TRRE, TRRD FAN OUTPUT CONTROLLERS

APPLICATION OF TRRE AND TRRD CONTROLLERS

TRRE (single-phase) and TRRD (three-phase) transformer controllers are intended for the switching and five--stage speed control of voltage controllable fans (e.g. RP, RQ, RO and RF fans, including their modifications).

DESIGN OF CONTROLLERS

TRRE(D) controllers are equipped with an integrated control and power systems. Unlike TRN controllers, these cheaper controllers are not equipped with thermal protection of the fans. For transparent comparison of controller types, refer to table # 6.

INTEGRATED BASIC FEATURES

As standard, TRRE and TRRD controllers provide the following properties and features:

Start-up

Starting /stopping the fan using the rotary selector situated on the front panel.

Fan Output Control

Five-stage fan output (speed) control by changing the input voltage, which corresponds with the position of the selector on the front panel.

Blocking of Output Stages

These controllers enable mechanical blocking of output stages 0–3 by simple adjustment of the rotary switch coulisse, refer to the following page. The blocking serves for the minimum air flow rate setting, i.e. to limit low outputs (e.g. air-handling systems equipped with an electric heater).

Operation, Output and Failure Signalling

Controllers signal current state of operation:

- Operation mode (the green indicator lights up)
- Stop mode (selector in the "0" position, the indicator does not light)
- Active output stage (selector's positions 1-5)
- Failure (selector's positions 1-5, the indicator does not light)

OPERATING CONDITIONS, POSITION

These controllers are intended for indoor applications in a dry, dust and chemical free environment. They are designed for normal environmental conditions in accordance with ČSN 33 2000-1 ed.2 (IEC 60364-1).

- Degree of protection: IP 20
- Permissible ambient temperature: +5 °C to +40 °C
- Position: always vertical or horizontal.

The controllers can be situated on a wall, air-handling duct or ancillary construction; however, always only in the vertical or horizontal position. The installation must be performed considering the weight of the controller. They can be mounted on A and B combustibility grade materials in accordance with the ČSN EN 13 501-1 standard. The controller casing is provided with ventilation openings which must not be covered. Permanent and easy access to the controller must be ensured.

MATERIALS

External casings of all controller types are made of steel sheet finished with RAL 9002 sprayed powder coating. Plastics, copper, aluminium, transformer steel and galvanized sheets are used in the internal controller's structure. Switching and protection elements (switches, fuses, indicators, etc.) are used in both, power and control wiring.

DIMENSIONAL AND OUTPUT RANGE

Totally seven types of TRRE (D) five-stage controllers are manufactured in accordance with table #7 and figure # 29.

TABLE 7 – OUTPUT RANGE

Three-phase (3× 400 V)	Single-phase (1× 230 V)	Max. current (A)
TRRD 2D	TRRE 2	2
TRRD 4D	TRRE 4	4
TRRD 7D	TRRE 7	7
TRRD 9D	–	9

DESIGNATION OF CONTROLLERS

Example: Designation TRRE 4 specifies a single-phase fan controller designed for maximum current of 4 Amp.

FIGURE 29 – TRRE(D) CONTROLLER

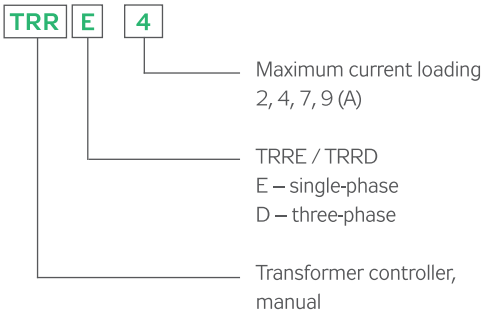

FIGURE 30 – CONTROLLER DESCRIPTION

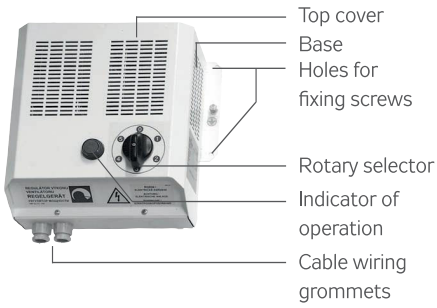

FIGURE 31 – TRRE(D) CONTROLLER TYPES

Controllers - top cover closed

Controllers - top cover open

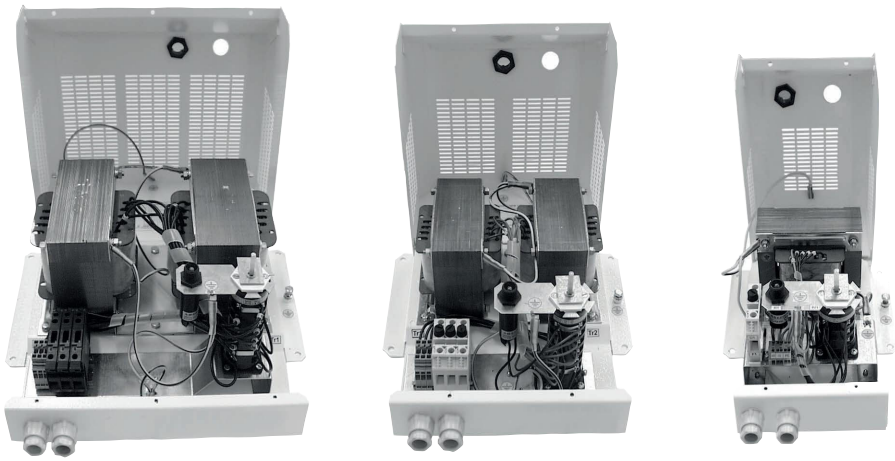

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FIGURE 32 – CONTROLLER DIMENSIONS

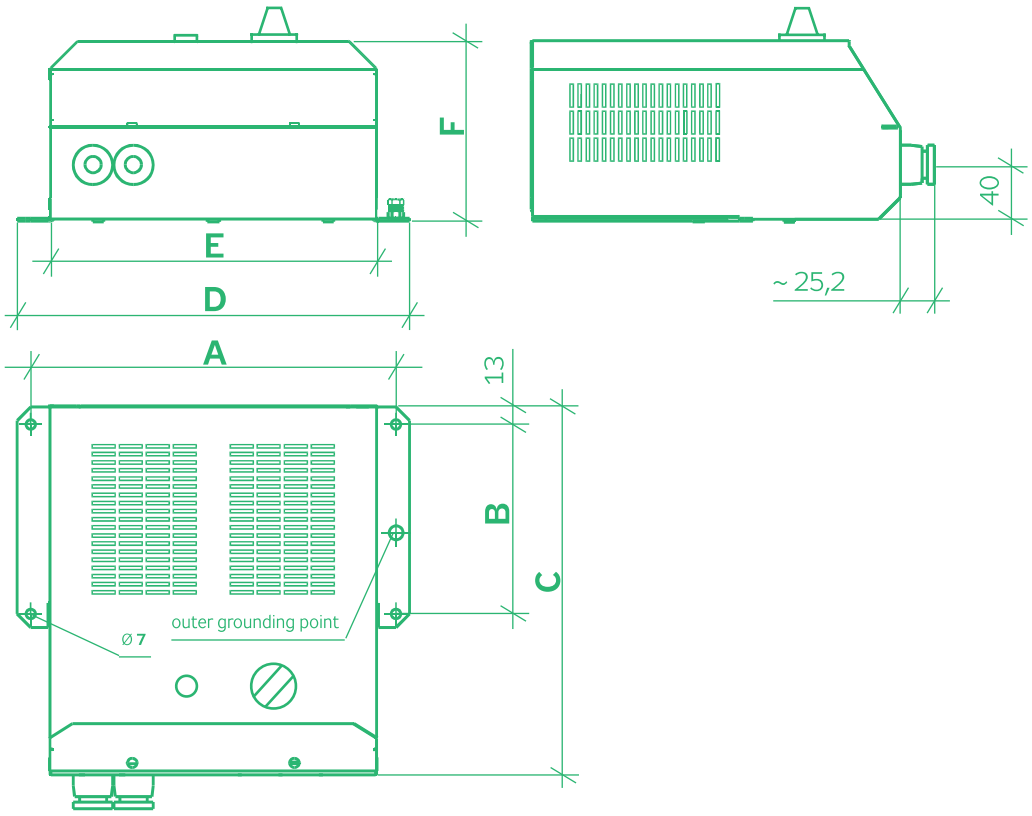


TABLE 8 – DIMENSIONS AND WEIGHTS

Controller Type	Dimensions in mm						m
	A	B	C	D	E	F	kg
TRRE 2	185	120	253	205	157	134	5
TRRE 4	185	120	253	205	157	134	7
TRRE 7	185	120	253	205	157	134	8
TRRD 2	270	140	273	290	242	134	10
TRRD 4	270	140	273	290	242	134	14
TRRD 7	340	170	303	360	312	157	26
TRRD 9	340	170	303	360	312	157	32

INSTALLATION

TRRE and TRRD controllers are not intended, due to their concept, for direct sale to end customers. Each installation must be performed in accordance with a professional project created by a qualified air-handling designer who is responsible for proper selection of the controller.

- The installation and commissioning can be performed only by an authorized company licensed in accordance with valid regulations.
- The controller can be mounted in a vertical or horizontal position and mounted on a wall or on auxiliary construction.
- he controller must be placed within reach of the operator. The installation must be performed considering the weight of the controller, easy wiring, free cooling openings and its degree of electrical protection.
- he controllers enable mechanical blocking of output stages 0-3. The blocking serves for the minimum air flow setting, i.e. to limit low outputs or to block the "0" stage if the control unit is used. The controller's blocking can be simply carried out by bending the corresponding lamella on the rotary switch coulisse. For more information about blocking refer to the installation instructions.

WIRING

- The wiring can be performed only by a qualified worker licensed in accordance with national regulations.
- Cables for the power supply, fan motors connection and control are led through plastic grommets and connected to the WAGO terminals in the lower part of the controller casing. The controller's entry is provided with plastic grommets.
- The TRRE and TRRD controllers are not equipped with an integrated fan motor protection. Therefore, external protection devices must be used (STE, STD relays or control unit).
- Each fan should be connected to a separate controller. If this recommendation cannot be fulfilled, max. two fans can be connected to one controller, and enough current margins must be kept; i.e. the minimum rating current of the controller must be 20% higher than the sum of the maximum currents of connected fans.

Example: The maximum sum of currents of two RP 60-35/31-6D fans is 2 x 1.86Amp = 3.72Amp. Adding 20% of safety margin, it makes the total controller's current of 4.46 Amp. Then, the closet bigger controller's size is TRRD 7.

- Each installation of the controller must be performed on a basis of the project and in accordance with the controller's documentation, respectively documentation other connected equipment.
- The wiring must be checked before putting the device into operation.
- Prior to commissioning, it is necessary to carry out all inspection and adjustment operations.

FIGURE 33 – MECHANICAL BLOCKING

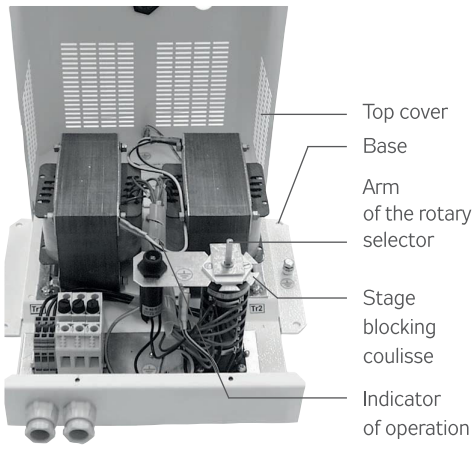
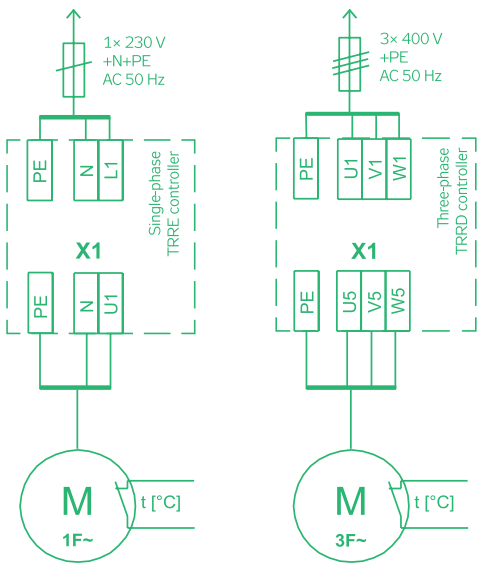


FIGURE 34 – TRRE(D) WIRING SCHEME



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On following page you find illustrations of installations and wiring of TRRE and TRRD controllers.

- → **A –** Installation including STE(D) protecting relay
  One TRRE controller with STE protecting relay
- → One TRRD controller with STD protecting relay
- → **B –** Installation including the control unit
  Control unit (VCX) with two TRRE and TRRD controllers

Non-standard assembly connections must be consulted with the manufacturer in writing. The controller's wiring in accordance with the manufacturer's prescription or approval is essential for validity of the guarantee.

EXAMPLES, TRRE(D) CONTROLLERS

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EXAMPLE A

FAN WITH THERMAL PROTECTION, WITHOUT CONTROL

An assembly of TRRE and TRRD controllers with a fan and STE and STD protecting relays in a single venting system is shown in figure # 35
(a = single-phase, b = three-phase).
This connection ensures::

- Manual selection of the fan output within the stage range "1" to "5".
- Thermal protection of the fan by STE(D) relay
- Manual switching on/off of the fan

The controller and protecting relay must be placed within the operator's reach. To ensure control exactness in this application, it is advisable to block the "0" position. In this case, the air-handling assembly will be started from STE(D) protecting relay. The blocking is not essential; however, without the blocking it will be possible to switch the fans off from both, protecting relay and controller.

After turning the selector to position 1-5, the fan will start at the corresponding output. An indicator on the front panel will light up indicating the fan's operation.
If the fan is overloaded, the thermo-contact circuit will be disconnected due to overheating of the motor winding, and STE(D) protecting relay disconnect the power supply to TRRE(D) controller. The air-handling assembly can be restarted after removing the failure cause and unblocking the STE(D) protecting relay.

EXAMPLE B

FAN WITH CONTROL UNIT AND PROTECTION BY TRRE (TRRD) CONTROLLER

An assembly of the control unit with TRRE and TRRD controllers is shown in figure # 36.
This connection ensures:

- Manual selection of the fan output within the stage range "1" to "5".
- Thermal protection of the motor (TK thermo-contact terminals are connected to 5a, 5a, 5b, 5b terminals in the control unit).
- Manual or programmable switching on/off of the entire device using the control unit.

Position "0" on the controller must be blocked in the assembly with a control unit The controller must be placed within the operator's reach.

The required fan output can be set by switching the selector's positions "1" to "5". After starting the air-handling assembly from the control unit, an indicator on the TRRE(D) controller's front panel will light up indicating the fan's operation. All protection and safety functions of the fans as well as the entire system are ensured by the control unit.

FIGURE 35 – CONTROLLER CONNECTION

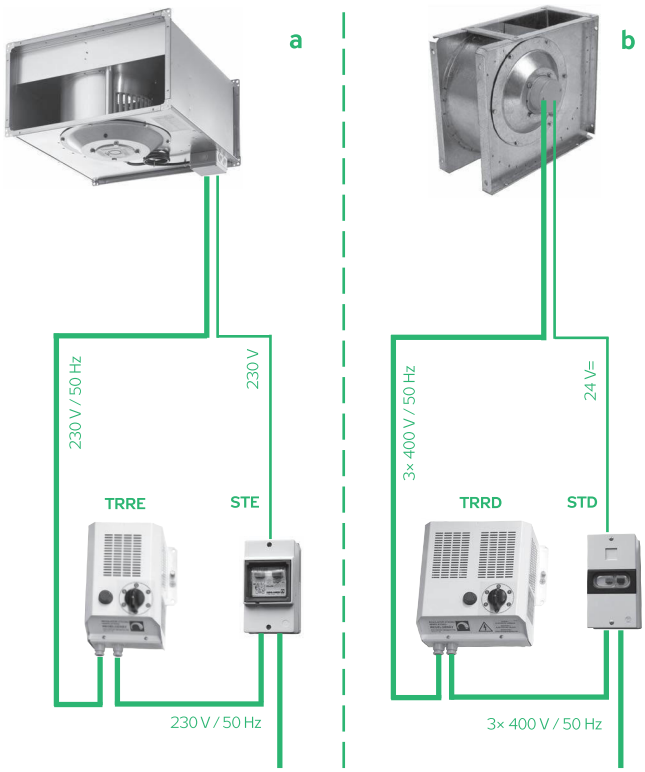

FIGURE 36 – CONTROLLER CONNECTION