

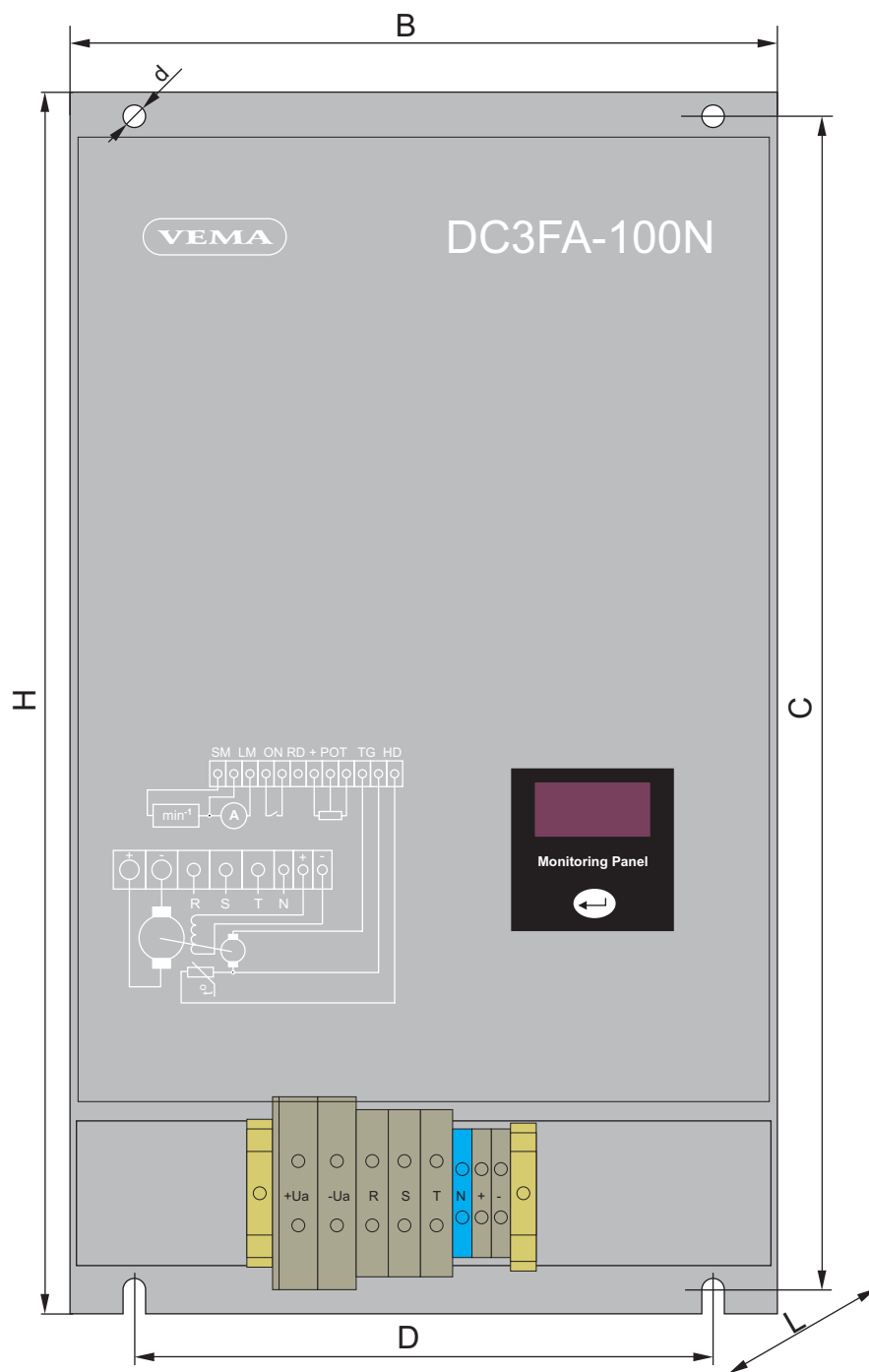


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THREE-PHASE NON-REVERSIBLE THYRISTOR CONVERTOR

DC3FA-XXN

USER'S MANUAL



Фиг.1

INTRODUCTION

The thyristor convertors of type DC3FA-XXN are designed to regulate the speed of DC motor. The drives represent a three-phase rectifier for the armature current and a monophaserectifier for the field current. The symbols XX in the drive specification denote the value of the maximal current of the convertor. The letters 'N' and 'R' stand for non-reversible (N) and reversible (R) type of the convertor.

The microprocessor unit controls the protection and alarm circuits of the convertor. The LED display can visualize the value of armature voltage, field current, armature current, motor's temperature and the tacho-generator's voltage, provided the motor is supplied with one.

This series of convertors can work either with tacho or on armature voltage feedback.

The sequence of the three phases is arbitrary. So is the polarity of the tacho-generator. This provides for good reliability of the convertors and reduces damages due to incorrect actions of the technical set-up personnel.

TECHNICAL SPECIFICATIONS

| | | | | | | | | | | | | |
|--------------------------|-------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|------|
| Nominal power Pn (kW) | to 5,5 | to 18 | to 37 | to 50 | to 60 | to 80 | to 100 | to 150 | to 180 | to 220 | to 320 | |
| Nominal armature current | 25A | 50A | 100A | 160A | 200A | 250A | 300A | 400A | 500A | 600A | 800A | |
| Nominal field current | 6A | 10A | 10A | 16A | 16A | 16A | 16A | 25A | 25A | 25A | 25A | |
| Nominal armature voltage | от 0 до 400V | | | | | | | | | | | |
| Supply voltage | 3 x 380 V | | | | | | | | | | | |
| Alarm status | FL OC PF TG OS OH | | | | | | | | | | | |
| Indication | Ua Ia If Utg | | | | | | | | | | | |
| Dimensions | H | 285 | 320 | 380 | 400 | 440 | 480 | 560 | 500 | 650 | 800 | 1600 |
| | B | 180 | 220 | 220 | 310 | 310 | 310 | 310 | 460 | 460 | 500 | 600 |
| | L | 160 | 180 | 180 | 200 | 200 | 200 | 200 | 320 | 380 | 420 | 600 |
| | D | 100 | 180 | 180 | 250 | 250 | 250 | 250 | 300 | 300 | 400 | - |
| | C | 270 | 305 | 365 | 380 | 420 | 460 | 530 | 470 | 620 | 760 | - |
| | d | 7 | 7 | 7 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | - |

FEATURES OF THE CONVERTOR

The convertor is connected to the power set by the means of a three-phase drossel, so the power set can be protected from the commutation currents of the convertor.

The system for automatic regulation is designed as a two-contour scheme with subordinated relation. The value of the armature current is obtained using rectification with two current transformers. The value of the field current is measured by the means of a third current transformer.

The electronic protection of the convertor is supplied by the microprocessor unit. The unit is watching the regulator parameters in order to avoid fault situations.

The mnemonics displayed by the microprocessor unit have the following meaning:

SP Speed

Normal working mode, the armature voltage is being displayed;

FC Field Current

Testing in normal working mode. On the first depressing of the button the value of the field current is displayed.

AC Armature Current

Testing in normal working mode. On the second depressing of the button the value of the armature current is displayed.

OH OverHeat

Testing in normal working mode. On the third depressing of the button the value of the motor temperature is displayed, provided it is equipped with Pt100 thermoresistor.

TG Tachometer Generator

Testing in normal working mode. On the fourth depressing of the button the value of the tachogenerator's voltage is displayed. This parameter is displayed only if the tacho presence jumper is closed.

OFF

The convertor is disabled. The ON contact is opened.

.O.C. Over Current

The armature over-current alarm has taken place. The convertor is disabled.

.O.H. OverHeat

The motor overheat alarm has taken place. The convertor is disabled.

.P.F. Power Fault

The power failure alarm has taken place due to failure in one of the phases. The convertor is disabled.

.F.L. Field Loss

The field loss alarm has taken place due to a corruption in the filed current. The convertor is disabled.

When any alarm takes place, the convertor is disabled. In order to start it again, the user must switch off the power supply and then reset the power supply.

INSTALLATION OF THE CONVERTOR

After the convertor has been unpacked, the user must inspect it to be assured that no damages are made on it during the transportation. The common damages are breakings, isolation corruptions and so on.

Upon the initial launch, the motor must be separated from the mechanisms.

Before the regulator is connected to the motor and the power set, the screws on the lower lid are to be taken off, so the pins can be approached.

The electrical switch on must be done according to Fig.1.

After the power supply is on, the user must check the direction of the motor fan. The display reads "SP" for about 1 second and then "0" for about two seconds, if the set value is zero. When the set value is greater than zero, the motor starts to move and the "SP" value represents the armature voltage.

It is recommended that the user measures the field current and if it differs from the one assigned on the motor passport, the user can tune it up using the FLD potentiometer on the main board. To do this, the upper lid must be taken off.

When the ON contact is not needed to command the convertor, it can be closed by a shortcut because the microprocessor unit controls all transitions during the powerup sequence.

If the motor is not equipped with a thermosensor, the OH contact must be closed to prevent the motor overheat alarm.

The SM output provides for measuring the motor speed by an external DC speedmeter. The LM output is used when measuring the armature current by the means of an external DC amperemeter (up to 60 mV).

The calibration of the external device is done by the LM potentiometer on the main board.

The revolutions feedback voltage in DC3FA convertors can be either the one from the tachometer, or the armature voltage itself. The jumper J1 is used to set the feedback source. The position 1-2 sets the feedback to the tachometer and the position 2-3 serves for feedback on the armature voltage.

Usually, the feedback on armature voltage is selected in case the motor is not equipped with tachometer.

When tachometer feedback is used, it is requested that maximal armature voltage is scaled by the potentiometer RP1. The potentiometer is denoted by TG. The scaling is to be performed when the motor is running. The operator must carefully increase the set value until the nominal armature voltage is reached. Then it can be tuned by the RP1 potentiometer so that when the maximal armature voltage corresponds to a maximal set value.

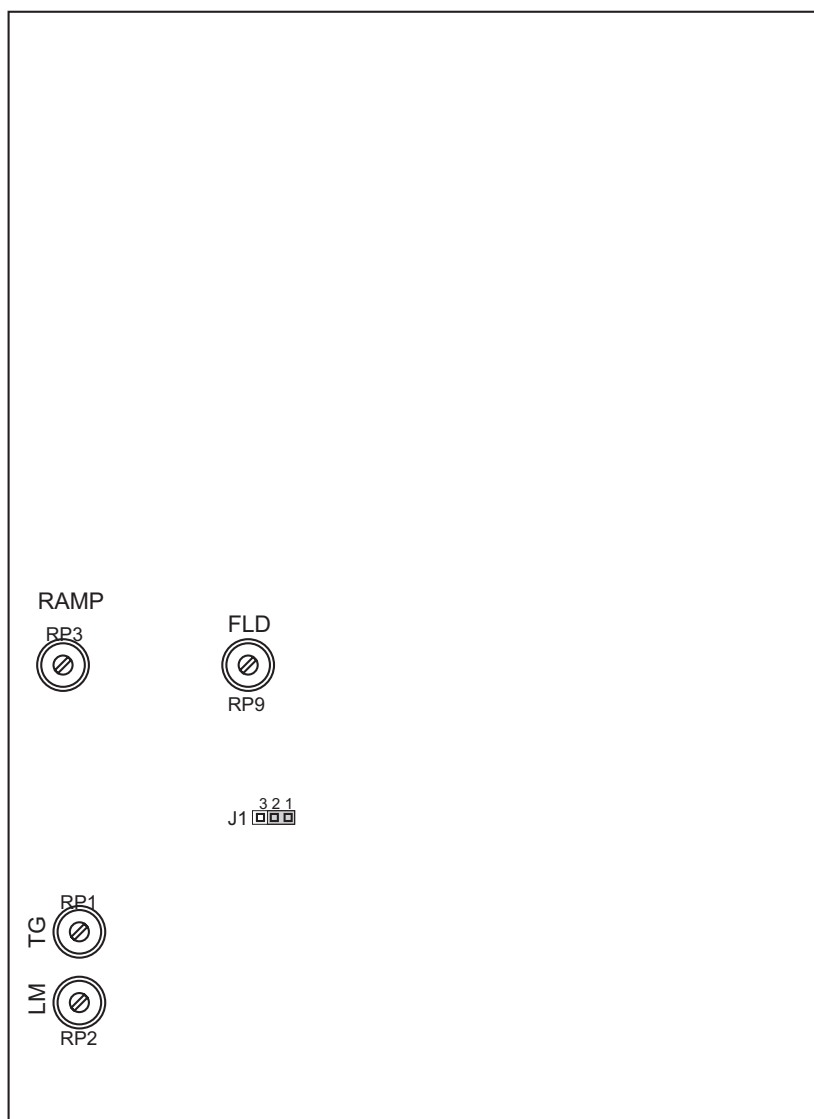


Fig.1

The electrical wiring of the DC convertor is displayed on Fig.2 and Fig.3. The connections on Fig.2 represent the standard wiring for a single convertor, and the one on Fig.3 can be used when multiple convertors are to be connected to a common source, for instance when a synchronous change in the speed of several machanisms is to be achieved. In such a case, it is recommended that a galvanically separation module is used

The thyristor regulators with galvanically separated input are shipped with inbuilt galvanical separator. The range of the separator is 0 to 10V input and output voltage.

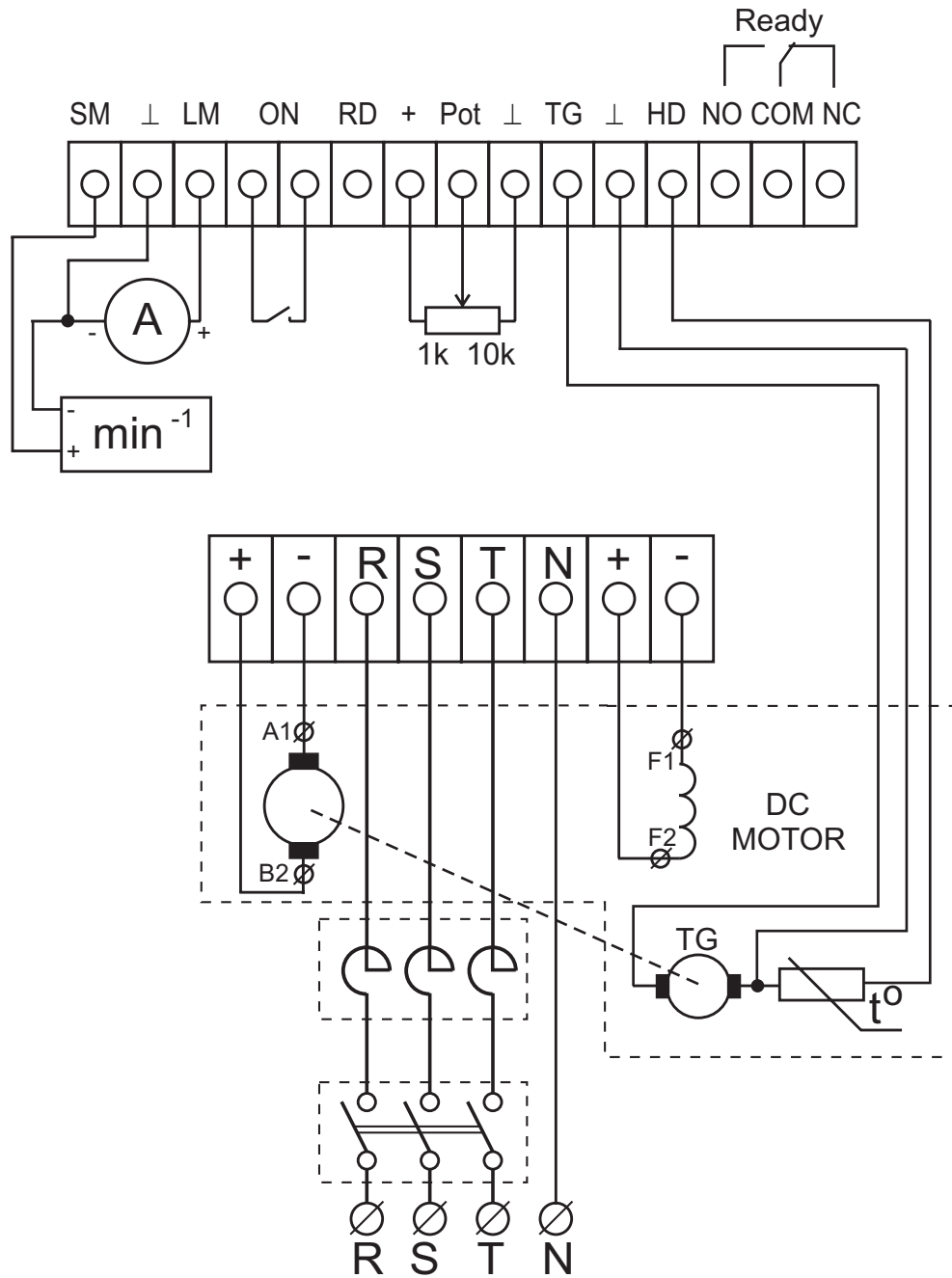


Fig.2

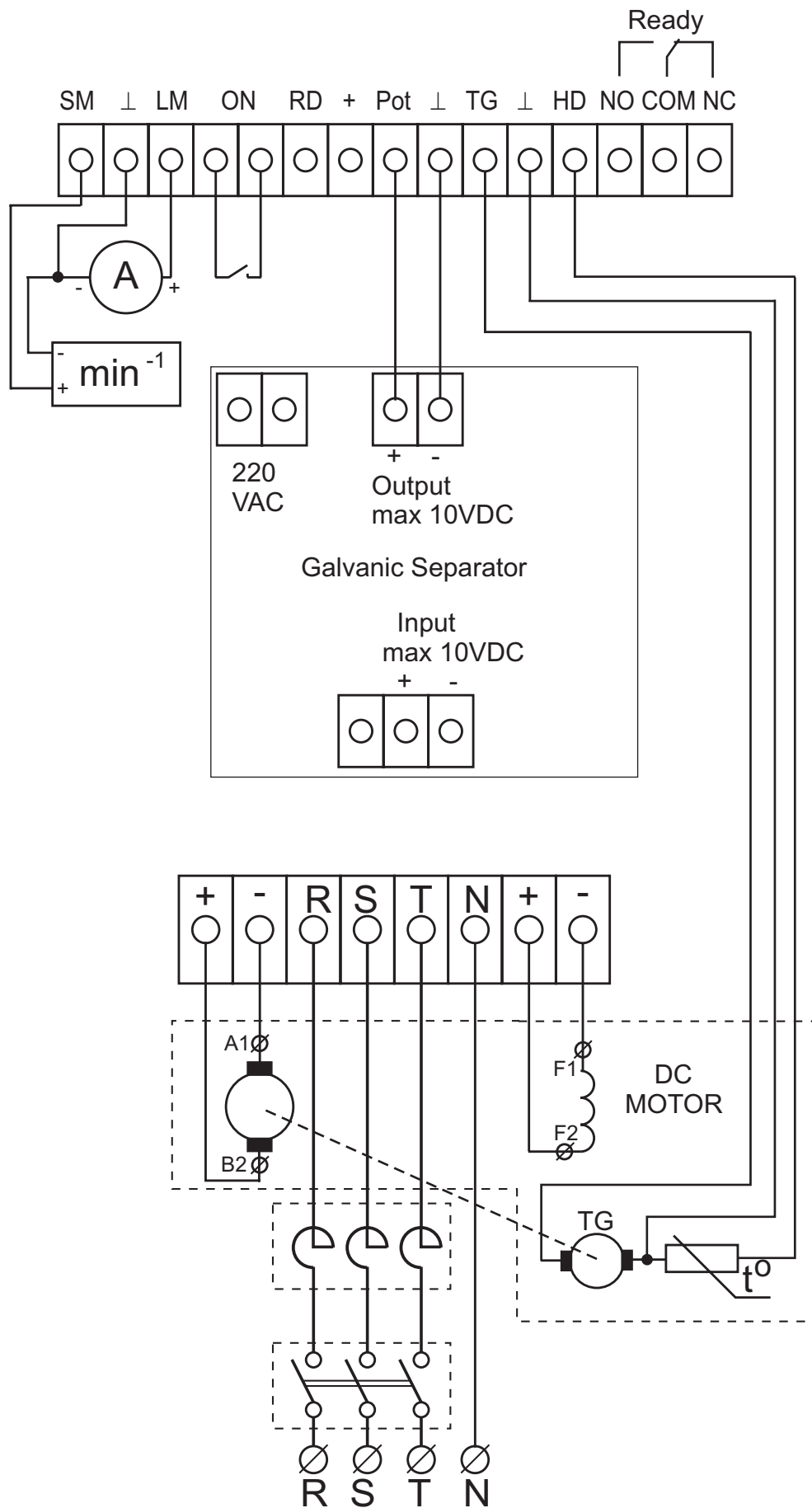


Fig.3

Special functions

There is a special function to lower the value of the armature current alarm (OC).

The thyristor converters are equipped with the standard current defense for their class. The class stands for the maximal allowed current for the converter. If the motor used requires a significantly less armature current, then the special OC-lower function can be used. Note, that only lowering of the OC value is possible.

To activate this special function the "ON" inputs of the converter should be open.

The display should read "oFF".

Depress the button until the OC value is displayed.

Now single short press of the button will lower this value down to the desired new value.

After the desired value is reached, depress and hold the button until the display reads 'oFF'.

The new OC value is saved and the "ON" inputs can be closed.

The DC converter will work with the new OC limit value.