

# Industrial Electrical Controls



## TEMPERATURE CONTROLLERS



# TEMPERATURE CONTROLLERS & ACCESSORIES








Full selection of Temperature Controllers and Accessories designed for dry applications such as transformers, motors and other industrial equipment.

[springercontrols.com](http://springercontrols.com)








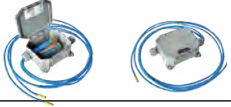




# TEMPERATURE CONTROLLERS

Since 1993, **Springer Controls** Company has been partnered with **Tecsistem of Italy** to provide temperature control devices and solutions to the US marketplace. **Springer Controls** has a variety of electronic temperature controllers specifically designed for dry applications like transformers, motors, generators, drives and other industrial equipment. Selection is typically made by the number of temperature inputs required and the type of output required.

## QUICK REFERENCE INDEX

Series	# Inputs	Temperature Controller - Description Summary	Page #
<b>T154</b> 	4 Pt100 inputs	The T154 has 4 RTD inputs to monitor temperature at 4 different locations with channels 1,2, and 3 using the same alarm threshold, and channel 4 independent. An economical option for monitoring temperature in dry transformers. Outputs are: 2 alarm relay (ALARM & TRIP), 1 relay for fan control and 1 fault relay for signaling sensor faults or other self-diagnostic faults. UL approved.	4
<b>NT935</b> 	4 Pt100 inputs	The NT935 has 4 RTD inputs to monitor temperature at 4 different locations. It is most commonly used for monitoring temperature with motors or dry/resin cast transformers. All NT935 units come with 2 alarm output relays, 2 fan control relays and 1 fault relay for signaling sensor faults or other self-diagnostic faults. The NT935 can also be configured with Ethernet or RS232/485 & 4-20mA outputs. UL approved.	6
<b>NT538</b> 	8 Pt100 inputs	The NT538 has 8 RTD inputs to monitor temperature at 8 different locations. It is most commonly used for monitoring temperature with motors or variable frequency drives. All NT538 units come with 2 alarm output relays, 2 fan control relays and 1 fault relay for signaling sensor faults or other self-diagnostic faults. The NT538 can also be configured with Ethernet or RS232/485 & 4-20mA outputs. UL approved.	10
<b>T1048</b> 	4 Pt100 or 4 TcK inputs	The T1048 has 4 configurable inputs for monitoring temperature in 4 different locations. By changing input cards the T1048 can be configured to accept inputs from either an RTD or a thermocouple. The T1048 comes with 2 alarm output relays and 1 fault relay for signaling sensor faults or other self-diagnostic faults. The T1048 can be fitted with Ethernet or RS232/485 outputs. UL approved.	12
<b>NT539</b> 	3-6-9 Pt100 inputs	The NT539 is designed specifically for transformers with more than 3 windings. Featuring 3, 6 or 9 RTD inputs and 3 trip, alarm and fan output relays and an additional fault relay for signaling sensor faults or other self-diagnostic faults.	14
<b>NT511</b> 	4 Pt100 inputs	The NT511 AD temperature controller is a combination unit designed to control the temperature of a medium voltage dry transformer and control the power of the fan cooling system. It is intended for use with tangential fans, with 6 output relays rated for 1.5A at 230 VAC to provide power directly to the fans. Every fan circuit is protected by a fuse and in case of failure will provide a fault signal to alert an operator.	16
<b>T119</b> 	3 PTC inputs	The T119 is an economical choice for simple protection of medium voltage dry transformers. It has 3 inputs suitable for use with our PTC or PTFE temperature sensors. It has 2 alarm output relays and 1 alarm relay for fan control with an adjustable time delay OFF function Panel or Din-rail Mount.	18

## QUICK REFERENCE INDEX

Series	#Inputs	Temperature Controller - Description Summary	Page #
<b>T30</b> 	2 PTC inputs	The T30 is an economical choice for simple protection of low and medium voltage dry transformers. The T30 comes with 2 inputs (ALARM & TRIP) suitable for use with our PTC or PTFE temperature sensors and has 2 alarm output relays (ALARM/ALL and TRIP)	20
<b>T412</b> 	1 PT100 inputs	The T412 is a great choice when a single hot spot needs to be monitored. It has 1 input that can be used with a RTD like out PT100. It has two alarm relays for different temperature thresholds and one fault relay for signaling sensor gaults or other self-diagnostic faults.	22
<b>T512</b> 	12 Pt100 inputs	The “intelligent multi-channel” T512 is commonly used to control motor temperature, but can be used anywhere you need to monitor up to 12 independent channels, and 3 alarm thresholds for each channel. With 5 output relays and a Modbus RS485 RTU output the T512 can handle the most comprehensive temperature control requirements.	24
<b>MM453</b> 	1-24 configurable inputs	The MM453 temperature controller is designed for measuring the temperature of diesel generators and biogas as well as monitoring gearings, exhaust gas, lubrication oil and coolant. It is highly configurable with up to 24 temperature inputs using any of our RTD PT100, PT1000 or TCK thermocouple. 5 standard output relays with the option to add a 4-20mA analog and/or a RS485 output give you the felxibility you need to monitor temperature across your operation.	26
Temperature Controller Accessories		Accessory - Description Summary	Page #
 <b>Ethernet Converter</b>		The NT-CONV-ETH allows an existing Springer Controls / Tecsystem unit, set up with Modbus RTU RS485 output, to function directly to an Ethernet network.	28
<b>Ethernet Software Manager</b> 		The ETH-MANAGER software combined with an ETH Springer Controls / Tecsystem device allows you to monitor, set and analyze the thermal operation of the electrical machine you want to protect.	29
<b>RTD's (Resistance Temperature Detector) and Thermocouplers</b> 		Full selection of RTD's and thermocouplers available based on your specification.	30
<b>Sensor Junction Box series</b> 		The SCS-R junction box series is designed for quick, safe and economic connection of sensors to the temperature controller.	34
Fan Cooling Systems		Fan Cooling - Description Summary	Page 35
<b>VRT series</b> 		Springer Controls / Tecsystem offers the VRT series of controllers to control the room ventilation fan, which works in conjunction with their product line of temperature controllers.	36
<b>TTG FAN series</b> 		THE TTG series fans are the smallest in our range of ventilation fans. Air flow from 122ft <sup>3</sup> /min to 165ft <sup>3</sup> /min (208m <sup>3</sup> /hr to 280m <sup>3</sup> ). Power requirements from 43 - 51 Watts.	38
<b>TG FAN series</b> 		The TG series fans are the next step up from the TTG series. Air flow from 271ft <sup>3</sup> /min to 1377ft <sup>3</sup> /min (460m <sup>3</sup> /hr -2340m <sup>3</sup> /hr). Power requirements from 75 - 225 Watts.	39
<b>BAR FAN series</b> 		The BAR/BARRA series fans are sold in banks fo 3 fans to provide even higher air flow. Airfrol from 353ft <sup>3</sup> /min to 1765ft <sup>3</sup> /min (600m <sup>3</sup> /hr to 3,000m <sup>3</sup> /hr.	40

# T154 series

## Temperature Control of Medium Voltage (MV) Dry Type/Cast Resin Transformers




### VERSIONS

- **T154** (Tecsystem Code → **1CN0157**)
- **T154-V** with Voting function  
(Tecsystem Code → **1CN0182** - Non UL)

The **T154** is an electronic microprocessor based unit for the temperature control of MV dry type and cast resin transformers as well as motors. Developed with layout and advantages of the New technology Platform (dual display, new micro controller with increased operational capacity and data management), the unit ensures high levels of protection to electromagnetic interferences and ease of use which have made it the standard for this application. The **T154** maintains the standard 4 Pt100 inputs (3 phase transformer and a fourth option for the core or the ambient temperature), and 4 dry contact relay outputs (ALARM and TRIP, FAULT signal operation and start ventilation system (FAN)).

Optional sensor inputs (Ni100 / Ni120 / CU10 / PT1000 / IR etc.) are available.

The unit is  certified for the American and Canadian market, as well as for marine applications.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## T154 SERIES TECHNICAL DATA

### Power Supply

- Rated values 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- 4 inputs RTD Pt100 3 wires (max section 0.06 in<sup>2</sup> / 1.5 mm<sup>2</sup>)
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length cable compensation up to 546' (500 m) 0.04 in<sup>2</sup> (1 mm<sup>2</sup>)

### Outputs

- 2 alarm relays (ALARM-TRIP)
- 1 alarm relay for fan control (FAN1)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contact capacity: 10A-250 Vac-res cosΦ=1

### Dimensions

- 3.9" x 3.9" (100 x 100mm) DIN 43700 depth 5.15" (131 mm) (terminals included)
- Panel cut-out 3.6" x 3.6" (92 x 92mm)

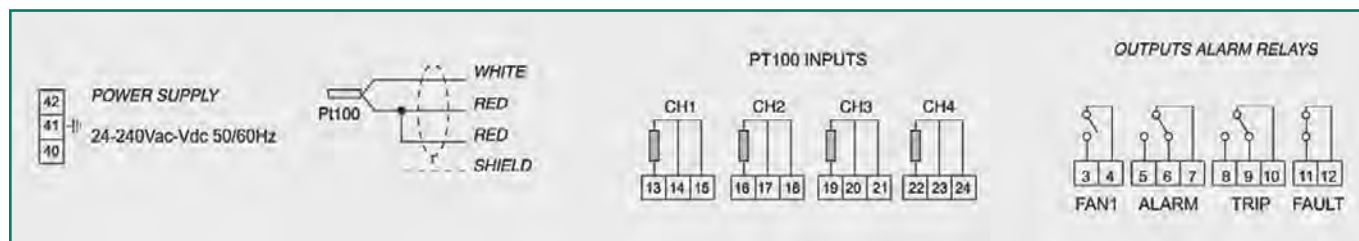
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy: ± 1% full scale value ± 1 digit
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- Self-extinguishing housing NORYL UL94V0
- Frontal in polycarbonate IP65
- Burden: 7.5VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 2 displays 0.5" (13 mm) with 3 digits for displaying temperatures, messages and channels
- 3 leds to display the state of the alarms of the selected channel
- 1 led to display the state of FAN
- Temperature monitoring range: reading from 32 °F to 464 °F (0 °C to 240 °C)
- 2 ALARM thresholds for channel 1-2-3
- 2 ALARM thresholds for channel 4
- 1 TRIP thresholds for each channel
- 1 ON-OFF thresholds for FAN1
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after one (1) minute's inactivity
- Incorrect programming warning
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage
- Frontal alarm reset push button

## ELECTRICAL CONNECTIONS



# NT935 series

## Temperature Control of High Voltage (HV) and Medium Voltage (MV) Dry Type/Cast Resin Transformers




### VERSIONS/OPTIONS

- **NT935-BASIC** unit with relay outputs (Tecsystem Code → **1CN0142**)
- **NT935-AD** with relay outputs, digital RS485 and Analog 4-20mA output (Tecsystem Code → **1CN0143**)
- **NT935-ETH** with relays and Ethernet output (Tecsystem Code → **1CN0139, specs pg. 8**)
  - **Dedicated Software:** ETH-MANAGER (see Accessories)
- **NT935-IR-BASIC** for infrared input with relay outputs (Tecsystem Code → **1CN0171** - Non UL, specs pg.9)
- **NT935-IR-AD** for infrared input with relay, digital RS485 and analog 4-20mA outputs (Tecsystem Code → **1CN0170** - Non UL)

The **NT935** temperature monitoring series is designed for a wide range of electromechanical and electronic equipment designed to protect the temperature of electrical machines such as motors, generators, and transformers. The **NT935** is an electronic micro-controller based unit specifically designed for dry type and cast resin transformers. The **NT935** has been developed with advantages of dual display, VOTING function, and contains a new micro-controller (with increased operation capacity and data management).

The **NT935** is able to monitor the temperature of the transformer with the same standards as the T154 controller. In addition, it will transmit real-time temperatures and offers the option to vary all the settings including the relays intervention thresholds. It is equipped with 4 Pt100 inputs to monitor temperature of the windings and /or the ambient temperature. Protection relays consisting of 2 ALARM thresholds for channels 1-2-3 and 2 ALARM thresholds for channel 4, and 2 ON-OFF thresholds for FAN1 & FAN2.

The unit is  certified for the American and Canadian market, as well as for marine applications.

**NT935** series is ideal for up to 4 thermal input channels. A variety of outputs are available including:  
**-BASIC:** Relays only    **-AD:** Analog & Digital Outputs    **-ETH:** Ethernet output (specs page 8)

The **NT935-IR** series is available where the use of RTD-Pt100 sensors are not recommended due to interference. (specs page 9)

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## NT935 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- 4 inputs RTD Pt100 3 wires (max section 1.5 mm<sup>2</sup>)
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length cable compensation up to 500 m (1 mm<sup>2</sup>)

### Outputs

- 2 alarm relays (ALARM-TRIP)
- 2 alarm relays for fan control (FAN1 and FAN2)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contacts capacity: 10A-250 Vac-res cosΦ=1
- Modbus RTU RS485 output
- Optically isolated 4.20mA output

### Dimensions

- 3.94" x 3.94" (100 x 100 mm) DIN 43700 depth 5.2" (131 mm) (terminals included)
- Panel cut-out 3.62" x 3.62" (92 x 92 mm)

### Options

- Basic version without RS485 and 4-20mA outputs:

NT935-BASIC unit has relay outputs only.  
(Tecsystem Code → **1CN0142**)

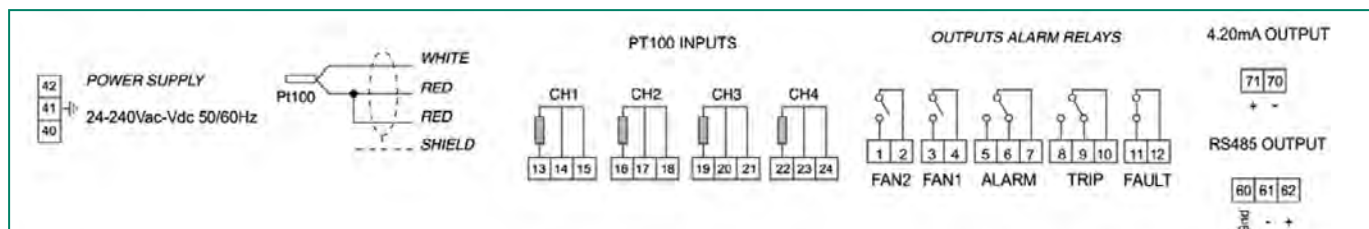
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy: ± 1% full scale value ± 1 digit
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- Self-extinguishing housing NORYL UL 94V0
- Frontal in polycarbonate IP65
- Burden: 7,5VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 2 displays 0.5" (13 mm) with 3 digits for displaying temperatures, messages and channels
- 3 leds to display the state of the alarms of the selected channel
- 2 leds to display the state of FAN1 and FAN2
- Temperature monitoring from 32 °F to 464 °F (0 °C to 240 °C)
- 2 ALARM thresholds for channels 1-2-3
- 2 ALARM thresholds for channel 4
- 2 ON-OFF thresholds for FAN1 and FAN2
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after 1 minute's inactivity
- Incorrect programming warning
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage
- Frontal alarm reset push button
- Voting function
- Intellifan function

## ELECTRICAL CONNECTIONS



## NT935-ETH (Tecsystem Code → 1CN0139)

The **NT935-ETH** is an innovative electronic device microprocessor based, which is designed for dry type and cast resin transformers, with integrated Ethernet port.

Equipped with all the necessary functions needed to monitor and control the temperature of the transformer, as well as the existing product line **NT935**, it is presented, in this edition 2016, with a more functional version of both hardware and software.

Communication with the network is via ModBus TCP/IP protocol, that allows the user to display and to program all the unit functions from the comfort of the desk!

The **NT935-ETH** maintains the traditional 4 Pt100 inputs (windings + ambient) and 4 relays ALARM, TRIP, FAN and FAULT, as well as new functions and renewed display on the front and thanks to the versatility of the new edition 2016, other sensor inputs (Ni100 / Ni120 / CU10 / PT1000 / IR etc.) are available.

This unit is  certified for Canadian and American market as well as for marine applications.

**POWER SUPPLY: with input from 85 to 260 Vac-dc.**

## TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 85-260 Vac-dc
- Vdc with reversible polarities

### Inputs

- 4 inputs RTD Pt100 3 wires
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length cable compensation up to 500 m (1 mm<sup>2</sup>)

### Outputs

- 2 alarm relays (ALARM-TRIP)
- 2 alarm relays for fan control (FAN1 and FAN2)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contacts capacity: 10A-250 Vac-res cosΦ=1
- Ethernet output 10Base T/ 100Base-TX Modbus TCP slave

### Dimensions

- 3.94" x 3.94" (100 x 100 mm) DIN 43700 depth 5.1" (130 mm) (terminals included)
- Panel cut-out 3.62" x 3.62" (92 x 92 mm)

### Options

- Dedicated Software: ETH-MANAGER

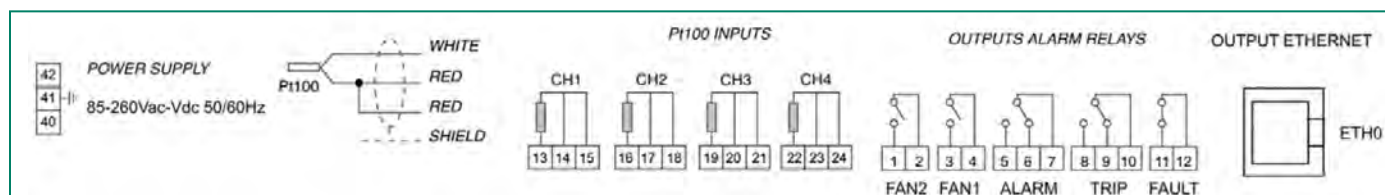
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy: ± 1% full scale value ± 1 digit
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- Self-extinguishing housing NORYL 94\_V0
- Frontal in polycarbonate IP65
- Burden: 4VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 2 displays 0.5" (13 mm) with 3 digits for displaying temperatures, messages and channels
- 3 leds to display the state of the alarms of the selected channel
- 2 leds to display the state of FAN1 and FAN2
- Temperature monitoring from 32 °F to 464 °F (0 °C to 240 °C)
- 2 alarm thresholds for channels 1-2-3
- 2 alarm thresholds for channel 4
- 2 ON-OFF thresholds for FAN1 and FAN2
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after 1 minute's inactivity
- Incorrect programming warning
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage
- Frontal alarm reset push button
- Voting function
- Intellifan function

## ELECTRICAL CONNECTIONS





## NT935-IR-AD (Tecsystem Code → 1CN0170)

The control unit **NT935-IR-AD** coupled to the dedicated infrared sensors TIR409 allows the temperature control without physical contact between the sensor and the surface to be measured. This characteristic makes it useful to control the temperature of medium or high voltage windings, where the use of PT100 is not recommended for the problems of electrical insulation and the security.

Unlike general products on the market, the **NT935-IR-AD** and TIR409 were studied in order to work even in very high electromagnetic fields, thus ensuring reliability and security to the system itself. The compact size make the sensor easy to install on any flat surface, while the laser pointer helps to verify if it has been correctly positioned. The unit is equipped with 3 inputs, to control the temperature of the 3 windings and a fourth additional input.

Output relays are available for ALARM, TRIP, FAN1 / FAN2 and FAULT.

As well as have all the new features introduced in the latest ED16 generation devices, including dual display, most capacity of relays, the unit is equipped with the function Voting and Intellifan and RS485 Modbus RTU and 4-20mA Analog output for data remote management.

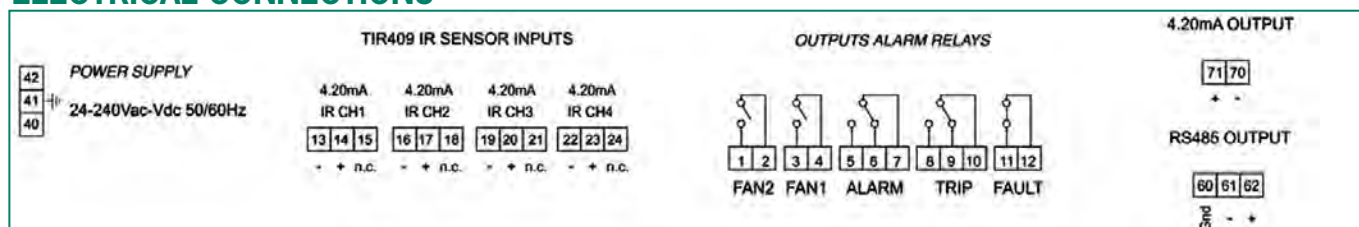
All our units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## TECHNICAL SPECIFICATIONS

Power Supply	Tests and performance
<ul style="list-style-type: none"> <li>Rated values 24-240 Vac-dc</li> <li>RVdc with reversible polarities</li> </ul>	<ul style="list-style-type: none"> <li>Assembling in accordance with CE rules</li> <li>Protection against electromagnetic noises CEI-EN61000-4-4</li> <li>Dielectric strength: 1500 Vac for 1 minute from relays to 4.20mA inputs, relays to power supply, power supply to 4.20mA inputs</li> <li>Accuracy: <math>\pm 0.5\%</math> full scale value <math>\pm 1</math> digit</li> <li>Ambient operating temperature: from <math>-4^{\circ}\text{F}</math> to <math>+140^{\circ}\text{F}</math> (<math>-20^{\circ}\text{C}</math> to <math>+60^{\circ}\text{C}</math>)</li> <li>Humidity: 90% non-condensing</li> <li>Self-extinguishing housing NORYL 94_V0</li> <li>Frontal in polycarbonate IP65</li> <li>Burden: 7,5VA</li> <li>Data storage: 10 years minimum</li> <li>Self-diagnostic circuit</li> <li>Option: tropicalization</li> </ul>
Inputs	Display and data management
<ul style="list-style-type: none"> <li>4 inputs IR 4.20mA sensor</li> <li>Removable rear terminals</li> <li>Input channels protected against electromagnetic interference</li> </ul>	<ul style="list-style-type: none"> <li>2 displays 0.5" (13 mm) with 3 digits for displaying temperatures, messages and channels</li> <li>3 leds to display the state of the alarms of the selected channel</li> <li>2 leds to display the state of FAN1 and FAN2</li> <li>Temperature monitoring from <math>32^{\circ}\text{F}</math> to <math>464^{\circ}\text{F}</math> (<math>0^{\circ}\text{C}</math> to <math>240^{\circ}\text{C}</math>)</li> <li>2 ALARM thresholds for channels 1-2-3</li> <li>2 ALARM thresholds for channel 4</li> <li>2 ON-OFF thresholds for FAN1 and FAN2</li> <li>Sensors diagnostic (Fcc-Foc-Fcd)</li> <li>Data storage diagnostic (Ech)</li> <li>Access to programming through front keyboard</li> <li>Automatic exit from relay programming, display and test after 1 minute's inactivity</li> <li>Incorrect programming warning</li> <li>Possibility of setting automatic channels scanning, hottest channel, manual scanning</li> <li>Maximum reached temperatures and alarm storage</li> <li>Frontal alarm reset push button</li> <li>Voting function</li> <li>Intellifan function</li> </ul>
Outputs	
<ul style="list-style-type: none"> <li>2 alarm relays (ALARM-TRIP)</li> <li>2 alarm relays for fan control (FAN1 and FAN2)</li> <li>1 alarm relay for sensor fault or working anomaly (FAULT)</li> <li>Output contacts capacity: 10A-250 Vac-res <math>\cos\Phi=1</math></li> <li>Modbus RTU RS485 output</li> <li>Optically isolated 4.20mA output</li> </ul>	
Dimensions	
<ul style="list-style-type: none"> <li>3.94" x 3.94" (100 x 100 mm) DIN 43700 depth 5.2" (131 mm) (terminals included)</li> <li>Panel cut-out 3.62" x 3.62" (92 x 92 mm)</li> </ul>	
Options	
<ul style="list-style-type: none"> <li>Basic version without RS485 and 4-20mA outputs:</li> </ul> <p>NT935-IR-BASIC unit has relay outputs only. (Tecsystem Code → 1CN0171)</p>	

## ELECTRICAL CONNECTIONS



# NT538 series

## Temperature Control of Medium Voltage (MV) Dry Type/Cast Resin Transformers



### VERSIONS

- **NT538-BASIC** relay outputs only (Tecsistem Code. → **1CN0160**)
- **NT538-AD** relay, digital RS485 and analog 4-20mA outputs (Tecsistem Code → **1CN0144**)
- **NT538-ETH** relay and ethernet output (Tecsistem Code → **1CN0140**)


**Option: DEDICATED SOFTWARE: ETH-MANAGER**  
(see accessories)

The **NT538 Series** is an electronic microprocessor based unit for the temperature monitoring of electric motors and MV dry type/cast resin transformers. **The NT538 Series** has 8 input channels, allowing for monitoring temperature at up to 8 different locations. Featuring a dual display with 3 digits for displaying temperatures, messages and channels, along with 3 LED's to display the state of the alarms of the selected channels and 2 LED's to display the state of two separate fans. It is equipped with 8 inputs for Pt100 sensors and thanks to the versatility of the latest edition, other sensor inputs (Ni100 / Ni120 / CU10 / PT1000 / IR etc.) are available. It is equipped with 4 dry contact relay outputs, ALARM and TRIP, FAULT for working anomalies and drive of FAN cooling system.

The **NT538-ETH** is an innovative electronic device microprocessor based, which is designed for dry type and cast resin transformers, with integrated Ethernet port. Communication with the network is via ModBus TCP/IP protocol, that allows the user to display and to program all the unit functions from the comfort of the desk! The **NT538-ETH** maintains the traditional 8 Pt100 inputs (windings + environment) and 4 relays ALARM, TRIP, FAN and FAULT, as well as new functions and renewed display on the front and thanks to the versatility of the latest edition, other sensor inputs (Ni100 / Ni120 / CU10 / PT1000 / IR etc.) are available.

**NT538** series is ideal for up to 8 thermal input channels. A variety of outputs are available including:

-**BASIC**: Relays only    - **AD**: Analog & Digital Outputs    - **ETH**: Ethernet output (specs page 11)

The unit is  certified for the American and Canadian market, as well as for marine applications.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**NT538-AD: UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

**NT538-ETH: UNIVERSAL POWER SUPPLY: with input from 85 to 260 Vac-dc.**

## NT538 TECHNICAL SPECIFICATIONS

### Power Supply

- ND538-AD: Rated values 24-240-260 Vac-dc
- ND538-ETH: Rated values 85-260 VAc-dc
- Vdc with reversible polarities

### Inputs

- 8 inputs RTD PT100 3 wires (max section 1.5 mm<sup>2</sup>)
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length cable compensation up to 546.8' (500 m) (1 mm<sup>2</sup>)

### Outputs

- 2 alarm relays (ALARM-TRIP)
- 2 alarm relays for fan control (FAN1 and FAN2)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contact capacity: 10A-250 Vac-res COS $\phi$ =1
- NT538-AD: Modbus RTU RS485 output
- NT538-AD: Optically isolated 4-20mA output
- NT538-ETH: Ethernet output 10Base T / 100 Base-TX Modbus TCP slave

### Dimensions

- 3.9" x 3.9" (100 x 100mm) DIN 43700 depth 5.15" (131 mm) (terminals included)
- Panel cut-out 3.6" x 3.6" (92 x 92mm)

### Options

- Basic version without RS485 and 4-20mA outputs; NT538-BASIC (Tecsystem Code → **1CN0160**)
- Ethernet Version; NT538-ETH (Tecsystem Code → **1CN0140**)
  - Dedicated Software (ETH-Manager)

### Tests and Performance

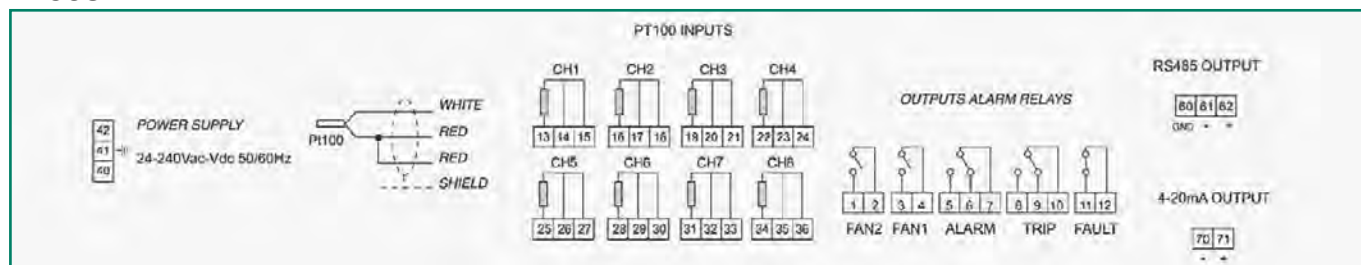
- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy:  $\pm 1\%$  full scale value  $\pm 1$  digit
- Ambient operating temperature: from -4°F to +140°F (-20°C to +60°C)
- Humidity: 90% non-condensing
- Self-extinguishing housing NORYL UL94V0
- Frontal in polycarbonate IP65
- Burden: 7.5VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit

### Display and Data Management

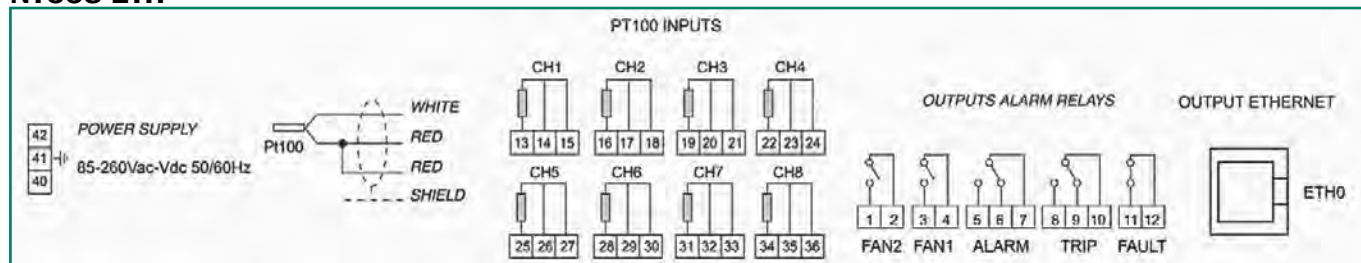
- 2 displays 0.5" (13 mm) with 3 digits for displaying temperatures, messages and channels
- 3 leds to display the state of the alarms of the selected channel
- 2 leds to display the state of FAN1 and FAN2
- Temperature monitoring range: reading from 32°F to 464°F (0°C to 240°C)
- 1 ALARM threshold for each channel
- 1 TRIP thresholds for each channel
- 2 ON-OFF thresholds for FAN1 and FAN2 in common for all enabled channels
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after 1 minute's inactivity
- Incorrect programming warning
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage
- Frontal alarm reset push button
- Audible alarm (ALARM) with silent key
- Voting function
- Fail Safe function

## ELECTRICAL CONNECTIONS

### NT538-AD



### NT538-ETH



# T1048 series

## Temperature Control of Medium Voltage (MV) Dry Type/Cast Resin Transformers



### VERSIONS

- **T1048-PT100-BASIC** (Tecsystem Code → **1CN0162**)
- **T1048-PT100-RS485** unit w/PT100 inputs and RS485 Modbus RTU output (Tecsystem Code → **1CN0149**)
- **T1048-PT100-ETH** (Tecsystem Code → **1CN0148**)
- **T1048-TCK-BASIC** unit w/TCK inputs (Tecsystem Code → **1CN0161**)
- **T1048-TCK-RS485** unit w/TCK inputs and RS485 Modbus RTU output (Tecsystem Code → **1CN0151**)
- **T1048-TCK-ETH** with TCK sensors Inputs (Tecsystem Code → **1CN0150**)

**T1048** was designed as a technical evolution of the **T2612** series, including all the new features presented in the latest generation devices including dual display and more powerful relays. The **T1048** series is more compact and lighter, has a power supply with extended range (85-260 Vac/dc), includes hysteresis, failsafe, intelligfan functions. All input channels are protected from electromagnetic interference, the power supply is fuse protected making the **T1048** rugged and durable for difficult applications.

The **T1048** comes standard to accept 4 RTD inputs (Pt100 sensors), an option is available with 4 TCK (thermocouple) inputs as well. The unit can also be equipped with Ethernet output with Modbus TCP/IP protocol to display and program all the unit functions while sitting at your desk!

This unit is available with  certification for Canadian and American market.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (in tropical climates).

**POWER SUPPLY: with input from 85 to 260 Vac/dc.**

## T1048 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 85-260 Vac-dc
- Vdc with reversible polarities
- Protection fuse 2,5A 5x20

### Inputs

- 4 configurable inputs by installing one of the following different cards:
  - Card for 4 inputs RTD Pt100 sensor 3 wires
  - Card for 4 inputs TcK (thermocouple)
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length Pt100 cable compensation up to 546.8' (500 m) (1 mm<sup>2</sup>)
- Sensor length TcK cable compensation up to 109.3' (100 m) (with cable and joints compensated)

### Outputs

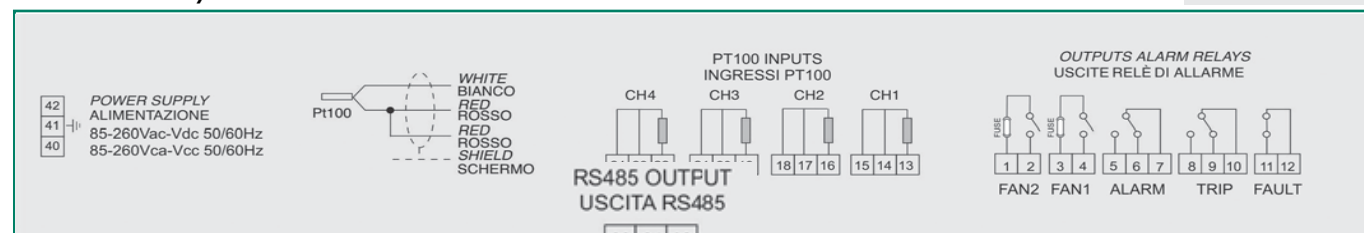
- 2 alarm relays (ALARM-TRIP)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output relays with 10A-250Vac-res COSΦ=1 contacts (ALARM-TRIP-FAULT)
- 2 alarm relays for fan control (FAN1 and FAN2) with 16A-250Vac-res cosΦ=1 contacts, fuse 10A for line
- Option: RS485 output Modbus RTU
- Option: Ethernet 10Base T/ 100Base-TX Modbus TCP slave

### Dimensions

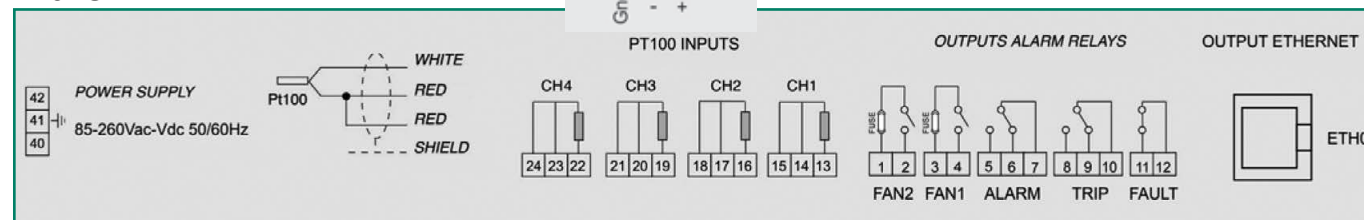
- 9.1" x 6.5" depth 2.4" (232 x 166 mm depth 60 mm)
- Panel cut-out 5.5" x 8.1" (140 x 205 mm)

## ELECTRICAL CONNECTIONS

### T1048-Basic / T1048-RS485



### T1048-ETH



### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy:  $\pm 1\%$  full scale value  $\pm 1$  digit
- Ambient operating temperature: from  $-4^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ )
- Humidity: 90% non-condensing
- Housing polycarbonate
- Frontal in polycarbonate IP65
- Absorption: 8VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 2 displays 0.8" (20.5 mm) with 3 digits for displaying temperatures, messages and channels
- 3 leds to display the state of the alarms of the selected channel
- 2 leds to display the state of FAN1 and FAN2
- Temperature monitoring range: reading from  $-68^{\circ}\text{F}$  to  $428^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$  to  $220^{\circ}\text{C}$ ) alarm settings  $32^{\circ}\text{F}$  to  $428^{\circ}\text{F}$  ( $0^{\circ}\text{C}$  to  $220^{\circ}\text{C}$ )
- 2 ALARM thresholds for channels 1-2-3
- 2 ALARM thresholds for channel 4
- 2 ON-OFF thresholds for FAN1 and FAN2
- Key and Led enable forced ventilation FON
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after 1 minute's inactivity
- Incorrect programming warning
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage
- Frontal alarm reset push button
- Audible alarm (ALARM) with silent key
- Voting function
- Fail Safe function
- Intellifan function
- Hysteresis function ALARM and TRIP (HYS)

#### RS485 OUTPUT USCITA RS485

60 61 62

Gnd - +

# NT539 series

## Temperature Control of Medium Voltage (MV) Dry Type & Cast Resin Transformers



### VERSION

- **NT539**  
(Tecsistem Code → **1CN0023** - Non UL)

The **NT539** is an electronic microprocessor based unit, specifically designed to control transformers with more than three windings, such as those used in the conversion AC-DC plants/systems. The **NT539** can also be used to control the temperature of distribution in medium and low voltage systems with three phase transformers.

It is equipped with 9 Pt100 inputs and the following relays: 3 for the ALARM, 3 for the TRIP and 3 for the FAN cooling system. Additionally it comes with a self monitoring circuit and output that will signal if it detects a sensor fault or other internal problem on the PC board.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## NT539 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- 3-6-9 inputs RTD Pt100 sensors 3 wires
- Removable rear terminals
- Input channels protected against electrical and magnetic noises and spikes
- Sensor length cable compensation up to 546.8' (0.04 in2 ) / (500 m) (1 mm<sup>2</sup>)

### Outputs

- 3 alarm relays (ALARM TR1, ALARM TR2, ALARM TR3)
- 3 trip relays (TRIP TR1, TRIP TR2, TRIP TR3)
- 3 fan relays (FAN TR1, FAN TR2, FAN TR3)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contact capacity: 6A-250 Vac-res cosΦ=1

### Dimensions

- 5.6" x 2.8" (144 x 72mm) DIN 43700 depth 5.15" (131 mm) (terminals included)
- Panel cut-out 5.47" x 2.6" (139 x 67mm)

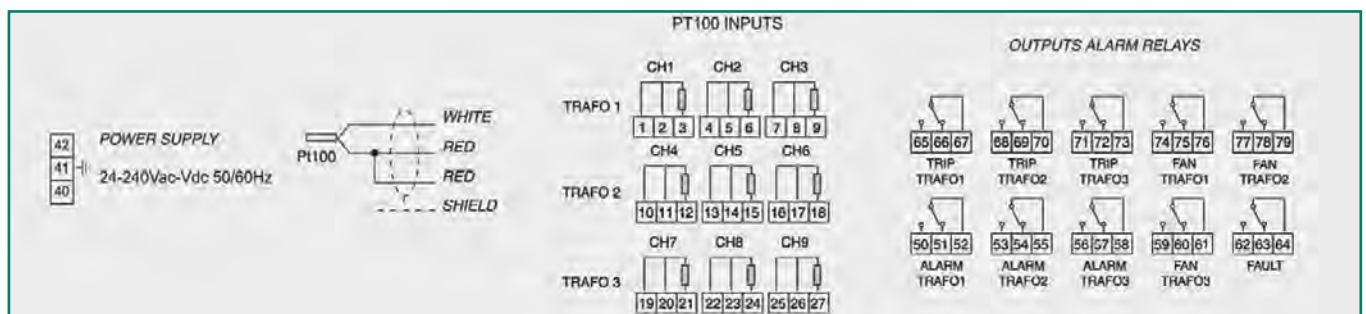
### Tests and Performance

- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Assembling in accordance with CEI-EN61000-4-4
- Accuracy:  $\pm 1\%$  vfs,  $\pm 1$  digit
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- PPO UL 94V0 self-extinguishing housing
- Frontal in polycarbonate IP54
- Burden: 6VA
- Data storage: 10 years minimum
- Digital linearity of sensors signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 1 display for temperature (°C TEMPERATURE)
- 1 display for reference channel and programming parameter (CHANNEL)
- 4 leds indicating display mode (SCAN, AUTO, HIGH, TMAX)
- 4 leds indicating alarm or trip channel (FAULT, FAN, ALARM, TRIP)
- 3 leds indicating reference transformer (TR1, TR2, TR3)
- Temperature monitoring from 32 °F to 392 °F (0 °C to 200 °C)
- 2 alarm thresholds for each transformer (alarm/trip)
- ON-OFF thresholds for fan control for each transformer
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Entering the programming mode by frontal push button
- Automatic stop of programming cycle after one (1) minute of no operation
- Wrong programming automatic display
- Maximum temperature and alarm storage
- Frontal alarm reset key

## ELECTRICAL CONNECTIONS



# NT511 series

## Temperature Control of Medium Voltage (MV) Dry Type/Cast Resin Transformers



### VERSIONS

- **NT511-AD** w/RS485 and 4-20mA output (Tecsystem Code → **1CN0104** - Non UL)
- **NT511-BASIC** unit with relay outputs only (Tecsystem Code → **1CN0010** - Non UL)
- **NT511-RS485** unit with digital RS485 output (Tecsystem Code → **1CN0011** - Non UL)

The **NT511** temperature and fan control is a microprocessor based temperature controller that combines the temperature controller and the ability to power the fan cooling system directly. The **-AD** version is equipped with Analog 4-20mA and Digital RS485 Modbus RTU outputs simultaneously. It is recommended with the use of tangential fans, thanks to the presence of 6 outputs 230 Vac 1.5 A max. (each).

Every single fan is protected by a fuse and in case of failure the unit provides a FAULT signal. The metal structure is designed for installation on the box of the transformers. It has 4 inputs suitable for RTD P100 sensors which are all protected against electromagnetic interference. The unit is equipped with dry contacts to signal FAULT, ALARM and TRIP. For the fan control there are 6 active outputs which provide power directly to the fans.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**POWER SUPPLY: 230 Vac.**



## NT511 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated voltage: 230 Vac  $\pm 10\%$  50/60 Hz

### Inputs

- 4 inputs RTD Pt100 sensors 3 wires
- Removable rear terminals
- Input channels protected against electrical and magnetic noises and spikes
- Sensor length cables compensation up to 546.8' (500 m) (1 mm<sup>2</sup>)

### Outputs

- 2 alarm relays (ALARM-TRIP)
- 6 fan outputs rated 230 Vac 50/60 Hz 1.5 Amp. Max (protected by 2 Amp. fuse)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contact capacity: 5A-250 Vac  $\cos\Phi=1$
- Modbus RTU RS485 output
- Optically isolated 4.20mA output

### Dimensions

- 8.27" x 10.24" x 3.35" (210 x 260 x 85mm)
- Panel cut-out 9.1" x 7.16" (232 x 182mm)
- Color: RAL 7035

### Options

- Basic version without RS485 and 4.2mA outputs (relays only)
- AD Version with RS485 and 4-20mA output

### Tests and Performance

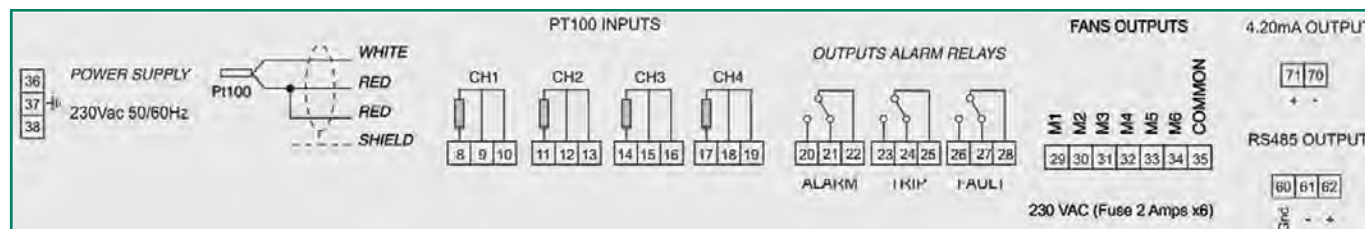
- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy:  $\pm 1\%$  v/s,  $\pm 1$  digit
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- Housing: steel electrostatic painted
- Digital linearity of sensors signal
- Self-diagnostic of temperature sensor
- Program and reading resolution: 1 digit
- Burden: 6VA
- Frontal in polycarbonate IP54
- Data Storage: 10 years minimum
- Option: tropicalization

### Display and Data Management

- 1 display for temperature and programming parameters (°C TEMPERATURE)
- 1 display for reference channel (CHANNEL)
- 3 leds indicating display mode (SCAN, HIGH, TMAX)
- 4 leds indicating alarm or trip channel (FAULT, FAN, ALARM, TRIP)
- 6 leds indicating motor status line (M1, M2, M3, M4, M5, M6)
- 1 led indicating program mode (PRG)
- 1 led indicating manual mode fan operating (MAN)
- Temperature monitoring from 32 °F to 392 °F (0 °C to 200 °C)
- 2 alarm threshold (alarm/trip)
- ON-OFF thresholds for fan control
- Sensors diagnostic (Fcc-Foc-Fcd)
- Data storage diagnostic (Ech)
- Entering the programming by frontal push button
- Wrong programming automatic display
- Possibility of setting automatic channels scanning or hottest channel
- Maximum temperatures and alarm storage
- Frontal alarm reset key

## ELECTRICAL CONNECTIONS

### NT511- AD



# T119 series

## Temperature Control of Medium Voltage (MV) Dry Type/Cast Resin Transformers



### VERSIONS

- **T119** (TecsSystem Code → **1CN0048** - Non UL)
- **T119-DIN** DinRail Mountable  
(TecsSystem Code → **1CN0092** - Non UL)

The **T119** temperature controller was developed to control the temperature of medium voltage cast resin and dry transformers. It has 3 series of Ptc inputs (ALARM, TRIP, FAN), each input can be connected from 1 to 9 Ptc's in series, making it a simple and economical choice for reliable protection. All inputs are protected against electromagnetic interference for consistent performance. The **T119** temperature controller has 2 output relays for temperature alarm/sensor or system fault, and another relay for fan control with a time delay off function. The **T119** is available in a DIN rail mount version and a front panel mount version to make installation simple and easy.

All our units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

# T119 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated voltage: 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- 3 series of Ptc inputs:
  - 1 series for ALL1
  - 1 series for ALL2
  - 1 series for FAN
- Removable rear terminals
- Input channels protected against electromagnetic noises and spikes

### Outputs

- 2 alarm relays (ALL1/fault - ALL2)
- 1 alarm relay for fan control (FAN) with time delay OFF (5-10-20-40 min.)
- Output contact capacity: 5A-250 Vac cosΦ=1

### Dimensions T119

- 1.9" x 3.8" (48 x 96mm) din 43700 depth 5.9" (150 mm) (terminals included)
- Panel cut-out 1.7" x 3.6" (44 x 92mm)

### Dimensions T119 DIN

- 4.17" X 2.28" (106 X 58mm) DIN 43880 depth 3.54" (90mm)

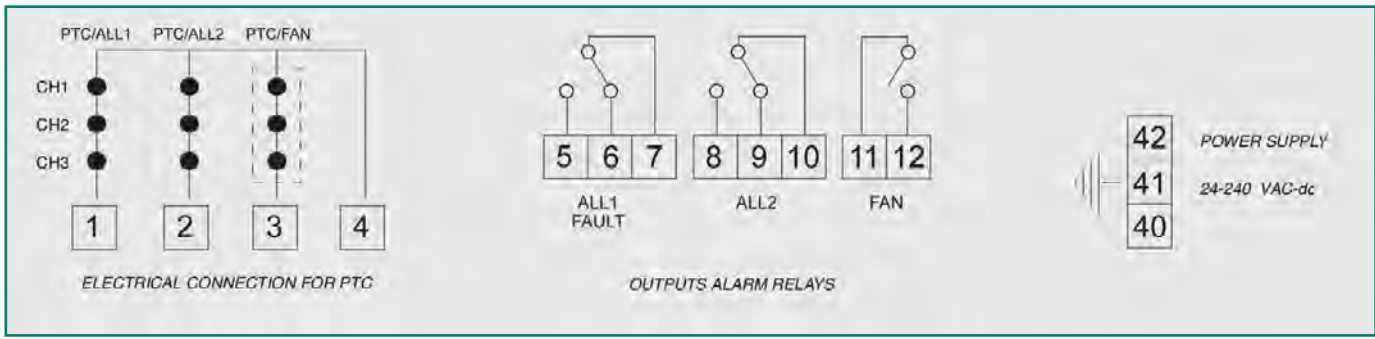
### Tests and performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- PPO UL 94V0 self-extinguishing housing
- Option: tropicalization
- Frontal in polycarbonate IP54
- Burden: 2VA
- Data storage: 10 years minimum
- Self-diagnostic circuit

### Display and data management

- Led indicating alarm, trip, fan
- Led indicating FAULT
- 2 alarm threshold
- 1 ON thresholds for fan control
- Entering the programming by frontal push button

# ELECTRICAL CONNECTIONS



# NOTES

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# T30 series

## Thermal Control of Low Voltage (LV) and Medium Voltage (MV) Dry Type/Cast Resin Transformers



### VERSIONS

- **T30** (Tecsistem Code → **1CN0071** - Non UL)
- Available with **Power Supply** at 120 Vac (Tecsistem Code → **1CN0072**)

The **T30** temperature controller is a simple, cost effective solution to control temperature of low voltage and medium voltage dry and cast resin transformers. The **T30** comes with 2 inputs suitable for Ptc thermistors for alarm and trip. The input channels are protected from electromagnetic interference for consistent, reliable operation. 2 output relays (ALL/FAULT and TRIP) are available and the 4 front panel LEDs display the status of the system. The fault circuit trips in case of sensor failure or if the board self diagnostics detects a problem so it may be quickly remedied.

All our units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**POWER SUPPLY: 230 Vac.**

## T30 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated voltage: 230 Vc  $\pm 10\%$  50/60 Hz

### Inputs

- 2 series of Ptc inputs:
  - 1 series for L1 (ALARM)
  - 1 series for L2 (TRIP)
- Input channels protected against electromagnetic noises and spikes

### Outputs

- 2 alarm relays (ALL/FAULT, TRIP)
- Output contact capacity: 5A-250 Vac  $\cos\Phi=1$

### Dimensions

- 2.8" x 3.54" (71 x 90mm) depth 2.28" (58mm) (DIN rail mounting)

### Options

- Available 120Vac power supply version

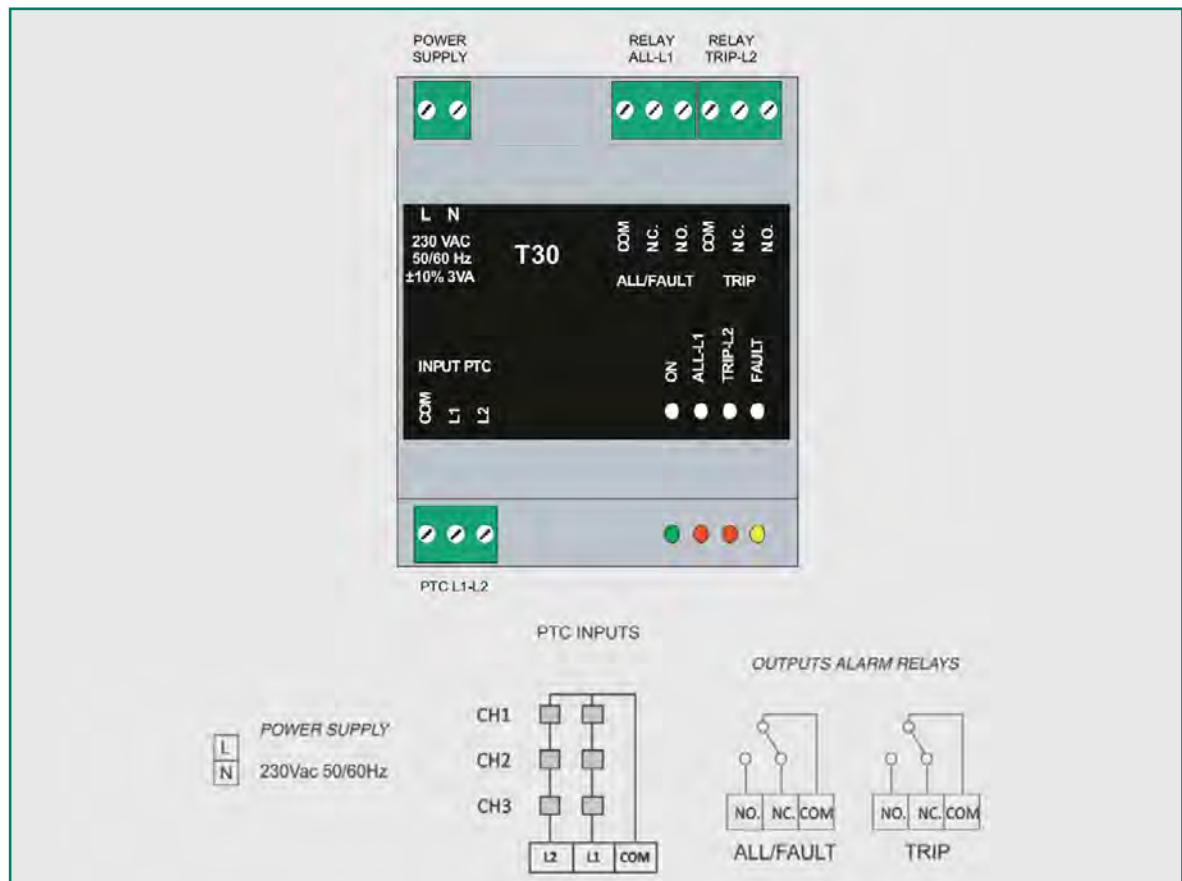
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Ambient operating temperature: from -4 °F to +140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing
- PPO UL 94V0 self-extinguishing housing
- Option: tropicalization
- Burden: 2VA
- Self-diagnostic circuit

### Display and Data Management

- Led indicating alarm and trip
- Led indicating FAULT
- Led indicating ON

## ELECTRICAL CONNECTIONS



# T412 series

## Temperature Control System for Electrical Machines



### VERSIONS

- **T412**  
(Tecsystem Code → **1CN0074** - Non UL)
- **T412-TcK** TcK sensor input unit  
(Tecsystem Code → **1CN0075** - Non UL)

The **T412** temperature controller is a single input temperature controller that provides plenty of features for monitoring a single hot spot. The input can interface with a RTD Pt100 sensor as a standard but has the option for using a TcK thermocouple depending on your sensor preference. The input is protected from electromagnetic interference for consistent, reliable performance. The outputs consist of 3 relays; 2 alarm relays for different trip thresholds and another fault relay for signaling a sensor fault of a self diagnostic fault on the PC board.

All our units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## T412 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- 1 RTD input Pt100 sensor 3 wires
- Removable rear terminals
- Input channels protected against electromagnetic noises and spikes
- Sensor length cable compensation up to 547 yds. (500 m) (1 mm<sup>2</sup>)
- Sensor length TcK cable compensation up to 109 yds. (100 m) (with cable and joints compensated)

### Outputs

- 2 alarm relays (L1-L2)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contacts capacity 5A-250 Vac  $\cos\Phi=1$

### Dimensions

- 1.89" x 3.78" (48 x 96 mm) DIN 43700 prof. 6.3" (160 mm)
- Panel cut-out 1.7" x 3.6" (44 x 92 mm)

### Options

- 1 TcK input

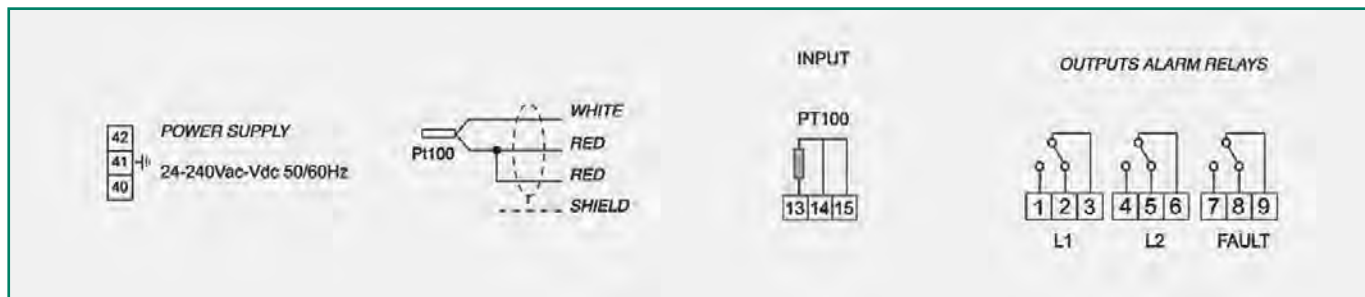
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy:  $\pm 1\%$  full scale value  $\pm 1$  digit
- Ambient operating temperature: from  $-4^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ )
- Humidity: 90% non-condensing
- PPO UL 94V0 self-extinguishing housing
- Frontal in polycarbonate IP54
- Burden: 3VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Option: tropicalization

### Display and Data Management

- 1 display 0.3" (7 mm) high with 3 digits for displaying temperatures
- Led indicating alarm (L1) or trip (L2)
- Led indicating fault
- Temperature monitoring:
  - $32^{\circ}\text{F}$  to  $392^{\circ}\text{F}$  ( $0^{\circ}\text{C}$  to  $200^{\circ}\text{C}$ ) for Pt100
  - $32^{\circ}\text{F}$  to  $1830^{\circ}\text{F}$  ( $0^{\circ}\text{C}$  to  $999^{\circ}\text{C}$ ) for TcK
- 2 alarm thresholds
- Pt100 sensors diagnostic (Fcc-Foc-Fcd)
- TcK sensors diagnostic (Foc)
- Wrong programming automatic display
- Programmed data call out
- Maximum and minimum temperatures reached storage
- Frontal alarm reset push button
- Possibility of setting HOLD function for output relays

## ELECTRICAL CONNECTIONS



# T512 series

## Temperature Control System for Electrical Machines



### VERSIONS

- **T512-Basic** unit with relay outputs (Tecsystem Code → **1CN0118**)
- **T512-RS485** with RS485 and relay outputs (Tecsystem Code → **1CN0168**)

The NEW “intelligent multi-channel” UNIT **T512**, mainly oriented to the control of motor temperature, can also be used wherever you need to monitor a maximum number of 12 independent channels (reading range  $-40^{\circ}\text{F}$  to  $464^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$  to  $240^{\circ}\text{C}$ )).

It is equipped with 12 Pt100 inputs and 5 output relays with contacts 5A-250V (AL0-AL1-AL2-AUX1-AUX2 – clean contacts), and it allows you to set up to three alarm thresholds for each channel.

The unique 20-character LCD display allows easy programming parameters and alarm management and also to view immediately the operating data.

This unit is available with  certification for Canadian and American market.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**



## T512 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 24-240 Vc-dc
- Vdc with reversible polarities

### Inputs

- 12 inputs RTD Pt100 3 wires (max section 0.1in2 (2.5 mm<sup>2</sup>))
- Removable rear terminals
- Input channels protected against electromagnetic interference
- Sensor length cable compensation up to 547yds. (500 m) (1 mm<sup>2</sup>)

### Outputs

- 5 alarm relays (ALO-AL1-AL2-AUX1-AUX2)
- 1 alarm relay for sensor fault or working anomaly (FAULT)
- Output contact capacity: 5A-250 Vac cosΦ=1
- Modbus RTU RS485 output

### Dimensions

- 7.56" x 3.78" (192 x 96 mm) depth 8.66" (220 mm) (terminals included)
- Panel cut-out 7.4" x 3.6" (188 x 92 mm)

### Options

- Basic Version - relay outputs only

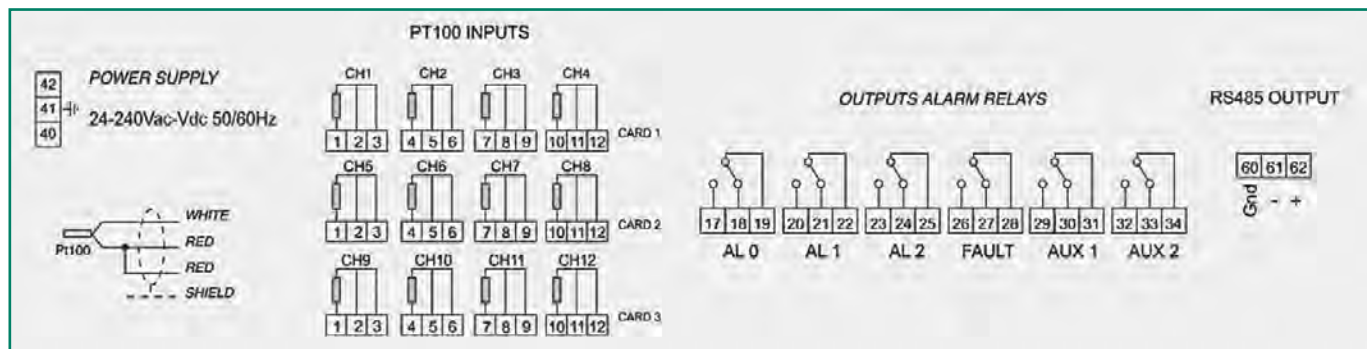
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy: ±1% full scale value ±1 digit
- Ambient operating temperature: from -4° F to +140° F (-20° C to +60° C)
- Humidity: 90% non-condensing
- Black anodized aluminium case
- Burden: 10VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 1 LCD display with 4 lines of 20 characters to show the working data and program parameters
- 6 led indicating the status of the relays (ALO, AL1, AL2, AUX1, AUX2, FLT)
- Reading temperature from -40° F to 464° F (-40° C to 240° C)
- Alarm management from 32° F to +464° F (-0° C to 240° C)
- 3 ALARM thresholds for each input
- Sensor diagnostic (Fcc-Foc)
- Access to programming through front keyboard
- Automatic exit from relay programming, display and test after 1 minute inactivity
- Possibility of setting automatic channels scanning, hottest channel, manual scanning
- Maximum reached temperatures and alarm storage

## ELECTRICAL CONNECTIONS



# MM453 series

## Temperature Control System for Electrical Machines



### VERSIONS

- **MM453-Basic unit** with relay outputs only (call factory for Tecsystem Code)
- **MM453-AD** with relay digital RS485 and analog 4-20mA outputs (call factory for Tecsystem Code)

The **MM453** temperature controller is designed primarily for controlling the temperature of diesel generators and biogas, but it is also commonly used for monitoring bearings, exhaust gas, lubricant and coolant. The 20-character, 4-line, wide alphanumeric LCD allows the operator to easily read the operating parameters and make adjustments. The highly configurable **MM453** can be fitted with a maximum of 24 inputs for 24 different temperature measuring locations. Cards with 4 inputs can be added individually for the RTD Pt100 sensors, Pt1000 sensors and the TcK thermocouple depending on your sensor preference. You can also mix and match input cards to achieve your desired input sensor arrangement. All the input channels are protected from electromagnetic interference for consistent, reliable performance. The alarm and fault signals can be routed to two separate relay banks allowing for a variety of output configurations. The **MM453** can also be fitted with a 4-20 mA output and a RS485 Modbus RTU output.

All units can also be supplied with a special coating on the electronic cards, resistant to difficult weather conditions, particularly characterized by high temperature and humidity (which are in tropical climates).

**UNIVERSAL POWER SUPPLY: with input from 24 to 240 Vac-dc.**

## MM453 TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values 24-240 Vac-dc
- Vdc with reversible polarities

### Inputs

- From 1 - 24 configurable inputs by different cards:
  - Card for 4 inputs RTD Pt100 sensor three wires
  - Card for 4 inputs RTD Pt1000 sensor three wires
  - Card for 4 inputs TcK (thermocouple)
- Possibility to mount in the same monitoring unit different cards (RTD or TcK)
- Removable rear terminals
- Input channels protected against electromagnetic noises and spikes
- Sensor length cable compensation for TTD Pt100-Pt1000 up to 547yds. (500 m) (1 mm<sup>2</sup>)
- Sensor length TcK cable compensation up to 109yds. (100 m) (with cable and joints compensated)

### Outputs

- 5 alarm relays (ALO, AL1, AL2, AUX1, AUX2)
- 1 relay for sensor fault or working anomaly (FAULT)
- Output relay with : 5A-250 Vac  $\cos\Phi=1$
- 4-20 MA output (with synchronizing signal) and RS485 ModBus RTU output

### Dimensions

- 7.56" x 3.78" (192 x 96 mm) depth 8.66" (220 mm) (terminals included)
- Panel cut-out 7.4" x 3.6" (188 x 92 mm)

### Options

- Basic Version without RS485 and 4.20mA output (relays only)
- Version with RS485 output and 4-20 mA (MM453 AD)

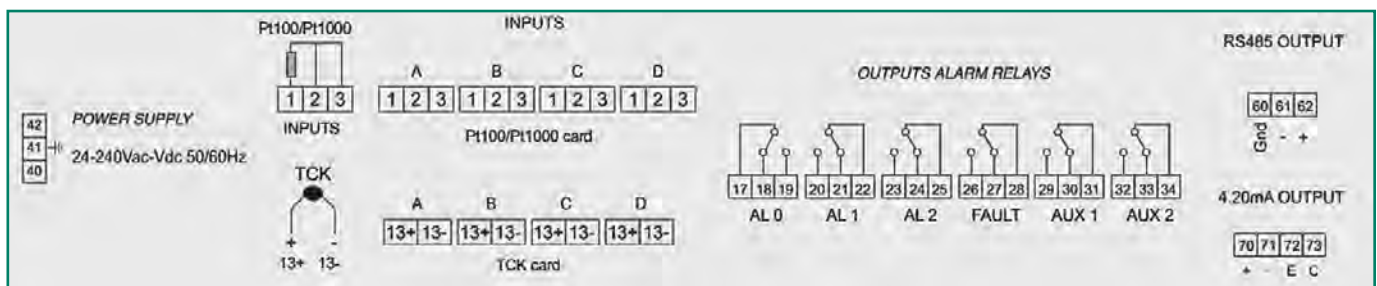
### Tests and Performance

- Assembling in accordance with CE rules
- Protection against electromagnetic noises CEI-EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- Accuracy:  $\pm 1\%$  full scale value  $\pm 1$  digit
- Ambient operating temperature: from  $-4^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ )
- Humidity: 90% non-condensing
- Black anodized aluminium case
- Burden: 10VA
- Data storage: 10 years minimum
- Digital linearity of sensor signal
- Self-diagnostic circuit
- Option: tropicalization

### Display and Data Management

- 20 characters and 4 lines LCD display to show the working data and program parameters
- 6 leds showing the status of the relays (ALO, AL1, AL2, AUX1, AUX2, FLT)
- Temperature reading range:
  - For Pt100:  $-40^{\circ}\text{F} \div 464^{\circ}\text{F}$  ( $-40^{\circ}\text{C} \div 240^{\circ}\text{C}$ )
  - For Pt1000:  $32^{\circ}\text{F} \div 572^{\circ}\text{F}$  ( $0^{\circ}\text{C}$  to  $300^{\circ}\text{C}$ )
  - For TcK:  $-40^{\circ}\text{F} \div 1832^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$  to  $1000^{\circ}\text{C}$ )
- 3 ALARM thresholds for each input
- Sensor diagnostic (Fcc-Foc)
- Selection between channel automatic scanning, hottest channel or manual scanning, all-time alarms (memo)
- Memory of the highest and lowest temperatures reached by the channels and by the alarms

## ELECTRICAL CONNECTIONS



# NT-CONV-ETH



## VERSION

- **NT-CONV-ETH** (Tecsystem Code → **1AC0070**)

Thanks to Ethernet connectivity, the **NT-ETH-CONV** allows operator to convert an existing Tecsystem monitor (with Modbus RTU RS485 output), directly to an Ethernet network.

The **NT-CONV-ETH** is equipped with all the essential network features, including an Ethernet 10BaseT / 100Base-TX, full TCP / IP stack, suitable for working as Modbus TCP slave.

The Web feature can be used for remote configuration of protection limits, real-time monitoring or troubleshooting.

**POWER SUPPLY: with input from 85 to 260 Vac-dc.**

## TECHNICAL SPECIFICATIONS

### Electrical Features

- Input rated voltage: 85-260 Vac-dc 50/60 Hz, 3VA max
- Protection fuse 0,2A 5x20

### Inputs

- RS485 Modbus RTU

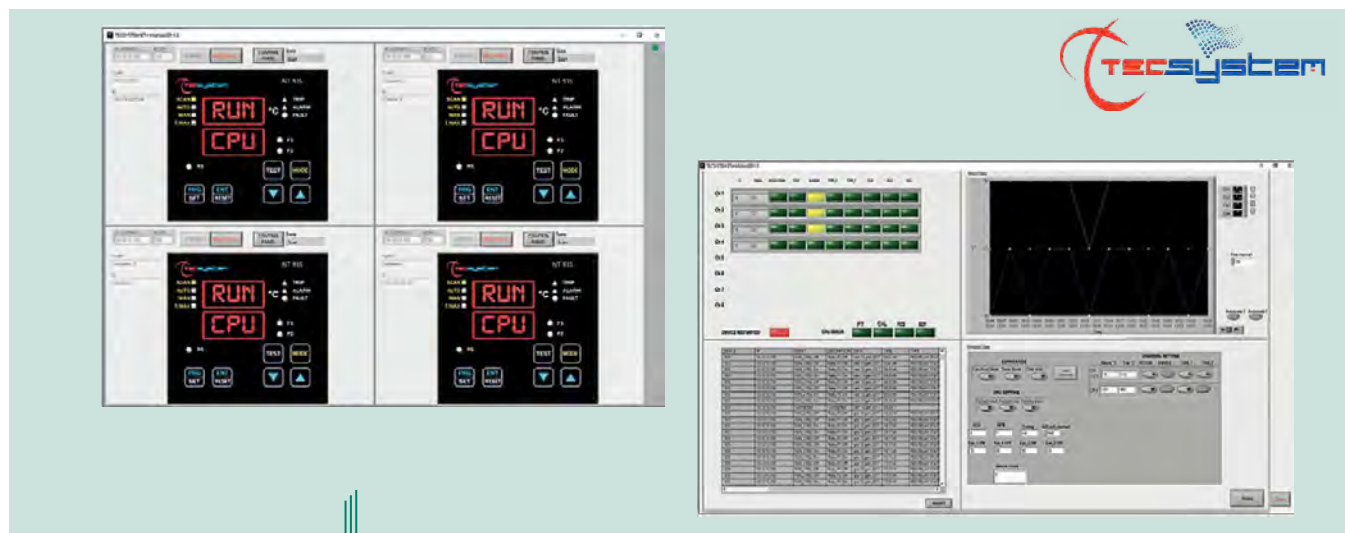
### Outputs

- Ethernet 10Base T / 100Base-TX Modbus TCP slave

### Mechanical Features

- Dimensions: 2.1" x 3.54" (53x90 mm) - h. 2.9" (73 mm) DIN rail
- PPO UL 94V0 self-extinguishing housing
- Ambient operation temperature from -4 °F to 140 °F (-20 °C to +60 °C)
- Humidity: 90% non-condensing

# ETH Manager Software



## VERSION

- **ETH-MANAGER-SOFTWARE** (Tecsystem Code → **1SW0001**)

The **ETH Manager Software**, combined with the ETH series Tecsystem devices, allows you to monitor, set and analyze the thermal operation of the electrical machine you want to protect: in the comfort of your office!

It has been developed to automatically recognize the input devices providing the control panel. In order to use it, you just need to connect the TECSYSTEM ETH devices directly to the Ethernet port on your PC or LAN, and once the network parameters are configured, you have a convenient, intuitive and complete software system, capable not only to monitor in a remote way the plant, but also to provide for the complete programming of the device in use!

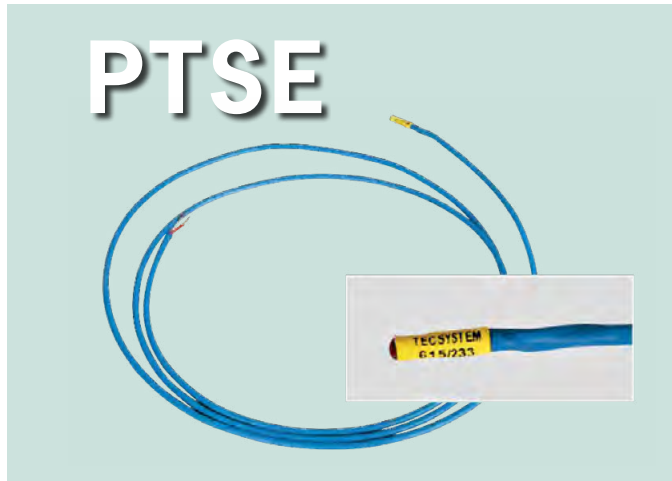
With **ETH Manager Software** you can also monitor and program independently from 1 up to 4 devices simultaneously.

The use of ETH Manager is recommended for structures such as:

- Electrical substations
- Photovoltaic systems
- Power stations
- Industrial plants

For each device you will have: temperature display, alarm activation, event recording, graphical representation (temperature pattern), programming panel and unit parameter control.

Available in High or Low resolution.



# PTSE

## VERSIONS

- **PTSE2.5** 8.2 ft (2.5 meters)  
(Tecsystem Code → **1SN0029**)
- **PTSE5.0** 16.4 ft (5.0 meters)  
(Tecsystem Code → **1SN0034**)
- **PTSE12.0** 39.36 ft (12.0 meters)  
(Tecsystem Code → **1SN0025**)

\*Custom lengths available upon request

## TECHNICAL SPECIFICATIONS

### PTSE Temperature Sensor

- Pt100 sensor
- Extension cable 3 wires with shield
- Standard cable length: 8.2 ft (2,5 m) (custom lengths on request)

### Technical Details

- Pick-up range: from -40 °F to +392 °C (-40 °C to +200 °C)

### Sensor

- Type: RTD Pt100 ohm at 32 °F (0 °C)
- Coefficient  $\alpha=0,385 \Omega / ^\circ C$
- Calibration: IEC 60751
- Accuracy: Class B

### Cable

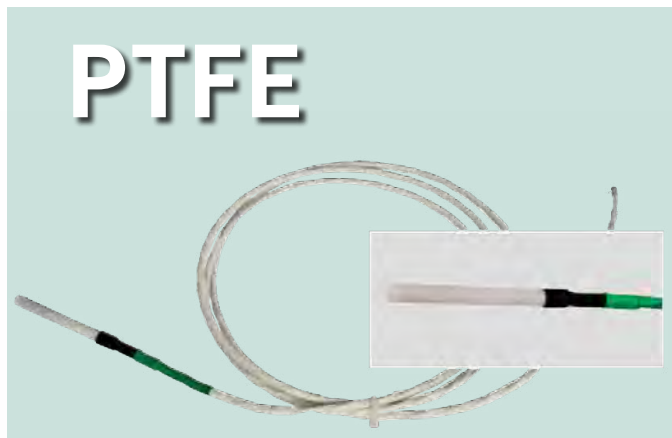
- Flexible tinned copper wires 3 x 0,35 mm<sup>2</sup>
- Primary insulation: silicon rubber
- Aluminium foil shield
- Secondary insulation: blue silicone rubber
- Color:  
- 2 red conductors - 1 white conductor

### Tests

- Dielectric strength: 5 KVac for 60"

### Options

- PTSE with 2 wires
- PTSE with 4 wires



# PTFE

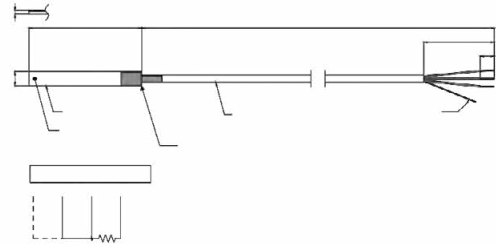
## VERSIONS

- **PTFE2.5** 8.2 ft (2.5 meters)  
(Tecsystem Code → **1SN0314**)
- **PTFE5.0** 16.4 ft (5.0 meters)  
(Tecsystem Code → **1SN0317**)
- **PTFE7.0** 22.96 ft (7.0 meters)  
(Tecsystem Code → **1SN0318**)

\*Custom lengths available upon request

## TECHNICAL SPECIFICATIONS

- PTFE 30 KV
- RTD Pt100 Pt100 ohm at 32 °F (0 °C)
- Calibration: IEC 60751
- Round  $\varnothing$  0.39" x 4.72" (10 x 120 mm)
- Cable CuAg 3 x 0.015 in<sup>2</sup> (0,38 mm<sup>2</sup>) insulated
- Standard cable length: 8.2 ft (2,5 m) (different lengths on request)
- Dielectric strength: 30 KVac - 60"
- Max. operating temp.: 220 °C



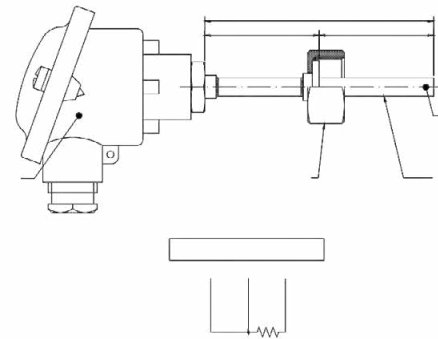
**TECHNICAL SPECIFICATIONS**

- Type: RTD Pt100 ohm at 32 °F (0 °C)
- Calibration: IEC 60751
- Flat type 0.1 x 0.4 x 2.36 inches (2,5 x 10 x 60 mm)
- Fiberglass laminated case
- Cable type CuSn 3 x 0.0086 inches<sup>2</sup> (0,22 mm<sup>2</sup>) MFA insulated
- Standard cable length: 8.2 ft (2,5 m) (different lengths on request)
- Max. operating temp.: 356 °F (180 °C)

**VERSION**

- **PTSP2.5** (Tecsystem Code → **1SN0062**)

\*Custom lengths available upon request



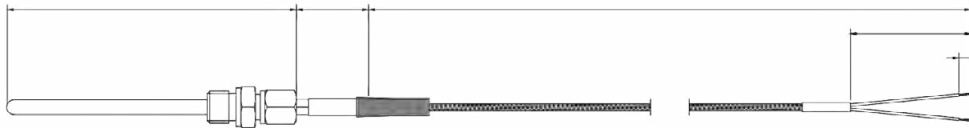
**TECHNICAL SPECIFICATIONS**

- Type: RTD Pt100 ohm at 32 °F (0 °C)
- Head DIN B, SS probe Ø 0.31" (8 mm)
- Probe length: from 3.93" to 7.87" (100 to 200 mm)
- Thread 3/4" or 1/2" gas
- Working ambient temperature: -40 °F + 212 °F (-40 °C + 100 °C) (sensor head)
- Range of temperature reading: -40 °F + 482 °C (-40 °C + 250 °C)

**VERSION**

- **PTO** (Tecsystem Code → **1SN0050**)

# TCK



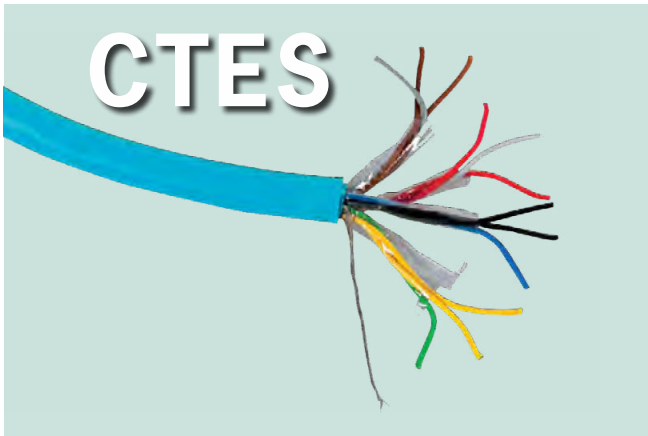
## TECHNICAL SPECIFICATIONS

- Thermocouple Cr-All
- Ø 0.24 x 5.91" (6 x 150 mm) U.T.
- Compression fitting thread 1/4" Gas
- Cable compensated type K 0.79 x 0,009 inches<sup>2</sup> (2 x 0,22 mm<sup>2</sup>) insulated TEX-TEX armored
- Max. operating temp.: 1382 °F (750 °C)
- Type "A" = straight type - Type "B" = 90° type

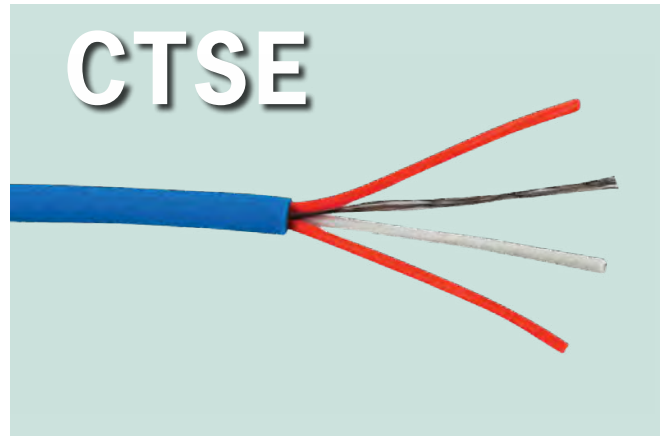
## VERSION

- **TCK** (Tecsystem Code → **1SN0216**)

# CTES



# CTSE



## VERSION

- **CTES** (Tecsystem Code → **1CA0003**)

## TECHNICAL SPECIFICATIONS

- Extension cable for Pt100 sensor
- In accordance with 20.35 CEI rules
- 4 turns 20AWG with shield
- External diameter: 0.472" (12 mm)
- Operating temp.: from -31 °F to +194 °F (-35 °C to +90 °C)
- Dielectric strength: 2000 Vac - 60"

## VERSION

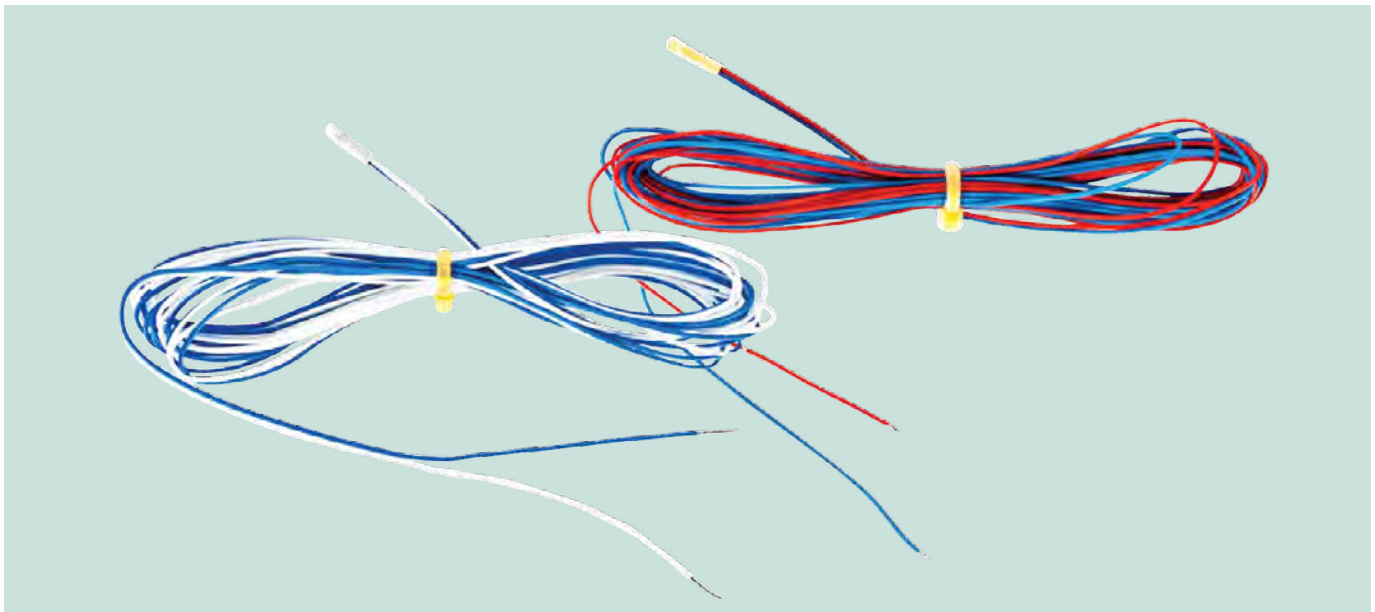
- **CTSE** (Tecsystem Code → **1CA0004**)

## TECHNICAL SPECIFICATIONS

- Extension cable for Pt100 sensor
- External diameter: 0.21" (5,2 mm) ± 0,2
- Operating temp.: from -40 °F to +392 °C (-40 °C to +200 °C)
- Dielectric strength: 5000 Vac - 60"



# PTC

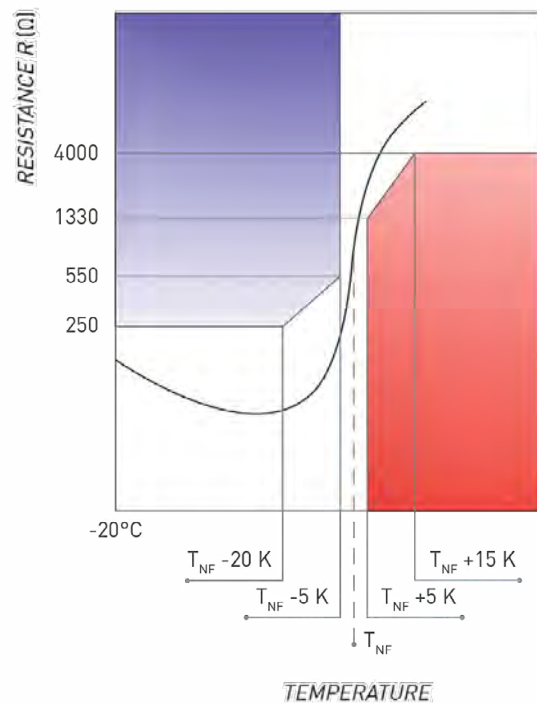


## VERSIONS

- **PTC** (Tecsystm Code → **Consult Factory**)

## TECHNICAL SPECIFICATIONS

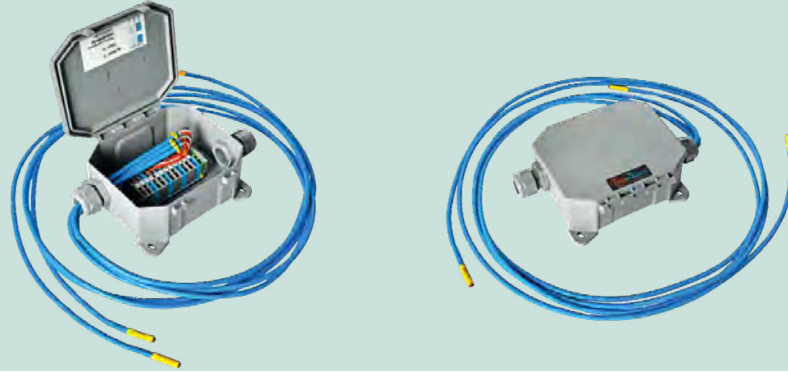
- Designed to control the temperature of the windings of transformers and motors
- In accordance with DIN 44081 and 44082 rules
- Response temperature: from 140°F to 374°F (60°C to 190°C)
- Fast response type
- Cable in PTFE (std. 118.11" (3 m) further lengths on request
- Ø of the sensor: 0.118" (3 mm)
- Lead cross-section: 0.005 inches<sup>2</sup> (0,14 mm<sup>2</sup>)
- Dielectric test Ueff 2500V



## CABLES COLOR CODING

60	70	80	90	100	105	110	115	120	125	130
WHITE	WHITE	WHITE	GREEN	RED	BLUE	BROWN	BLUE	GRAY	RED	BLUE
GRAY	BROWN	WHITE	GREEN	RED	GRAY	BROWN	GREEN	GRAY	GREEN	BLUE
135	140	145	150	155	160	165	170	180	190	
RED	WHITE	WHITE	BLACK	BLUE	BLUE	BLUE	WHITE	WHITE	BLACK	
BROWN	BLUE	BLACK	BLACK	BLACK	RED	BROWN	GREEN	RED	BROWN	

# SCS-R3/4



## VERSION

- **SCS-R3/4** (Tecsystem Code → **1SC0021**)

The **SCS-R** is a box designed and manufactured by TECSYSTEM for a quick, safe and economic connection of the sensors which detect the temperature of cast resin transformers.

The length of the cables, as well as the type of sensors, can be determined according to the specific needs of the customer.

The **standard version**, as shown in the photos, feature with 3 PT100 sensors type PTSE with 98.4" (2.5 m) cable each.

## TECHNICAL SPECIFICATIONS

### Box Features

- Dimensions: 187x128x58 mm (cable glands included)
- Protection: IP55
- Material: Polyamide UL 94V0

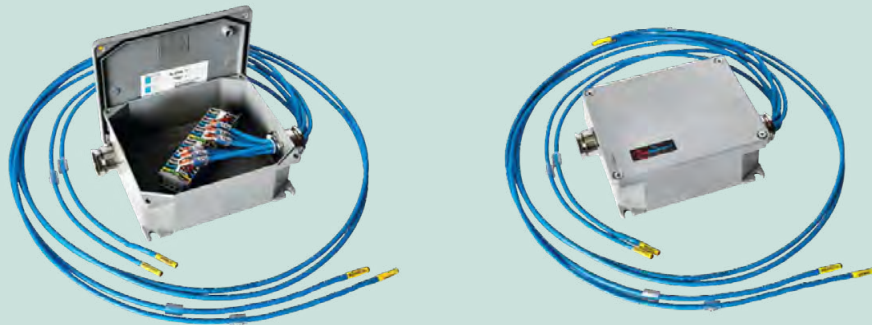
### Cable Gland Features

- Dimensions: PG16
- Protection: IP54
- Material: Polyamide UL 94V0

### Technical Board Features

- Wiring section: from 0,25 to 1,5 mm<sup>2</sup>
- Flame resistance: UL 94V0
- Operating Temperature: from -4 °F to +248 °F (-20 °C to +120 °C)

# SCS-R6/8



## VERSION

- **SCS-R6/8** (Tecsystem Code → **1SC0090**)

The **SCS-R** is a box designed and manufactured by TECSYSTEM for a quick, safe and economic connection of the sensors which detect the temperature of cast resin transformers.

The length of the cables, as well as the type of sensors, can be determined according to the specific needs of the customer.

The **aluminium version**, as shown in the photos, feature 6 PT100 sensors type PTSE with 98.4" (2.5 m) cable each..

## TECHNICAL SPECIFICATIONS

### Box Features

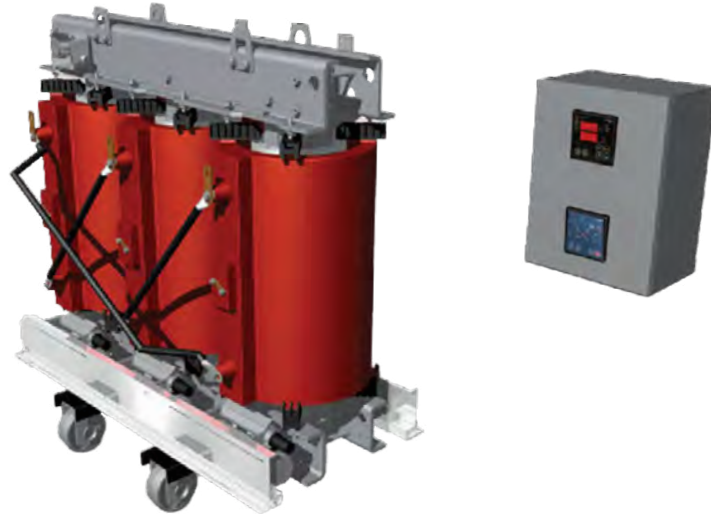
- SCS-R 6 dimensions: 197x143x67 mm (PG16 cable glands included)
- SCS-R 8 dimensions: 224x169x81 mm (PG16 cable glands included)
- Protection: IP66
- Material: die-cast aluminium

### Cable Gland Features

- Dimensions: PG16 or PG21
- Protection: IP54
- Material: Polyamide nickel brass

### Technical Board Features

- Wiring section: from 0,25 to 1,5 mm<sup>2</sup>
- Flame resistance: UL 94V0
- Operating Temperature: from -4 °F to +248 °F (-20 °C to +120 °C)



# Ventilation & Cooling Fans

Fan cooling allows transformers to withstand higher power than the nominal rating while still maintaining optimum temperature and safety. Fans are particularly important when integrated into the entire operation. Therefore it is appropriate to consider the environment where the fan will be located and pay attention to factors that can influence the temperature of the transformer and utilize a variety of factors to help control temperature.

For example:

- North-South orientation of the largest walls of the transformer room/ location to reduce heating from the sun.
- Consider humidity inside the room
- Keep the room as dust free as possible
- Keep the area free from corrosive or flammable gasses.

In many installations the transformer fan cooling is initiated by the temperature controller, which responds to the temperature of the transformer. The ventilation of the transformer room is often controlled by a thermostat. While these two devices work toward the same goal, they are working independently. For optimum air circulation, and ultimately energy savings, the two systems should work together to cool the room/transformer.

To achieve this, Springer Controls/Tecsystem offer the VRT series of controllers to control the room ventilation fan, which works in conjunction with their product line of temperature controllers. Springer Controls/Tecsystem also offers a range of fans to provide ventilation if it is not already present.

# VRT200 series



## VERSIONS

- **VRT200** (Tecsystm Code → **1CN0188**)  
Supply Power 85-250vAC
- **VRT200-U** (Tecsystm Code → **1CN0178**)  
Supply Power 12 v AD/DC

The **VRT200** ventilation fan controller is designed to control a ventilation fan in coordination with monitoring the transformer temperature. It contains 1 contact to enable remote control of the fans, and another 2 inputs to monitor temperature via a Ptc sensor, or auxiliary contact. The 2 output relays carry up to 5A and 230VAC to power the fans. There is also a fault/alarm relay for signaling undercurrent or overcurrent conditions with the fan motor, indicating a problem with operation. A key panel in the front allows for manual start/stop of the fan(s) and an AUTO-TUNE feature helps you set up motor protection parameters.

On request, a protective coating can be applied to the electronics board for tropical climates.

## TECHNICAL SPECIFICATIONS

### Power Supply

- Rated values: 230 Vac  $\pm$  10% 50/60 Hz
- Burden: 5VA (max)

### Inputs

- 1 contact to enable the remote control (ENABLE)
- 2 inputs to check the temperature by Ptc or auxiliary contact.
- Removable rear terminals

### Outputs

- 1 alarm and fault relay (ALARM/FAULT)
- Output relay capacity: 5A-250 Vac cosF=1
- Outputs M1-M2: 230 Vac $\pm$ 10%, 2x5 A max., 50-60 Hz

### Dimensions

- 3.94" x 3.94" (100 x 100 mm) DIN 43700  
depth 5.16" (131 mm) (terminals included)
- Panel cut-out 3.62" x 6.62" (92 x 92 mm)

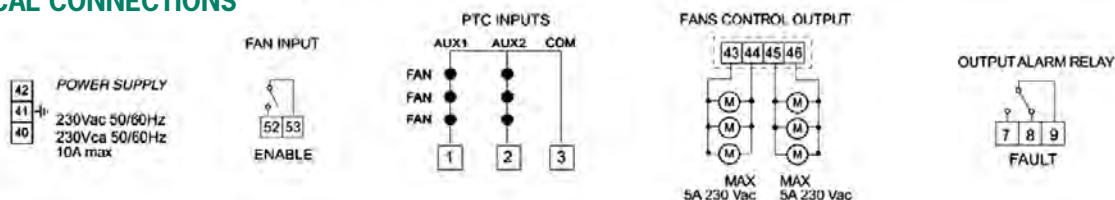
### Tests and Performance

- Assembling in accordance with CEI EN61000-4-4
- Dielectric strength: 1500 Vac for 1 minute: supply-relay fault, supply-remote
- Ambient operating temperature: from -4°F to +140°F (-20°C to + 60°C)
- Humidity: 90% non-condensing
- Self-extinguishing housing NORYL UL 94V0
- Option: tropicalization
- Frontal in polycarbonate IP65

### Display and Data Management

- Alarm leds: undercurrent, overcurrent, overtemp-aux stop
- Running, remote, local leds
- Prg, prg setting, cal. leds
- Starting AUTO-TUNING for motor protection set-up
- Front key for manual START/STOP of the motors
- Front alarm reset key
- Programming access through front key

## ELECTRICAL CONNECTIONS



# VRT600 series



## VERSIONS

- **VRT600** (Tecsistem Code → **1CN0201**)  
Supply Power 85-250vAC
- **VRT600-U** (Tecsistem Code → **1CN0096**)  
Supply Power 12 Vac-dc

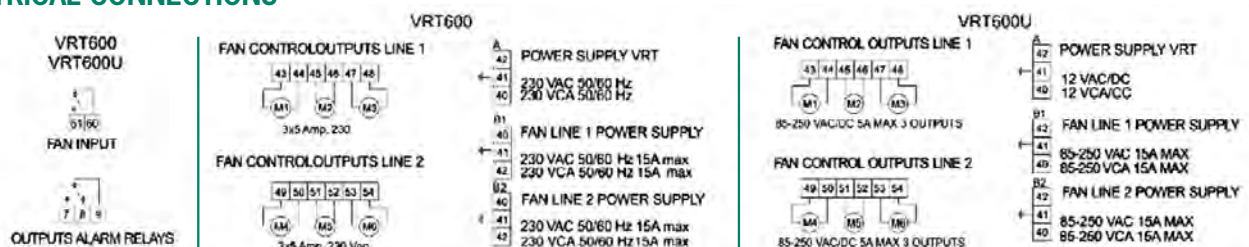
The **VRT600** ventilation fan controller is designed to control a ventilation fan in coordination with monitoring the transformer temperature. It contains 1 contact to enable remote control of the fans, and another 2 FAN input lines @ 230VAC, 15A maximum current. 6 output relays carry up to 30 Amp and 85-250 VAC to power the fans. There is also a fault/alarm relay for signaling undercurrent or overcurrent conditions with the fan motor, indicating a problem with operation. A key panel in the front allows for manual start/stop of the fan(s) and an AUTO-TUNE feature helps you set up motor protection parameters.

On request, a protective coating can be applied to the electronics board for tropical climates.

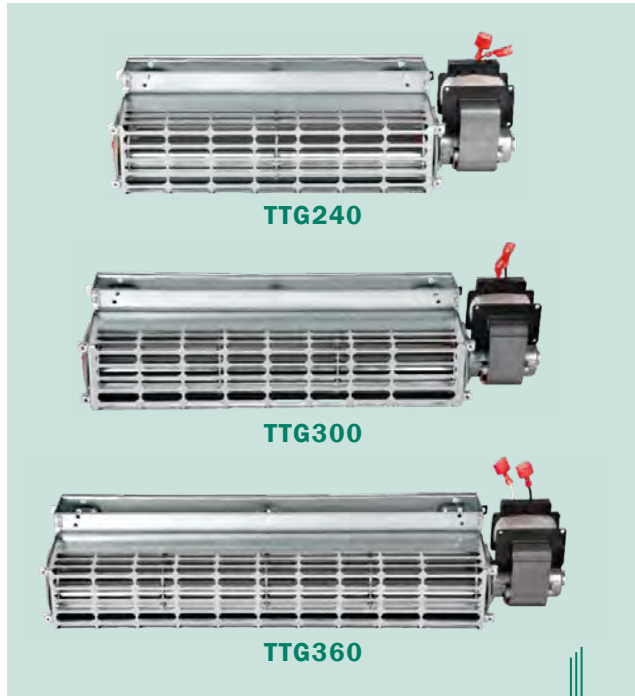
## TECHNICAL SPECIFICATIONS

Power Supply	Tests and Performance
<ul style="list-style-type: none"> <li>• Rated values 230 Vac ± 10% 50/60 Hz</li> <li>• Burden: 7,5 VA</li> </ul>	<ul style="list-style-type: none"> <li>• Assembling in accordance with CEI EN61000-4-4</li> <li>• Dielectric strength: 1500 Vac for 1 minute: supply-relay fault, supply-remote</li> <li>• Ambient operating temperature: from -4°F to +140°F (-20°C to + 60°C)</li> <li>• Humidity: 90% non-condensing</li> <li>• Self-extinguishing housing NORYL UL 94V0</li> <li>• Option: tropicalization</li> <li>• Frontal in polycarbonate IP65</li> </ul>
Inputs	Display and Data Management
<ul style="list-style-type: none"> <li>• 2 lines input FAN 230 Vac±10%, 15 A max., 50-60 Hz</li> <li>• 1 contact to enable the remote control (ENABLE)</li> <li>• Removable rear terminals (except FAN lines)</li> </ul>	<ul style="list-style-type: none"> <li>• Alarm leds: undercurrent, overcurrent, overtemp</li> <li>• Running, remote, local leds</li> <li>• Prg, prg setting, cal. leds</li> <li>• Starting AUTO-TUNING for motor protection set-up</li> <li>• Front key for manual START/STOP of the motors</li> <li>• Front alarm reset key</li> <li>• Programming access through front key</li> </ul>
Outputs	
<ul style="list-style-type: none"> <li>• 1 alarm and fault relay (ALARM/FAULT)</li> <li>• Output relay capacity: 5A-250 Vac cosF=1</li> <li>• Outputs: M1-M2-M3-M4-M5-M6: 230 Vac±10%, 6x5 A max., 50-60 Hz</li> </ul>	
Dimensions	
<ul style="list-style-type: none"> <li>• 3.94" x 3.94" (100 x 100 mm) DIN 43700 depth 5.16" (131 mm) (terminals included)</li> <li>• Panel cut-out 3.62" x 6.62" (92 x 92 mm)</li> </ul>	

## ELECTRICAL CONNECTIONS



# TTG fan series



The **TTG fan series** are the smallest ventilation fans we offer, but don't let their small size fool you, these fans still move a lot of air. **All TTG fans require 230VAC, 1ph, 50/60Hz input power.** The TTG is available in 3 sizes: (please consult factory for pricing)

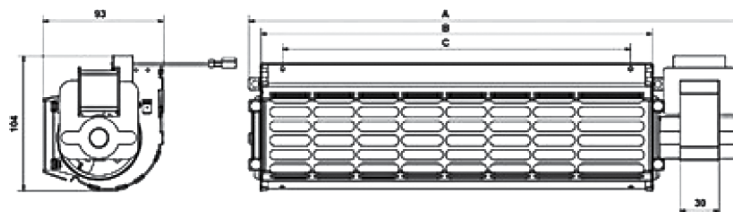
## VERSIONS

- **TTG240** 122cfm & 43 Watts  
(Tecsystem Code → **1VN0028**)
- **TTG300** 176cfm & 48 Watts  
(Tecsystem Code → **1VN0031**)
- **TTG360** 212cfm & 51 Watts  
(Tecsystem Code → **1VN0034**)

## TECHNICAL SPECIFICATIONS

Model	Ø	A	B	C	Voltage Current (V)/(A)	Input Power (W)	Frequency (Hz)	Speed (RPM)	Air Flow (M <sup>3</sup> /H)
TTG240	2.36" (60 mm)	12.6" (321 mm)	9.45" (240 mm)	8.23" (209 mm)	230/0.34	43	50	2540	208
TTG300		15" (381 mm)	11.9" (302 mm)	10.6" (269 mm)	230/0.35	48		2350	240
TTG360		17.4" (441 mm)	14.2" (360 mm)	12.9" (329 mm)	230/0.37	51		2200	280

- Insulation class F (Units Non UL)
- Special versions available by request.



# TG fan series



The **TG fan series** provides ventilation for rooms and structures to help save energy by combining the efforts of your transformer monitoring and cooling system with room ventilation. The TG fan series is offered in 4 different sizes, all suitable for 115 VAC input power: (please consult factory for pricing)

### VERSIONS

- **TG180** 271cfm & 75 Watts
  - **120v** (Tecsystem Code → **1VN0047**)
  - **240v** (Tecsystem Code → **1VN0067**)
- **TG360** 271cfm & 95 Watts
  - **120v** (Tecsystem Code → **1VN0011**)
  - **240v** (Tecsystem Code → **1VN0008**)
- **TG500** 589cfm & 120 Watts
  - **120v** (Tecsystem Code → **1VN0017**)
  - **240v** (Tecsystem Code → **1VN0013**)
- **TG1000** 1377cfm & 225 Watts
  - **240v** (Tecsystem Code → **1VN0018**)

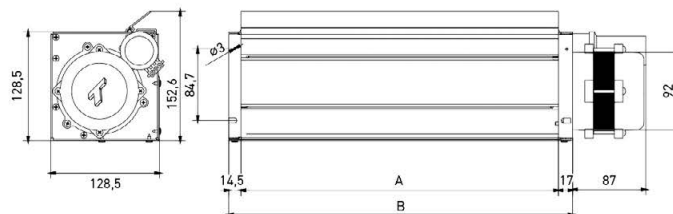
*Specifications on the following page*

### TECHNICAL SPECIFICATIONS

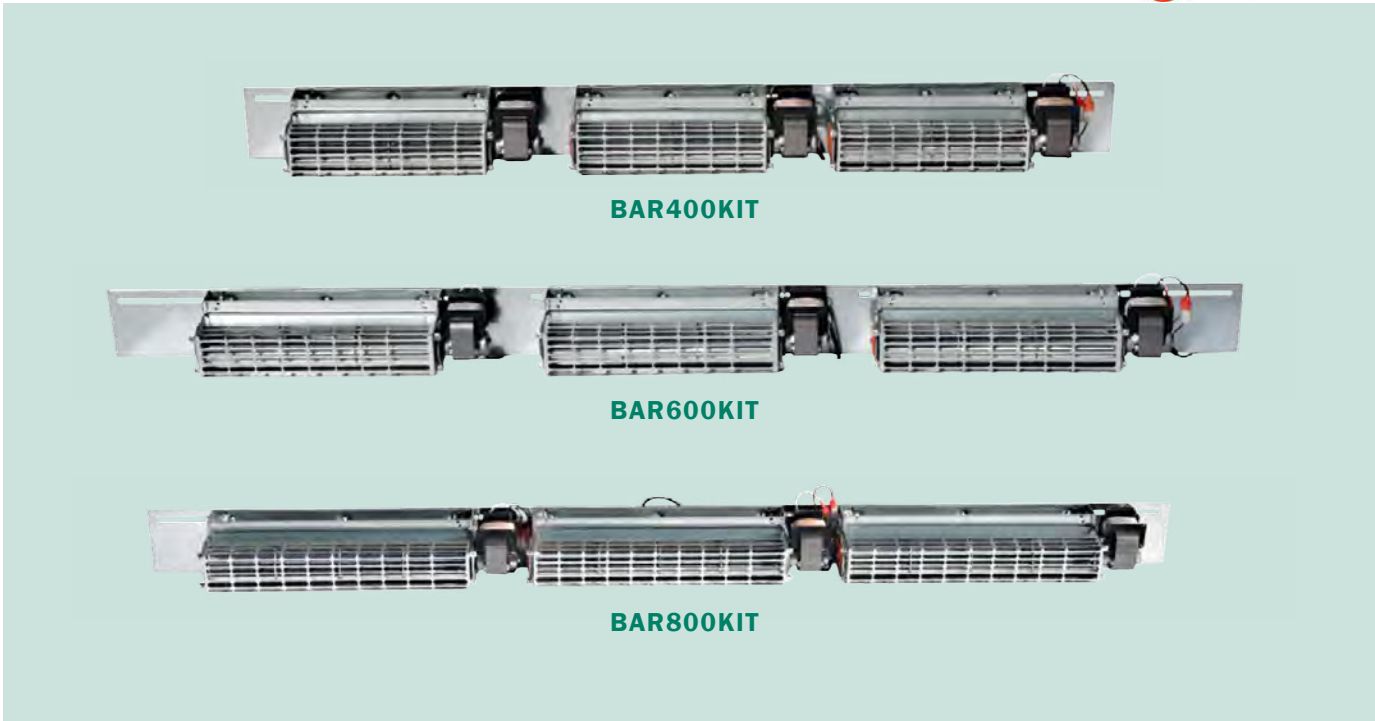
Model	Ø	A	B	Voltage Current (V)/(A)	Input Power (W)	Frequency (Hz)	Speed (RPM)	Air Flow (M <sup>3</sup> /H)
TG180	3.15" (80 mm)	7.72" (196 mm)	8.98" (228 mm)	230/0.34	75	50	2840	460
TG360		14.8" (376 mm)	16.1" (408 mm)	230/0.45	95		2710	800
TG500		20.3" (516 mm)	21.6" (548 mm)	230/0.54	120		2600	1000

- Insulation class B
- Special versions available by request.

- Available in 60 Hz, IP44 and UL, --- 120v listed are UL
- Power supply cable included



# BAR fan series

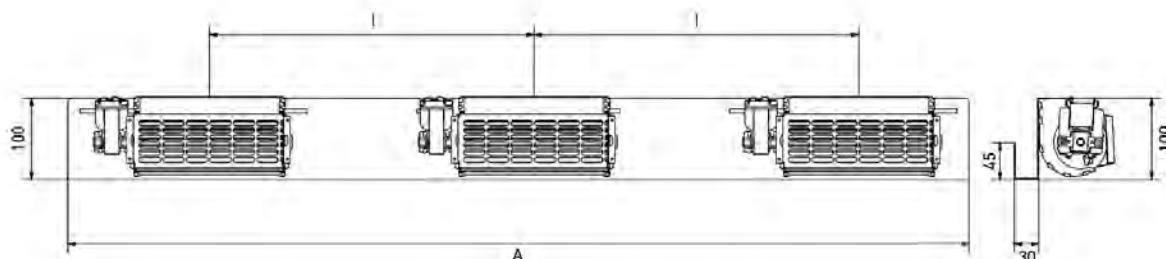


**BARx00KIT includes 3 Fans + Aluminum Bar + Conduit + Wiring + Accessories**

## SUGGESTED APPLICATIONS

Model	A	I min/max	Hypothetical Transfo Power	Air Flow (m <sup>3</sup> /H)	Model Fans
BAR400KIT	43.70" (1110 mm)	12.99"/16.53" (330/420 mm)	From 100 to 315 KVA	600	3 X TTG240
BAR600KIT	57.87" (1470 mm)	14.96"/22.64" (380/575 mm)	From 315 to 630 KVA	720	3 X TTG300
BAR800KIT		17.72"/21.42" (450/544 mm)	From 630 to 1250 KVA	800	3 X TTG360

- Special versions available by request.
- For BAR only, no fans, remove suffix "KIT"





# BAR fan series



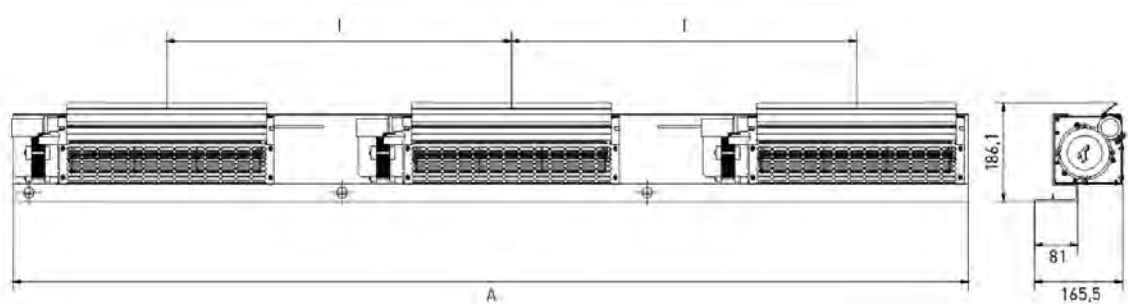
**BARxx00KIT includes 3 Fans + Aluminum Bar + Conduit + Wiring + Accessories**

## SUGGESTED APPLICATIONS

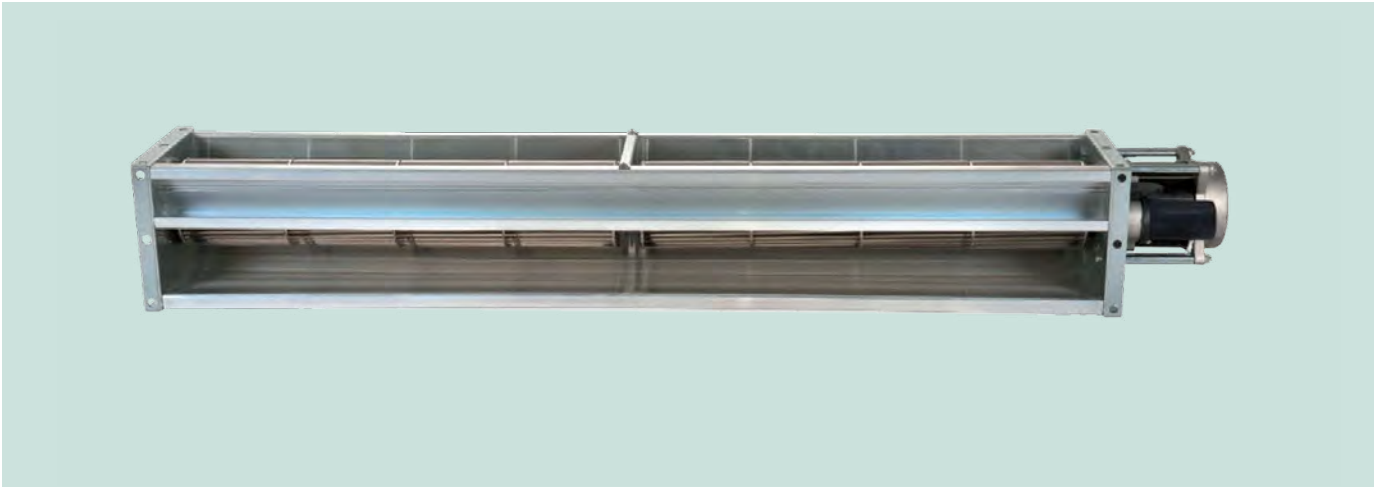
Model	A	I min/max	Hypothetical Transfo Power	Air Flow (m <sup>3</sup> /H)	Model Fans
BAR1200KIT-*	55.12" (1400 mm)	13.39"/22.24" (340/565 mm)	From 1250 to 1600 KVA	1380	3 X TG180
BAR1800KIT-*	70.87" (1800 mm)	20.28"/26.57" (515/675 mm)	From 1600 to 2000 KVA	2400	3 X TG360
BAR3600KIT-*	90.55" (2300 mm)	25.59"/33.86" (650/860 mm)	From 2000 KVA and higher	3000	3 X TG500

\* Add suffix "120V" or "240V"

- For BAR only, no fans, remove suffix "KIT"



# TG1000 fan



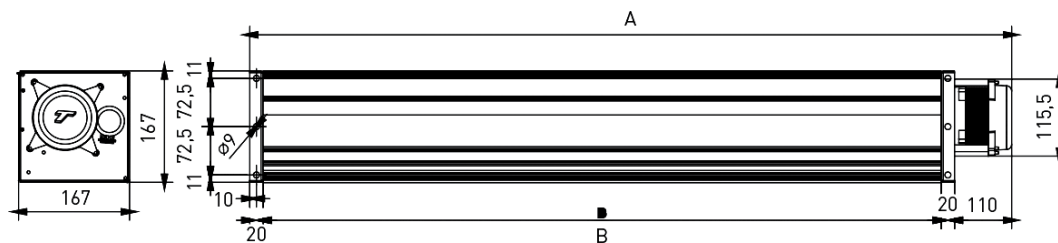
## VERSIONS

- **TG1000** 1377cfm & 225 Watts  
- **240v** (Tecsystem Code → **1VN0018**)

## TECHNICAL SPECIFICATIONS

Model	Ø	A	B	Voltage Current (V)/(A)	Input Power (W)	Frequency (Hz)	Speed (RPM)	Air Flow (M³/H)
TG1000	3.94" (100 mm)	46.38" (1178 mm)	40.16" (1020 mm)	230/1	225	50	1360	2340

- Insulation class B
- Available in clockwise and counterclockwise versions







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96074 Chester Road --- Yulee, Florida, 32097  
Phone: (904) 225-0575 --- Fax: (904) 225-9084