 – 10/20

Rotating Motor

Belltron Motor Control mod. BMC-9000 with
Programming Console PRG-8000

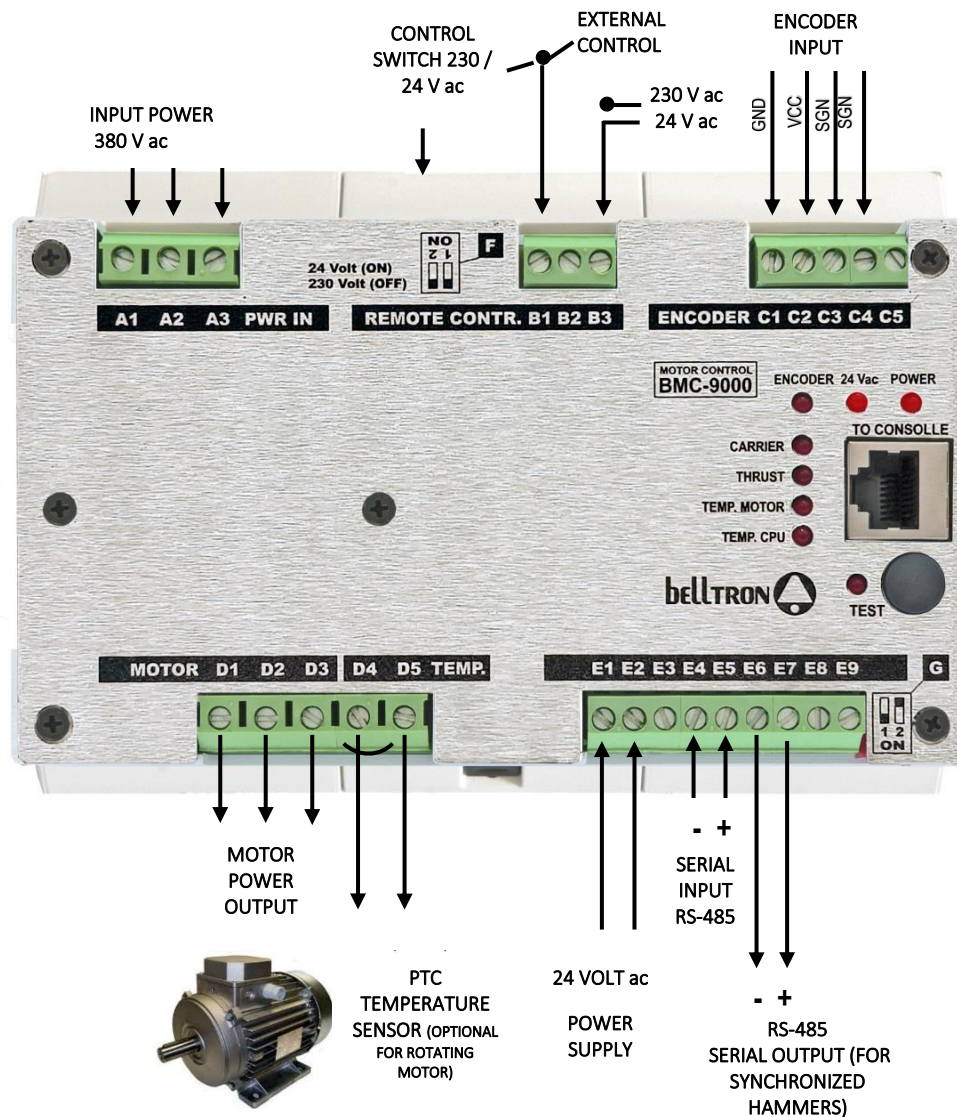


BMC-9000

INSTALLATION AND CONNECTIONS



1. Connect power cables. (A1/A2/A3).
2. Connect auxiliary voltage cables **24 Ac** (E1/E2).
3. Connect remote control cables. (B1/B2/B3).
4. SET CORRECTLY THE REMOTE-CONTROL VOLTAGE **24 o 230** (F).
5. Connect motor cables (D1/D2/D3).
6. Connect PRG 8000 Console.



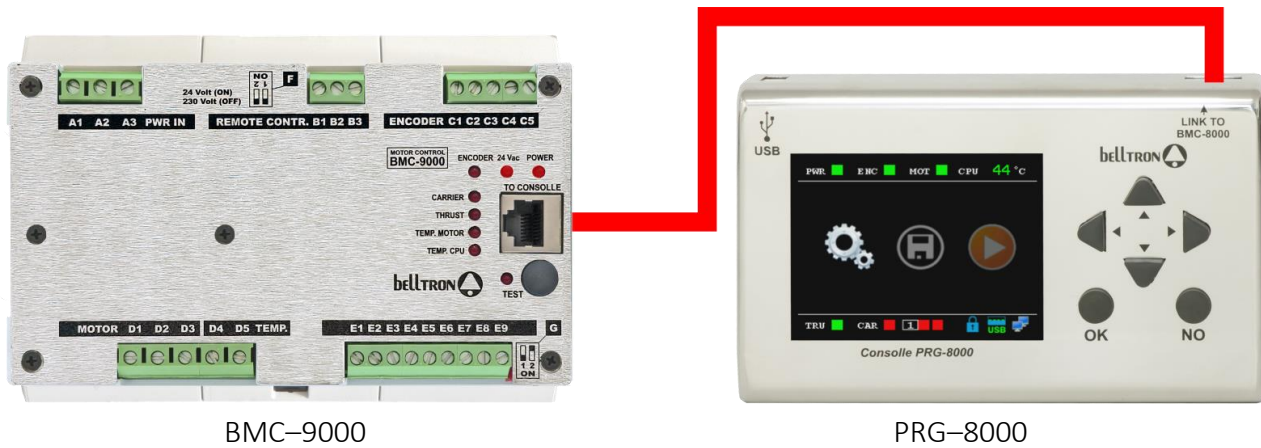
Connection diagrams are at the end of this manual.

BMC-9000

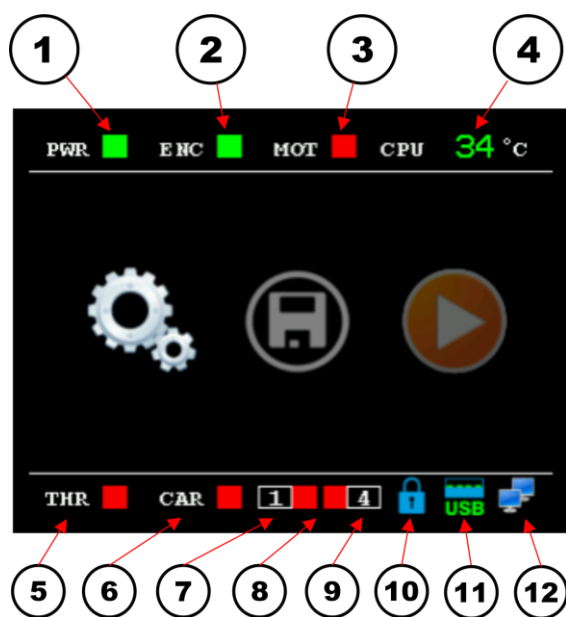
INTRODUCTION

Belltron BMC-9000 allows electronic control of asynchronous rotating and linear motors, both monophase (with 230Vac condensers) and three-phase (400 Vac) for movement of real bells.













Programming is carried out using the PRG-8000 control panel which is connected to the BMC-9000 system by means of a purposely supplied cable.



PRG-8000 CONTROL PANEL



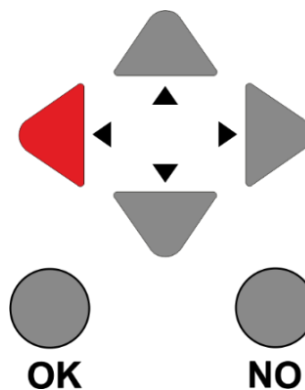
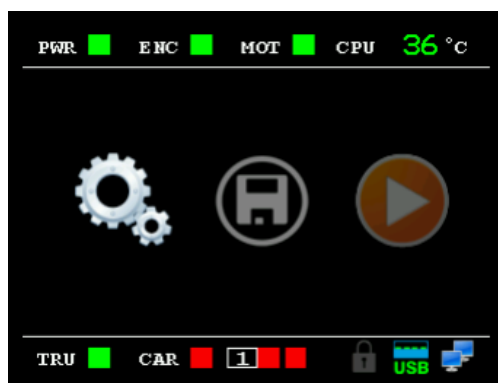
STATUS ICONS:

- ① PWR  : BMC-9000 internal power supplies are working correctly.
- ① PWR  : problem with one of the internal power supplies (BMC must be replaced).
- ② ENC  : external encoder connected.
- ② ENC  : external encoder error.
- ③ MOT  : motor temperature complying to norm.
- ③ MOT  : overheated motor temperature. Thermal protection activated.
- ④ CPU **xx°** : BMC-9000 power module temperature view.
- ⑤ THR  : BMC-9000 power module is pushing the motor.
- ⑤ THR  : no power to the motor.
- ⑥ CAR  : serial 485 output connection ON.
- ⑥ CAR  : serial 485 output connection OFF or not working.
- ⑦  : indicates, respectively: number of motor assigned in setup, peal or volteo bell control
- ⑧  : green led indicates peal activation.
- ⑧  : green led indicates synchronized hammer activation.
- ⑨  : indicates the number of the engine on which the synchronized hammer is active.
- ⑩  : BMC-9000 is not password protected and parameters will be accessible.
- ⑩  : BMC-9000 is password-locked and parameters will not be accessible.
- ⑪  : no usb device available.
- ⑪  : a usb device is connected and ready to be used.
- ⑫  : PRG-8000 control panel not connected or not functioning properly.
- ⑫  : PRG-8000 control panel connected to BMC-9000 correctly.

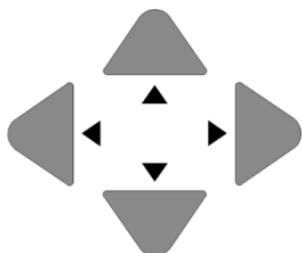
MENU EXPLANATION

CONFIGURATION AND SETUP

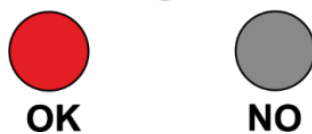
Select SETUP icon using the side arrows:



Press OK.



It will show:



ROTATING TYPE

PEAL

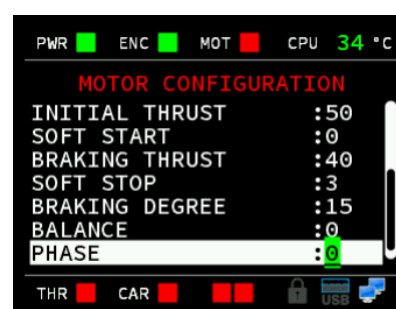
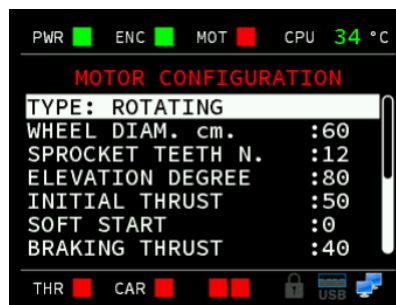
MOTOR SETUP

1.1.0 – ROTATING TYPE

Insert parameters:

Peal: Rotating type

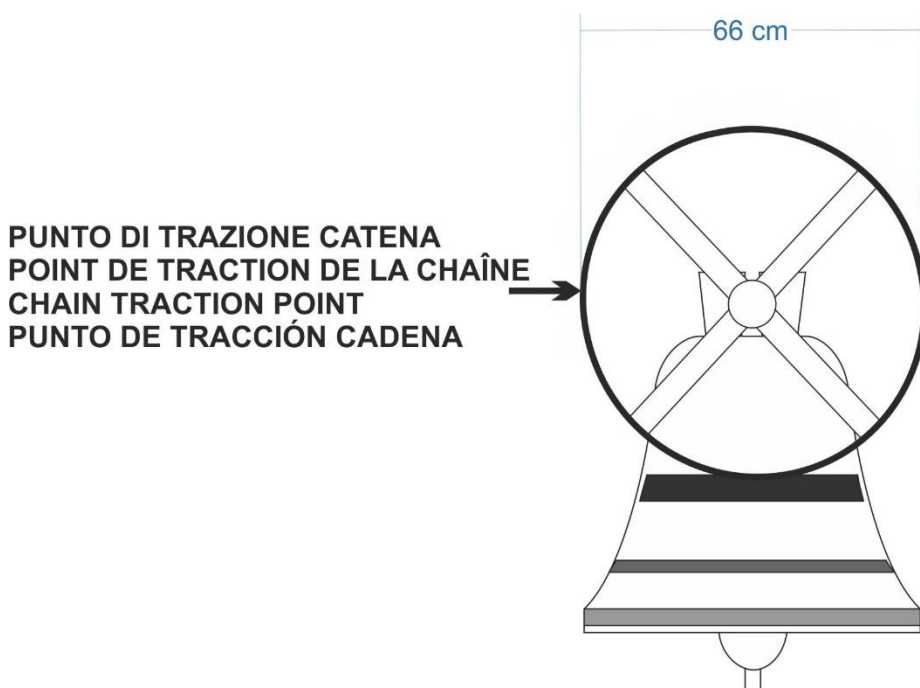
- 1.1.1 – Wheel Diameter
- 1.1.2 – Sprocket Teeth Number
- 1.1.3 – Elevation Degree
- 1.1.4 – Initial Thrust
- 1.1.5 – Soft Start
- 1.1.6 – Braking Thrust
- 1.1.7 – Soft Stop
- 1.1.8 – Braking Degree
- 1.1.9 – Balance
- 1.1.10 – Phase



1.1.1 – WHEEL DIAMETER

Set wheel diameter in centimeters.

The more accurate the measurements, the more precise the elevation degree of the bell will be

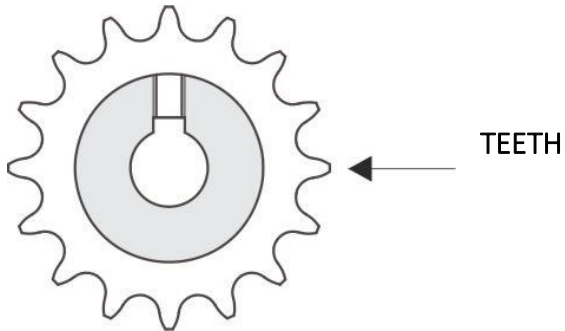


Diameter expressed in centimeters: max 300 cm.

Default 60

1.1.2 – SPROCKET TEETH NUMBER

After programming the SPROCKET TYPE on CONFIGURATION- PAR. 4.0, set the number of sprocket teeth. This setup will noticeably influence the precision of the elevation degree of the bell.



Parameter expressed in numbers: min. 5 max. 50
Default 12

1.1.3 – ELEVATION DEGREE

Elevation degree is the angle between the still bell and the bell at its maximum elevation.

Parameter expressed in degrees: min.=10, max.=120
Default 80

1.1.4 – INITIAL BELL THRUST (THRUST TIME LENGTH)

Thrust time length is the angle within which the motor pushes the bell (simulating a mechanic cam opening). This value can be modified according to the **bell weight** and the **power of the motor** connected to it.

If the bell is small, a short initial thrust is enough (about 0,30 sec,). If instead if we have a bigger bell, a longer initial thrust (about 0,70 sec.) is needed. Accordingly to a more or less powerful motor, the initial bell thrust has to be increased or decreased to reach the requested result.

The longer the push time, the faster the bell reaches the set elevation; however, an excessively long push time can cause longer time for reaching bell stabilization at the set elevation point.

Achieving the stabilization of the bell during SETUP takes longer than the time required in the operational phase. In fact, just before reaching the desired elevation angle, the algorithm used by the device performs repeated simulations to calculate the reduction of the thrust time needed to ensure the perfect stability of the bell.

Once this value is defined, operational stabilization will be achieved as quickly as possible.

Setup expressed in hundredth of seconds: min. 5 max. 99
Default 50

Note 1:

If the bell exceeds the set elevation value by 3 degrees, a safety system will block the motor power supply. The bell once back below the set elevation value, will be pushed back by the motor.

Note 2:

In case of loosening or hardening of the chain, the thrust is recalculated in real time by the software to always have maximum accuracy.

1.1.5 – SOFT START

This value defines the starting time by which the motor acts on the thrust of the bell, that is, the speed to reach its maximum power.

The shorter the maximum power, the greater the strength, the longer the time and the less force.

Parameter expressed in numbers: from 0 (maximum strength) to 9 (minimum strength)

On average, a parameter between 0 and 4 is used

Default 0

Starting time is the time it takes to gradually achieve maximum thrust or braking power. By setting a nonzero value, the engine will be free of sudden initial stresses.

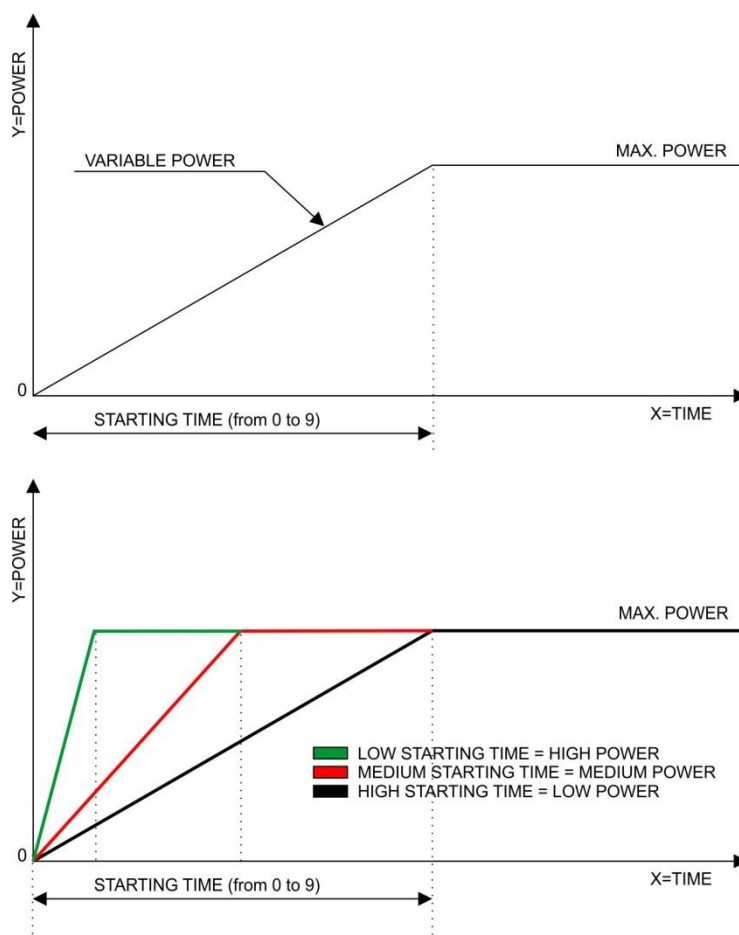
Note:

If the thrust is too strong (for example, an engine that is too large for the weight of the bell, or excessive length of thrust time), you can set a lower soft start value.

0 = maximum strength

9 = minimum strength

The correct value of soft START is related to that of the length of the THRUST TIME.



FORECAST GOAL: Reach the elevation angle in the desired time while maintaining maximum stabilization of the bell.

1.1.6 – BRAKING THRUST

It is the opposite of the starting thrust, that is, a reverse thrust to the direction of the bell. The longer the braking thrust will be, the more the bell will stop quickly.

Parameter expressed in hundredth of seconds: minimum=0, maximum=99.
Default 40

1.1.7 – SOFT STOP

Like the soft start, this value defines the attack time with which the brake will act (see note 1 of the par. 1.1.5).

With a medium/low activation time (greater strength) it will be possible to increase the effectiveness of braking, even for medium/large bells.

Parameter expressed in numbers: from 0 (maximum strength) to 9 (minimum strength).
Default 3

1.1.8 – END OF BRAKING ANGLE

The "end of braking" angle defines the angle at which the brake is deactivated. From that point the bell continues its deceleration by inertia.

If you want to turn off the braking, you can set the angle of "end braking" to 0=OFF.

Parameter expressed in degrees: 0=off, min. 1, max. 100.
Default 15

1.1.9 – BALANCE

If for mechanical reasons the peal bell rises more to one side than another, acting on this parameter will be possible to correct the difference within more or less 10 degrees.

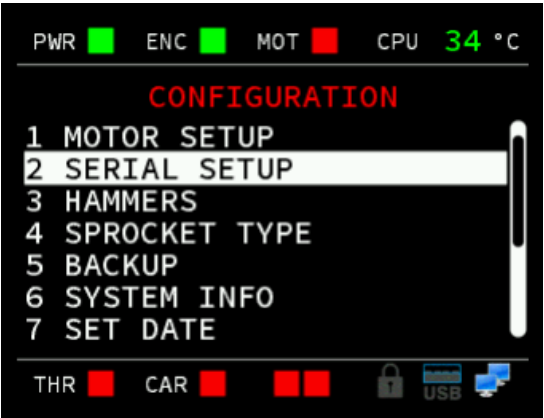
Parameter expressed in degrees: min = -10 max = +10.
Default 0

1.1.10 – PHASES

The failure of the engine may be due to an incorrect connection of the phases.

For convenience, change this parameter directly from the console from 0 to 1 and try again.
Default 0

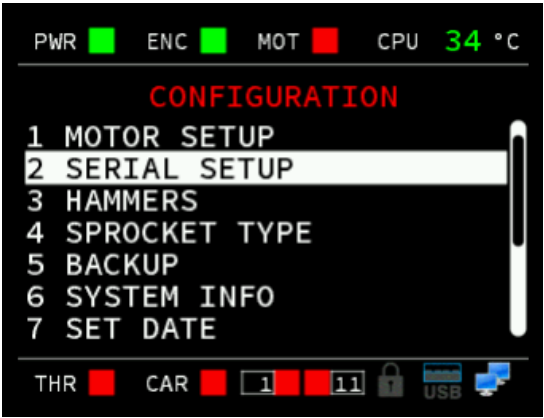
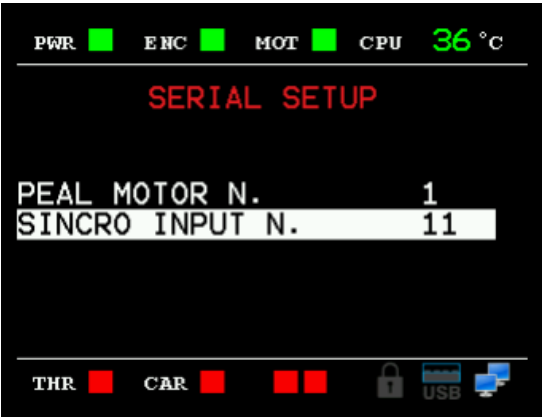
2.0 – SERIAL CONTROL



You can use (in place of the normal activation command of 24 or 230 volts), the serial cable 485 coming directly from the bell controller.

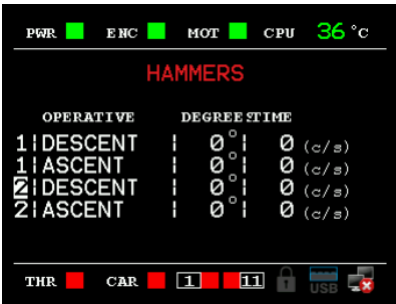
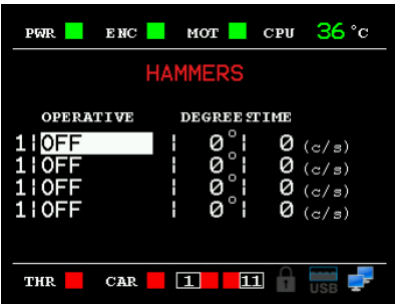
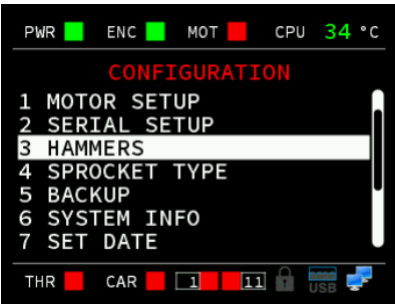
Each engine will be assigned an identification number to allow the unique recognition of the bell to be moved by the bell controllers of the 370 series, 870 series, 3800 series.

Rotating peal only



The assigned bell number will be shown on the display.

3.0 – SYNCHRONIZED HAMMERS

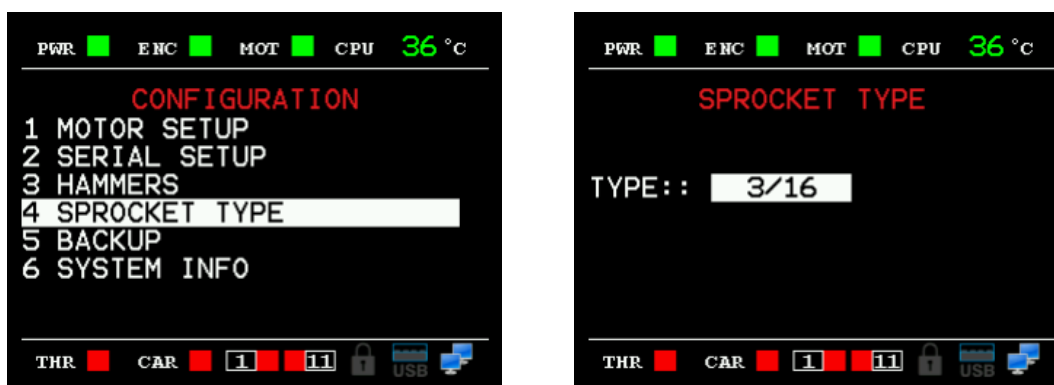


Ability to synchronize one or more hammer bells with a peal bell (max. 4)

Choices available:

- On which hammers to play.
- How many degrees of the peal bell beat the hammer while it is uphill
- How many degrees of the peal bell beat the hammer while it is going downhill.
- Hammer activation time in hundredths of a second (5 to 99).

4.0 – SPROCKET TYPE (FOR ROTATING MOTORS ONLY)




Set different sprocket measures:

- 1) 3/16
- 2) 5/16
- 3) 5/8

5.0 – CONFIGURATION BACKUP

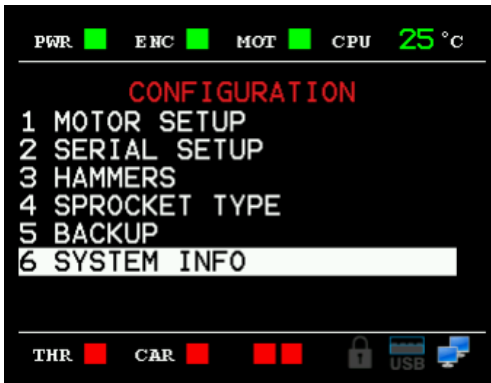


Place the USB memory in the upper-left entrance of the PRG-8000 (even with the device on) and wait a few moments.

When the on symbol  appears on the display, go ahead and copy (save) the data or retrieve the data.

- 1 – backup the whole configuration on external memory
- 2 – restore the whole configuration from external memory

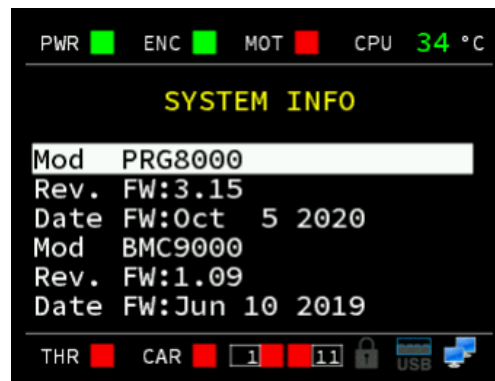
6.0 – SYSTEM INFO



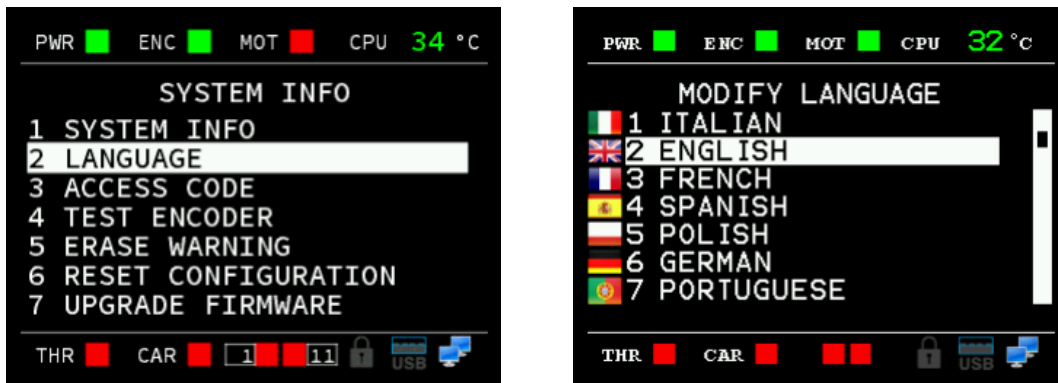
1. System info (serial number, production date, etc.)
2. Language
3. Access codes – customization (default 0000)
4. Test encoder
5. Erase warnings on BMC-9000
6. Reset configuration BMC-9000
7. Firmware update

6.1 – SYSTEM INFO

System info (serial number, production date, etc.)



6.2 – LANGUAGE



This function allows the installer to change the menu language.

Languages available:

- Italian
- English
- French
- Spanish
- Deutsch*

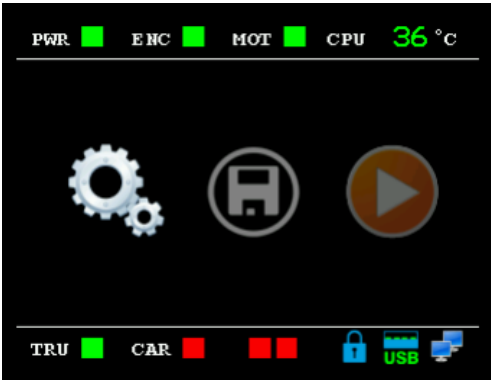
It is possible to add up to 15 different languages.

6.3 – ACCESS CODE



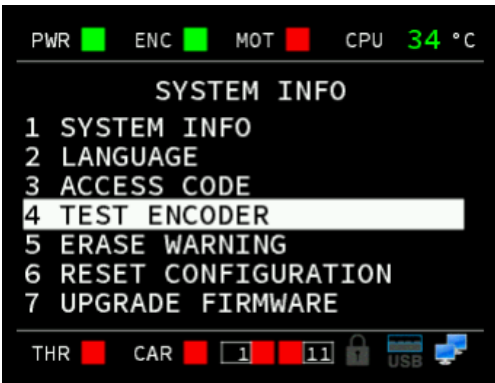
This function allows to change and enable the access code.

BMC-9000



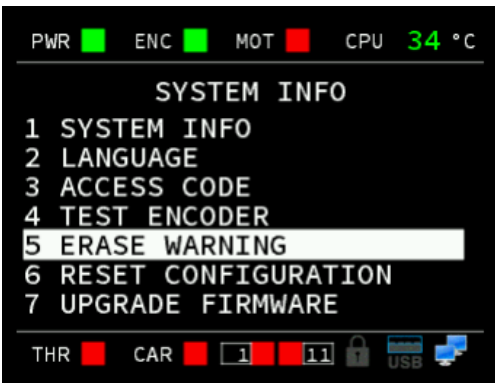
Once this function is enabled, the BMC-8000 device will be accessible only through the access code. The function is enabled when the PRG-8000 control panel is disconnected from the BMC-9000.

6.4 – ENCODER TEST



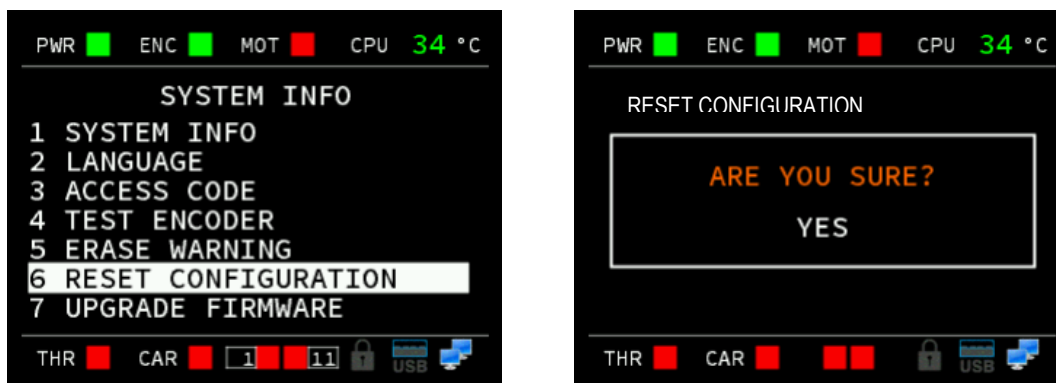
Check that the encoder is working correctly. By manually moving the bell you will see the numbers grow or decrease depending on whether the bell rises or falls. If you do not see the parameters check the links or replace the encoder.

6.5 – ERASE WARNINGS



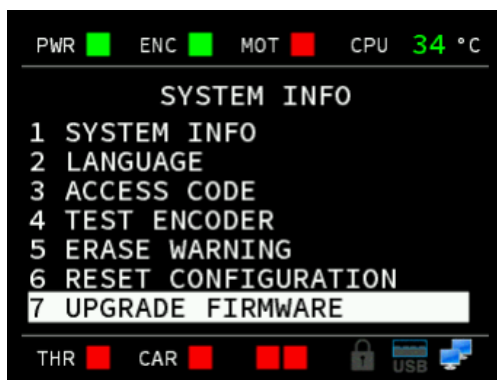
The BMC-9000 reports and keeps stored, with LEDs, any anomalies during the operating cycle. Using this menu, you can delete these reports and restore the normal operation of the LEDs.

6.6 – RESET CONFIGURATION



This feature allows the installer to erase from memory all previously stored parameters, thus restoring the default data entered by the manufacturer.

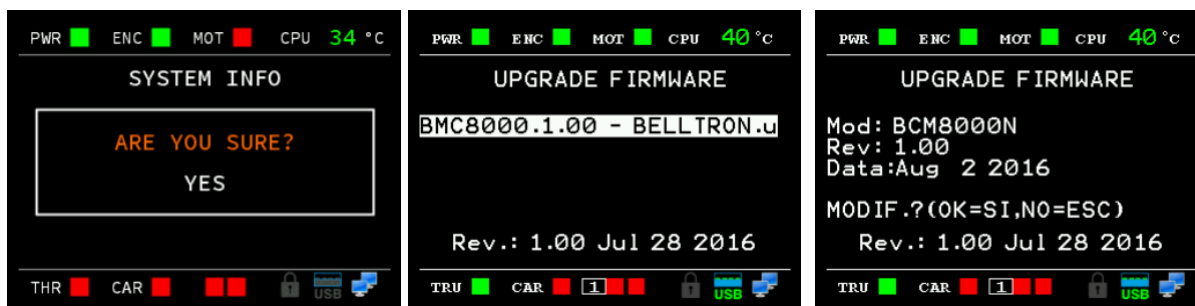
6.7 –FIRMWARE UPDATE



The firmware update makes the device better performing thanks to the possible addition of new features even at the user's request.

Procedure:

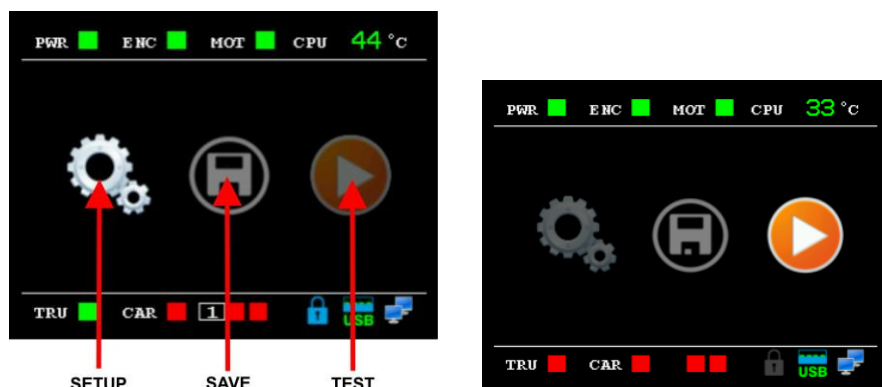
- Copy the update file to a USB memory.
- Place the memory in the USB input of the PRG–8000 (also with device ON).
- Enter the firmware update menu.



- Press OK on the highlighted file, press OK to start upgrade.

CONFIGURATION

OPERATIVE MODE

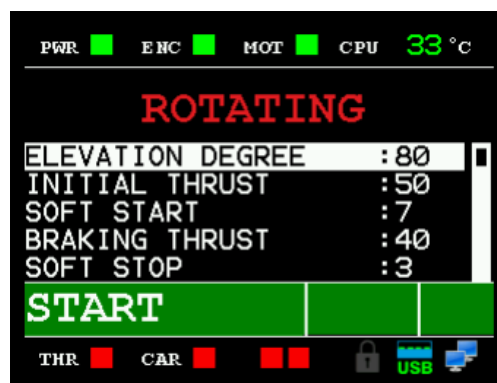


Select OPERATIVE TEST using the side arrow and confirm by pressing OK.

In this area it is possible to change real time (while the bell is moving) any previously set parameter until the requested setup is reached

Parameters that can be modified are:

- Elevation degree
- Initial thrust
- Soft start
- Braking thrust
- Soft stop
- Braking degree
- Balance

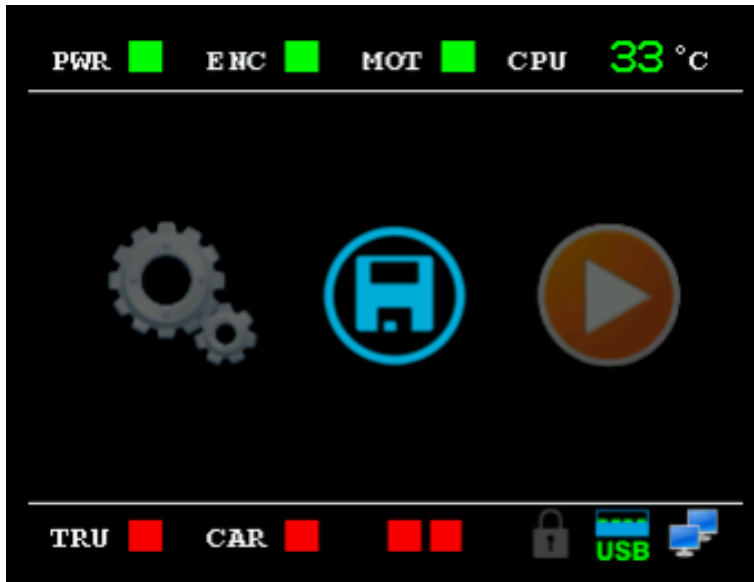


() If the bell starts very slowly it is necessary to increase the initial thrust, such a change will be immediately effective. Otherwise, if the bell starts very quickly it is necessary to decrease the initial thrust; in this case the time for stabilization will be longer. You can still stop the bell, change the initial thrust reducing it, then start the bell again.*

For a better understanding of the parameters, please refer to the respective paragraphs in the MOTOR PARAMETER section.

SAVE PARAMETERS

The bottom bar will display the changing of the bell parameters (Start, Elevation Degrees, Stability Reached, etc.).



Note: It is essential to save the setting after setup

Once the result is optimized, you must select the save icon and confirm with OK, the new parameters will replace those previously set at setup.

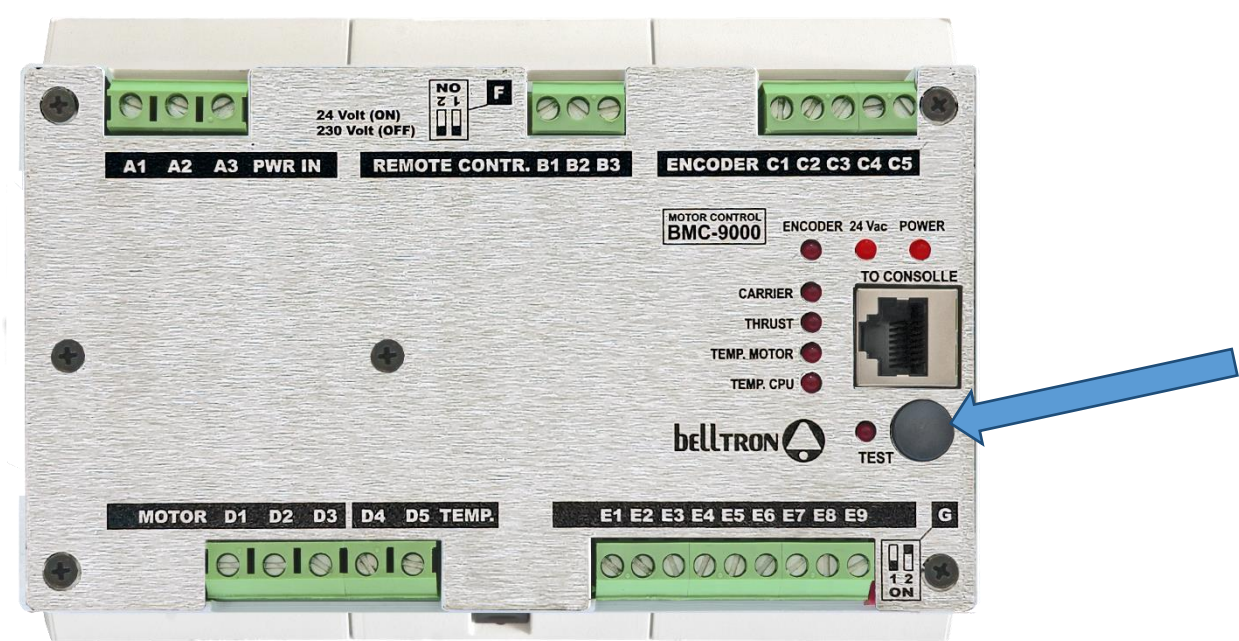
You can save and recover data using external USB memory.

BMC-9000

TEST

After you programmed the BMC-9000 module, perform a final check test:

- 1. Hold the **TEST** button for more than 3 sec., the LED (test) will flash.
- 2. Press again to start the bell **PEAL**.
- 3. Press to stop the bell.



Alternatively, manually operate the switch directly from the control panel.

ERROR REPORTING

In the case of malfunctioning, one of the LEDs will start blinking. In this way, the technician can quickly identify the reason for the anomaly by attributing it to the corresponding LED. The LED will continue to flash until the error signal is turned off via the "Clear Reports" menu (paragraph 4.5).

LED type	ON	OFF	Blinking
POWER	OK	NO POWER	----
24V.	OK	POWER FAILURE	POWER FAILURE
ENCORDER	----	OK	ENCORDER FAILURE*
CARRIER (With connection to GM)	OK	OK	Inverted cable
THRUST	----	It only turns on when the motor pushes	----
MOTOR TEMP.	----	OK	OVERHEATING or Undocked Protection
CPU TEMP.	----	OK	The CPU has reached 150 degrees

* A problem with the encoder does not necessarily indicate a rupture of the same, but more precisely that an anomaly has been found. The anomaly could result from an incorrect installation of the encoder, or a problem with the bell start.

BELL SYSTEM HOLTER

Thanks to Belltron know how, it is possible to record the activity of the bell on external USB memory by connecting, for the monitoring period only, a PRG-8000 console to the BMC-9000 control module.

Consequently, if the bell didn't function properly on a particular day of the month, you'll be able to check all the setups and analyze them step by step to understand and fix the bug that caused that particular problem.

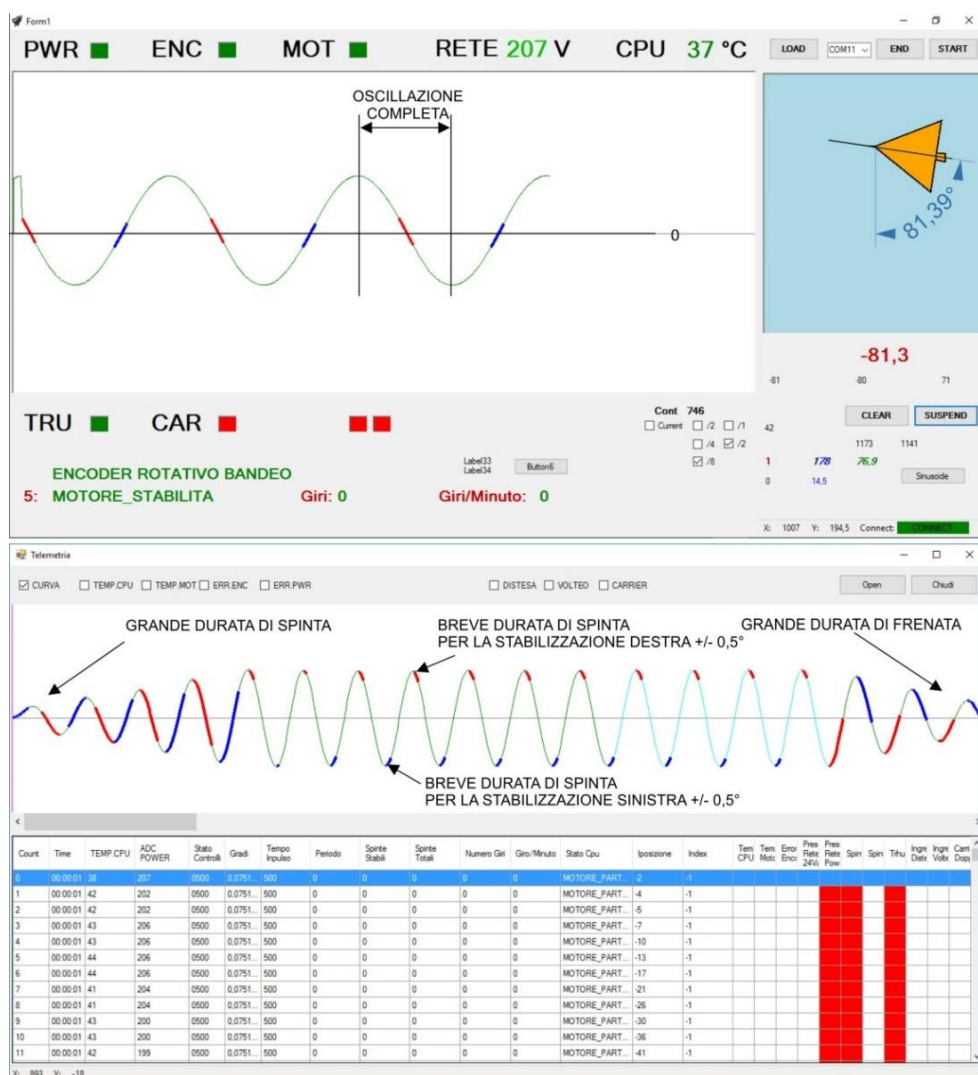
With the Bell System Holter program (one of a kind in its field and available for every Belltron installer) it is possible to graphically display on your PC the real evolution of the bell swinging.

In the same way you'll be able to display all the setups involved: temperature of the device, power supply and any eventual irregularity, elevation degree, initial thrust, soft start, braking thrust, soft stop, braking degree, balance, etc.

Furthermore, it will show the hardware status: if the encoder and the carrier are operative, if connections are correct, etc.

To sum up, it is possible to check any parameter of any melody played at any given time.

Following are some examples of setup parameter displayed and related graphic displays.



ROTATING - 380 V AC – SERIAL CONTROL

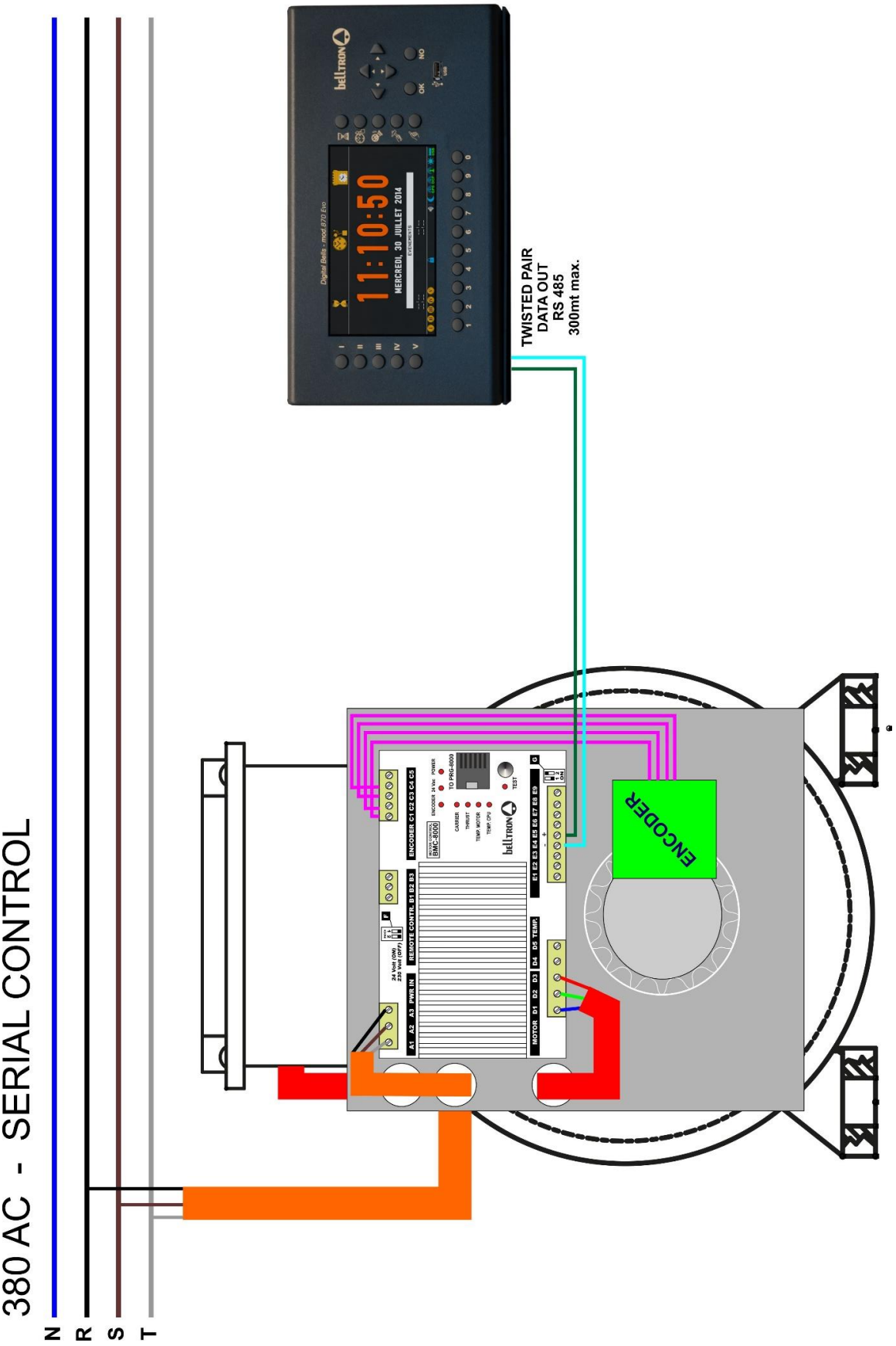


Fig. 1

ROTATING – 380 V AC – RL085 CONTROL (230V)

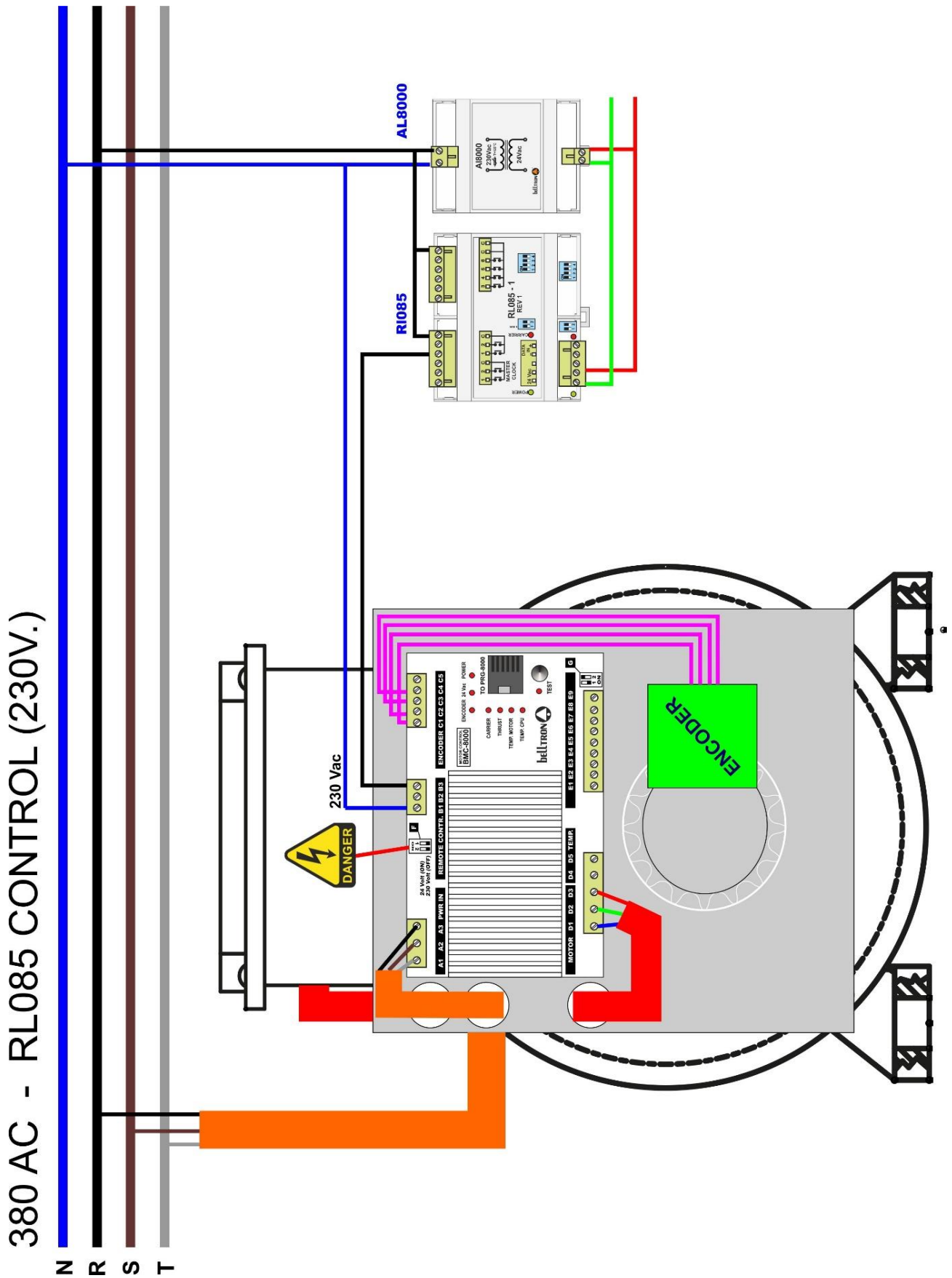


Fig. 2

ROTATING – 380 V AC – RL085 CONTROL (24V)

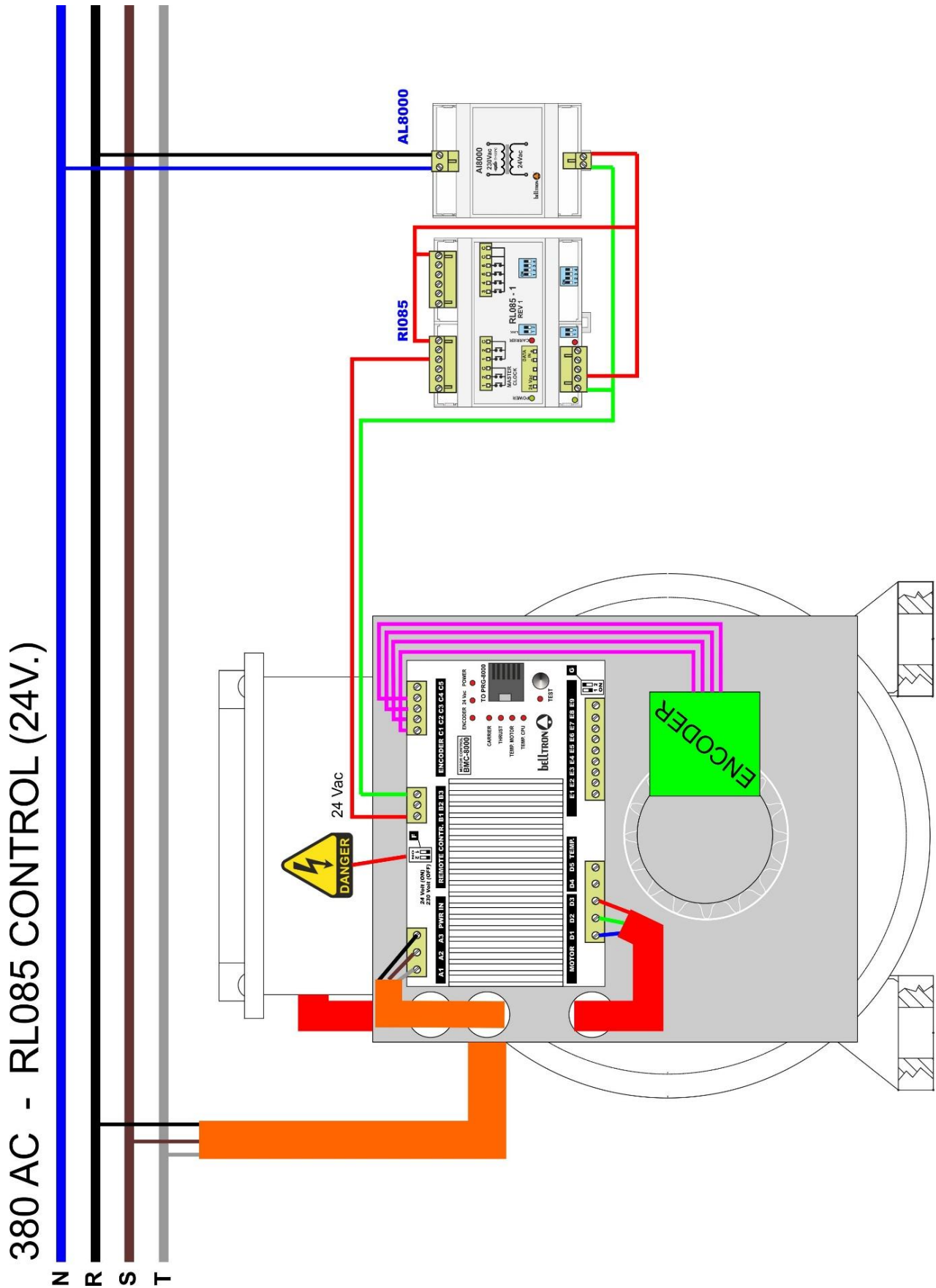


Fig.3

ROTATING – 230 V AC – SERIAL CONTROL

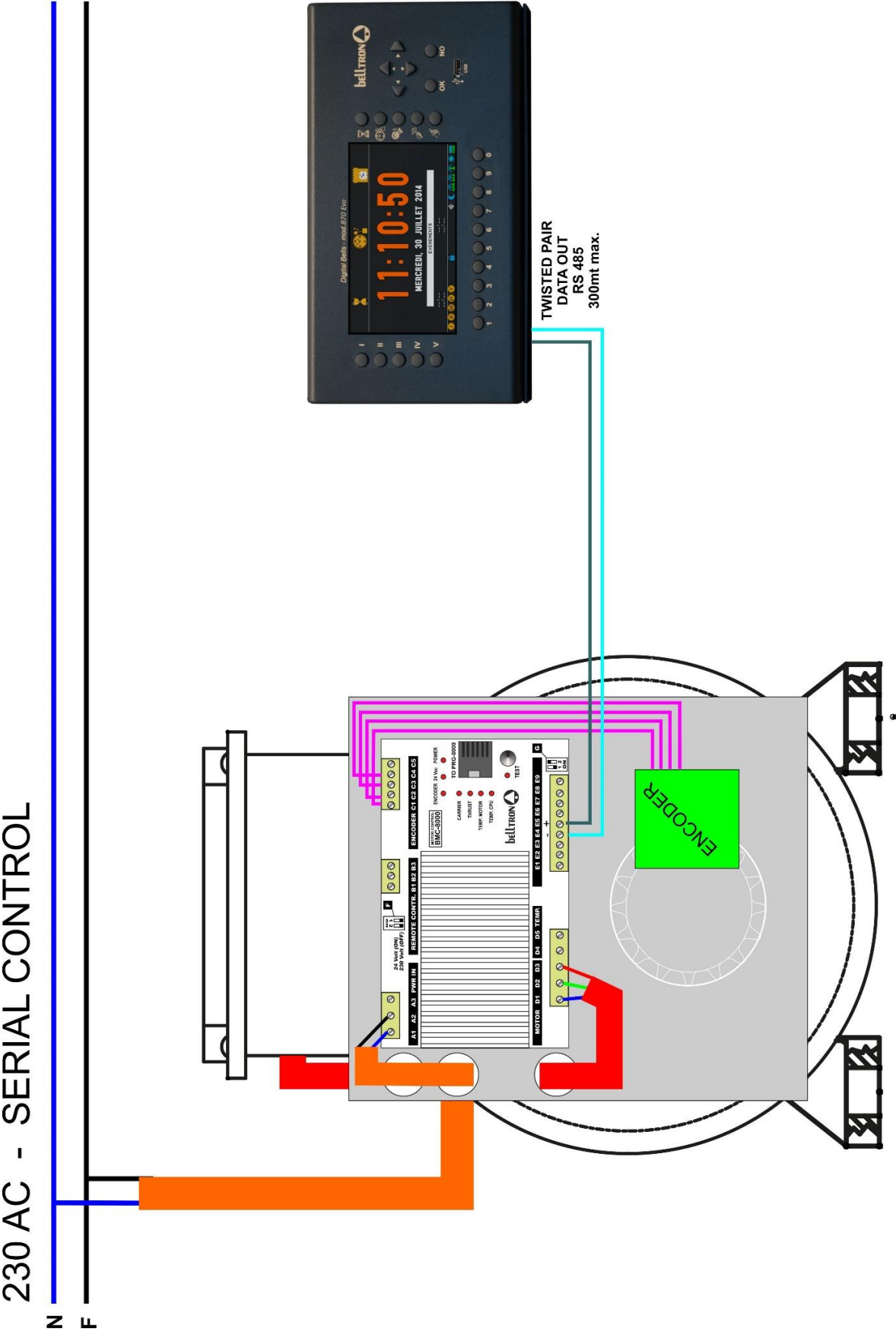


Fig.4

BMC-9000

ROTATING – 230 V AC – RL085 CONTROL (230V)

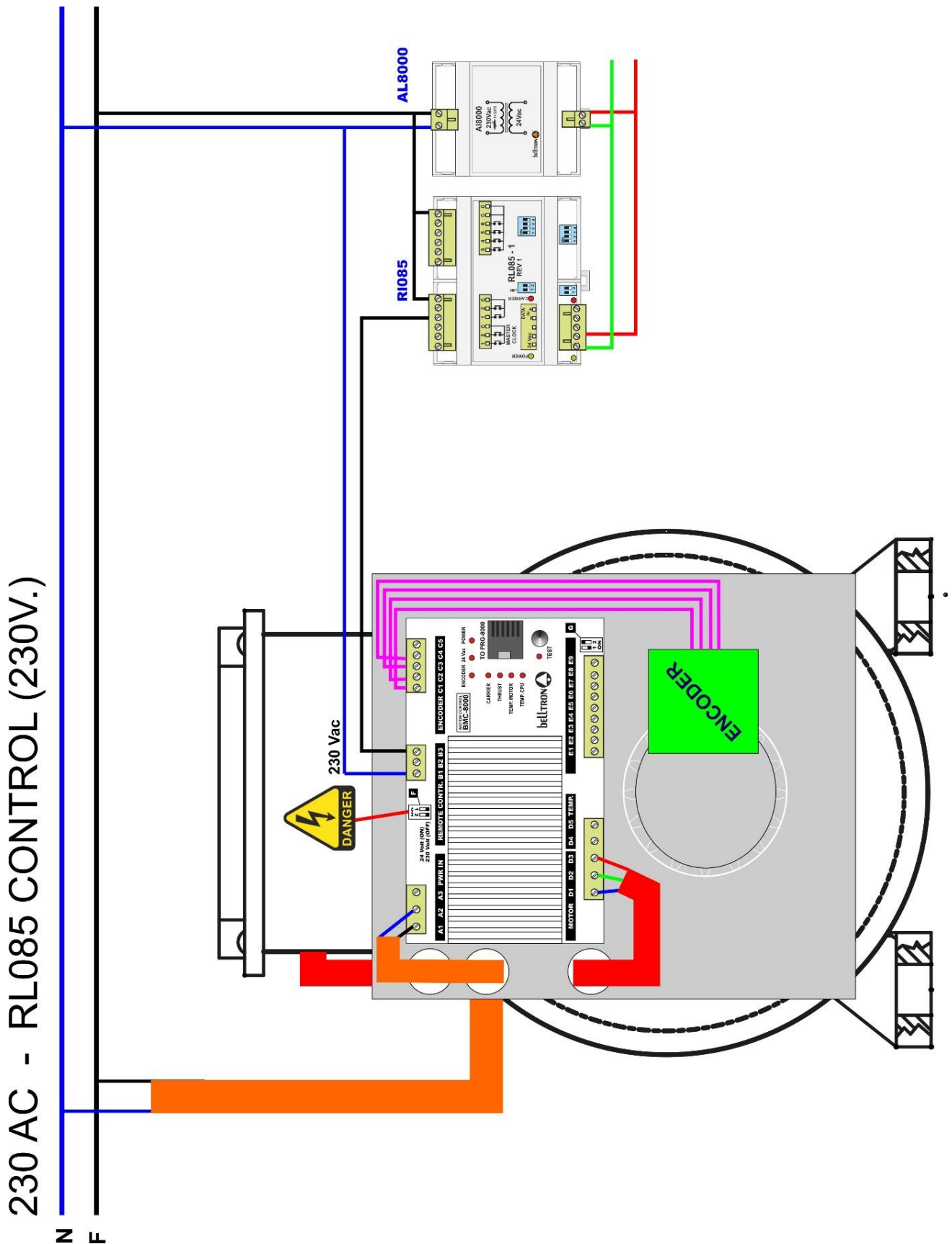


Fig.5

ROTATING – 230 V AC – RL085 CONTROL (24V)

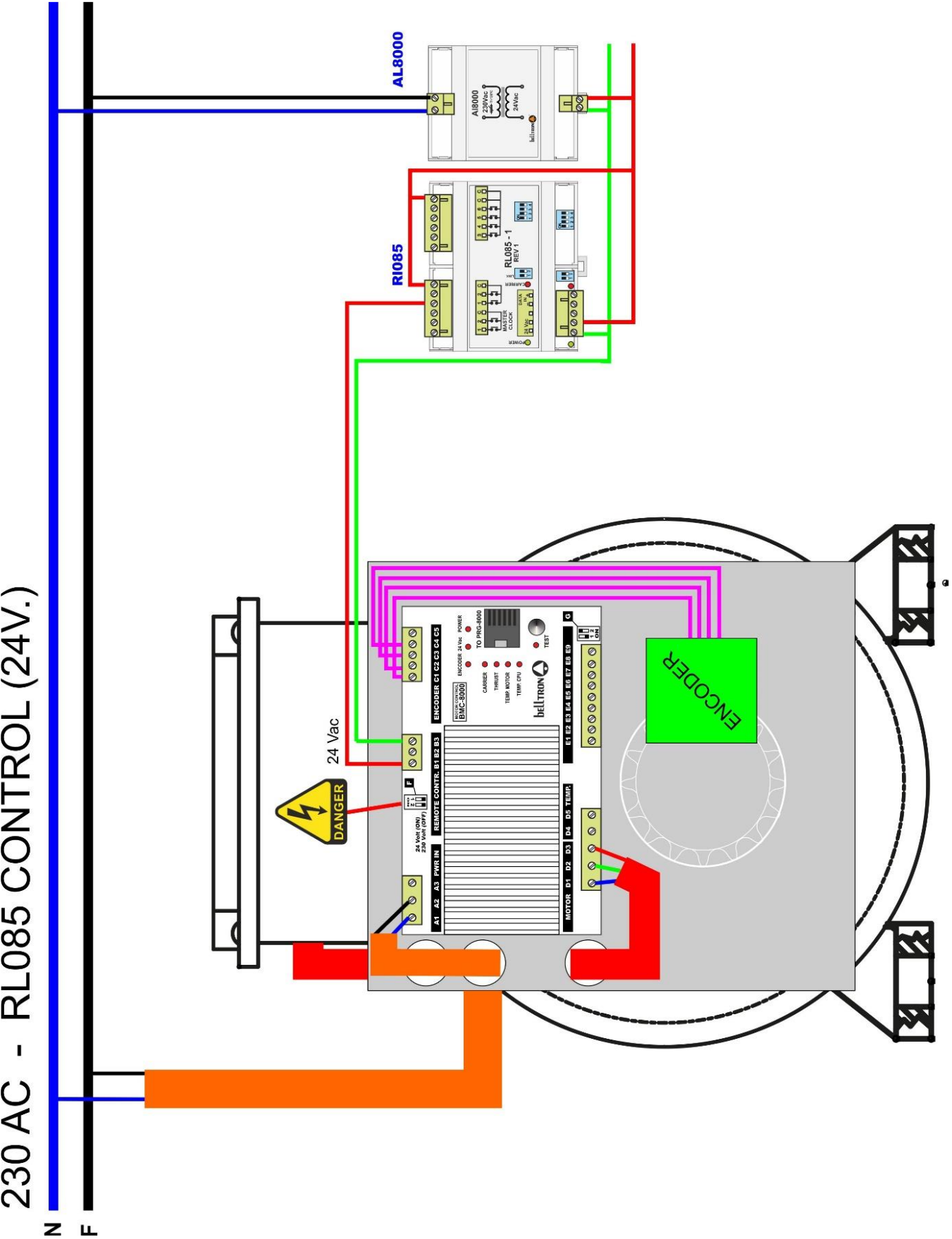




Fig. 6

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