

**TEST CERTIFICATE
MOD. T-154**

The monitoring unit has been tested according to the following procedure

TEST	PROT.	TEST DESCRIPTION
1	A	Buttons working
2	A	Relays contacts test
3	A	General mechanics test
4	A	Calibration and linearization at 100 and 200°C
5	A	Programming cycle test
6	B/C	Accuracy test at 60°C ($\pm 1\%$)
7	A	Power supply test at 20/270 Vac-dc
8	A	50 hours working
9	B/C	Dielectric test between phase-ground and ground relays contacts at 2500 Vca for 60 seconds
10	B/C	Electric noise on power supply line and sensor line test according to IEC801-IV

TEST PROTOCOL DESCRIPTION:

A= all the units
B= every 100 units
C= extra-price certificate

DATE OF TEST:

SERIE NUMBER:

RESULT:

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INSTRUCTION MANUAL

T-154

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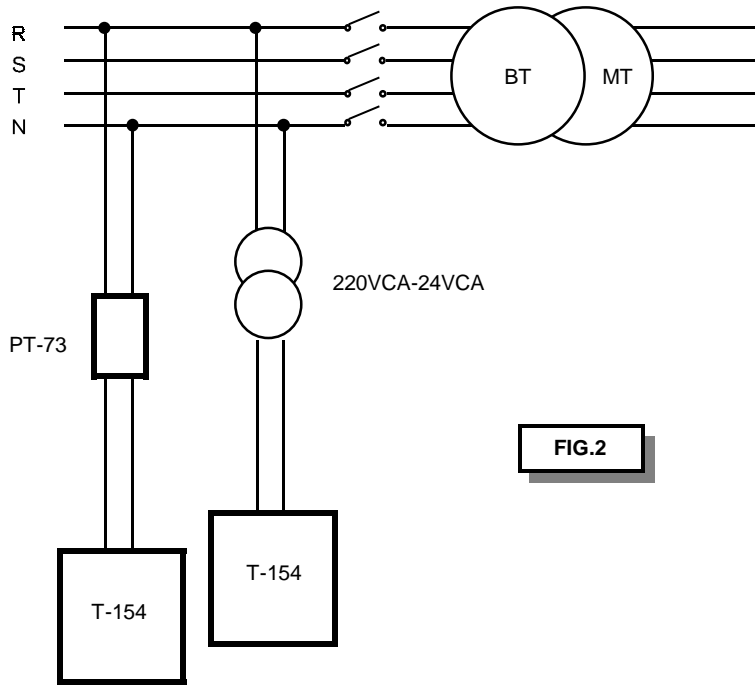


FIG.2

possible configuration of ALARM and FAULT relays parallel connection

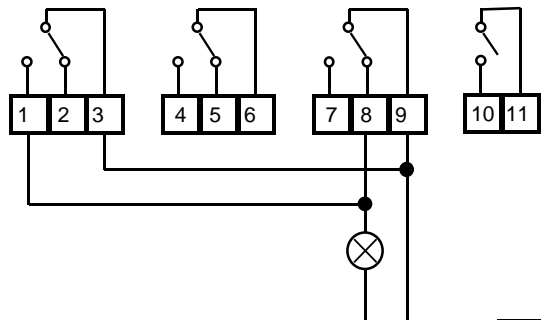
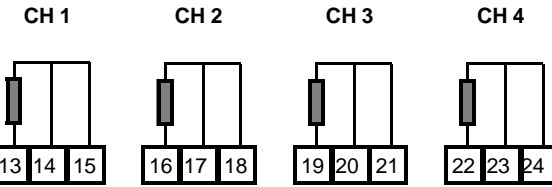


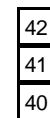
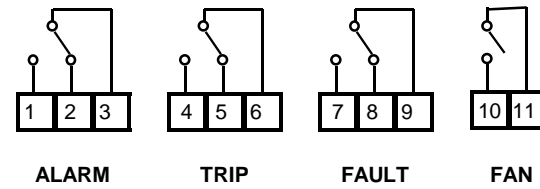
Fig.3

FIG.1 ELECTRICAL CONNECTION T-154

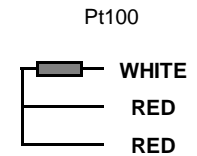
Pt100 SENSORS CONNECTION



ALARM AND FAN RELAYS CONNECTION



POWER SUPPLY
24-240 VCA-VCC



FAULTS DIAGNOSTIC

FAULT DIAGNOSTIC	CAUSES AND REMEDIES
The unit doesn't	
The unit doesn't switch on even if there is voltage to the terminals	Connector not well fit in its place. Connection wires not well closed in the clamp Burnt power supplier. <i>Take away and give again voltage.</i>
The CH4 is in FAULT FOC (Only three Pt100 sensors are connected)	Wrong programming of the unit. <i>Repete the programming.</i>
One of the 3/4 channels is in FAULT for FOC/FCC	Check the sensors Pt100 connection. Probable damaged sensor. <i>Subsitute the damaged sensor</i>
During the main switch manoeuvre ON-OFF, the ALARM and TRIP relays energize	Strong electrical noises on the power supply line. <i>Plug in the PT-73.</i> Check if the shield of the signal transport cable is connected to the ground in the side of the panel. <i>If you have not any shielded cable, You have to put it. (Mod. CT-ES).</i> <i>If it is not at your disposal, twist the three connecting wires of the sensors.</i>
All the Pt100 sensors are in FCC.	Wrong connection of the sensors. Upside-down terminal board. <i>Check the connections and the terminal board</i>
The temperature indicated by 1 or more channels is wrong.	Sensor/s Pt100 defective. <i>Check the sensor resistance by an Ohmetro.</i> Unit with input circuit unrated. <i>Send the unit to TECSYSTEM S.r.l. for reparation.</i>
With power supply at 24 Vdc, the unit switches off and , after a tension drop, it doesn't switch on again.	<i>Take off the voltage to the unit and check that the value of the Vdc is from 20 up to 24V.</i> <i>Give again voltage.</i> <i>If the unit does not switch on , send the unit back to TECSYSTEM S.r.l.</i>
Sudden release of the main switch with a normal temperature level. A only channel caused the unhooking.	Pt100 sensor defective (Fcd). <i>Substitute the sensor.Check the measure signal terminal board.</i>

AUXILIARY POWER SUPPLY	
<ul style="list-style-type: none"> Rated voltage 24-240 Vac-dc Maximum ratings 20-270 Vac-dc 	
INPUTS	OUTPUTS
<ul style="list-style-type: none"> 3 or 4 inputs RTD Pt100 sensors-3 wires removable rear terminals input channels protected against electromagnetic noises and spikes sensors lenght cables compensation up to 500 m (1mm²) 	<ul style="list-style-type: none"> 2 alarm relays (ALARM-TRIP) 1 alarm relay for fan control (FAN) 1 alarm relay for sensor fault or working anomaly (FAULT) output contacts capacity: 5A-250 Vac res. Arranged for output relays test
TEST AND PERFORMANCES	DISPLAYING AND DATA MANAGEMENT
<ul style="list-style-type: none"> Assembling in accordance with CE rules Protection against electrical and magnetic noises: CEI-EN50081-2/50082-2 Dielectric strength: 2500 Vac for 1 min. from relays to sensors,relays to power supply, power supply to sensors Accuracy: $\pm 1\%$ full scale, ± 1 digit Ambient operating temperature: -20°C to +60°C Humidity: 90% no-condensing ABS self-extinguishing housing-NORYL 94VO Opt. Frontal plastic protection Opt. Protection treatment of electronic part Frontal polycarbonate-IP65 Burden: 3VA Data storage: 10 years minimum Digital linearity of sensors signal Self-diagnostic circuit 	<ul style="list-style-type: none"> 1 display 13 mm high with 3 digits for displaying temperature led for displaying reference channel led indicating alarm or trip channel led indicating fault temperature monitoring from 0°C to 200°C 2 alarm thresholds 2 alarm ON-OFF thresholds for fan control sensors diagnostic (Fcc-Foc-Fcd) entering the programming by frontal push button automatic output from programming cycle after 1 minute of no-operation wrong programming automatic display programmed data call out possibility of setting automatic channel scanning, hottest channel,manual scanning maximum temperatures and alarms reached storage frontal alarm RESET push button
DIMENSIONS	
<ul style="list-style-type: none"> 96x96 mm-DIN43700-prof.140mm(with rear terminals) 	

MOUNTING

Make a hole with the dimensions of 92x92 mm in the panel plate.
Fasten firmly the unit by the fixing blocks you are equipped with.

POWER SUPPLY

The T-154 unit has an Universal Power Supply: it can be supplied indifferently from 24 to 240 Vac-dc without any respect of the polarities.

This particularity is obtained by the application of a tried power supplier which provides the installer free from the worries concerning the correct Vac or Vdc power supply.

The ground cable must be fixed to the clamp 41.

When the unit is supplied directly from the secondary of the transformers to protect, it can be fulminated by high intensity overvoltage (>270 Vac-dc - max limit).

This happens when the charge is connected with the locking of the master switch.

This is much more evident when the 220 Vac voltage is obtained directly from the bars of the secondary of the transformers and there is a fixed phase adjustment condenser of the same transformer.

*In order to protect the electronic apparatus, we counsel the application of the electro-
nic discharges of the serie PT-73 - mono or double phase - which have been studied
by Tecsystem Srl for this specific purpose.*

ALARMS AND FAN CONTROL ELECTRICAL CONNECTIONS

Carry out the electrical connections on the extractable terminal board after having taken them off from the apparatus (follow the Fig.1).

ALARM and TRIP relays energize only when the prefixed temperature limits are reached.

The FAULT relay energizes when the apparatus is supplied and it de-energizes when the Pt100 are damaged or when there is not any power supply voltage.

The FAN relay can be utilized for the cooling-fan control or else it can be inserted in a conditioning circuit of the transformer box.

THERMOMETRIC SENSORS CONNECTION

Each Pt100 sensor has three conductors : one white and two red (CEI 75.8)

The Fig.1 shows the disposition in the terminal board of the connection cables to the unit.

The CH2 channel must be always refired to the central column of the transformer.

The CH4 channel must be always refired to the core of the transformer or else to the ambient Pt100 sensor ,if you want to keep under thermic control the box of the transformer by the T-154 unit.

WARRANTY

The serie "T" units are under warranty for 12 months from the delivery date signed on the unit.

The warranty is recognised when the unit breaks down due to some production faults or insufficient calibration.

The warranty is not valid when the unit is tampered with or when it has been damaged for a wrong sensors connection or wrong power supply, out of the max working limits (20=270 Vac-dc). The warranty is not valid when the unit has been fulminated by excessive transitory voltages. In this case TECSYSTEM Srl does not answer for damages caused by faulted or defective units. All the delivery expenses (there and back) of the unit must be payed by the Customer.

In case of dispute, the qualified FORUM is the one in Milan.

The warranty is always F.CO our Company in CESANO BOSCONO.

PT100 EXTENSION CABLE: TECHNICAL SPECIFICATIONS

Cable 22xAWG 20/19 cu/stg

Section 0,55 mm²

Antiflame Insulation PVC105

In accordance to CEI 20.35 IEC 332.1

Max. working temperature: 105°C

Conformation : 4 terns of the numbered conductors (1-1-1.....4-4-4)

WWR twisted and coloured conductors

Shield cu/stg

PVC Antiflame protecting covering

External diameter 9,0 mm

Skins of 100 m











PROGRAMMING REHABILITATION IN CASE OF BLOCK (Prg no)

If the programming has been blocked (step 22), in order to enter again the programming of the unit, it is necessary to carry out the following unblocking procedure :

- enter the program vision way pushing PRG
- keep TEST pushed untill PRG stops to lighten.(LED PROGRAM alight)

During the blocking, pushing PRG for more than two seconds, on the display it appears "noP" to indicate the impossibility to program the datas.

PROGRAMMING**IMPORTANT: LED PROGRAM SWITCH OFF: VISUALIZATION OF THE PROGRAM****LED PROGRAM LIGHT ON: INPUT TO THE PROGRAM**

N° STEP	PUSH BUTTON	EFFECT	NOTES
1	PRG/SET	Keep the push button pressed for 7" until Set appears and PRG starts to lighten. when PRG stops lighteing the set DE-FAULT ALARM temperature will appear on the display	led program allight
2		set up the established limit	
3	PRG/SET	TRIP set T°appearst	
4		set up the established limit	
5	PRG/SET	"FAN" appears	
6		set up FAN YES or no	YES:FAN connected "no":FAN disconnected
7	PRG/SET	on the display appears oFF	
8	PRG/SET	it appears the oFF T°	
9		set up the temperature	only if at the step 6 you established YES
10	PRG/SET	on the display appears on	
11	PRG/SET	it appears the ON T°	
12		set up the temperature	only if at the step 6 you established YES
13	PRG/SET	on the display appears CH4	
14		set up CH4 YES or no	YES: Ch4 connected NO: CH4 disconnected
15	PRG/SET	way of FAN control-on the display appears CHF	
16		set up CH 1,2,3, or CH4	respective LED alight
17	PRG/SET	way of FAN control TEST on the display appears h00	
18		set up the number of hours	only if at the step 6 established YES h00 =function disconne.
19	PRG/SET	on the display appears Fcd	
20		set up Fcd YES or no	Fcd YES= control of damaged Pt100 connected
21	PRG/SET	on the display appears Prg	
22		set up Prg YES or no	Prg no = programming is blocked
23	ENT PRG/SET	out of the programming return to step 1	LAMP TEST

MEASURE SIGNALS TRANSPORT

All the transport cables of the Pt100 measure signals must absolutely:

- be divide from the power ones
- be realized with shielded cable with twisted conductors
- have a section of min 0,5 mm²
- be twisted if you have not any shield
- be firmly fixed in the terminal board
- have tinned or silvered conductors

All the serie "T" units have the sensors linearization with a max error of 0,5% v.f.s..

TECSYSTEM srl has realised a special cable for the measure signal transport with all

THERMOMETRIC SENSORS DIAGNOSTIC

In the case of damage of one of the thermometric sensors which are installed on the machine to protect, the **FAULT** relays energizes immediately, the ALARM and TRIP LED of the damaged channel (Chn) lighten and the **FAULT LED** is lightening.

Automatically on the display it will appear the kind of sensor damage which can be:

- **Fcc** if the sensor is in short circuit
- **Foc** if the sensor is disconnected

During the normal working of the unit, if you programmed **Fcd**/YES the display will signal by **Fcd** that a sensor is damaged and the LED which corresponds to the respective channel will lighten (Chn).

The **FAULT** relay energizes giving a signal to the operator.

After the replacement of the damaged sensor, you can RESET the alarm pushing RESET until on the display will appear **RST**.

TEMPERATURES DIAGNOSTIC

When one of the thermometric sensors surveys a temperature which is superior to 1°C of the alarm limit, after 4 seconds the **ALARM** relay will energize and the ALARM LED of the respective channel (Chn) will switch on..

We have the same situation when the TRIP temperature limit is surveyed: we have the energizing of the **TRIP** relay and the lighting of the LED TRIP of the respective channel (CHn)

When the surveyed temperature falls of 1°C in comparison with the prefixed limit for the **ALARM** and **TRIP** switching, the relays de-energize and the respective LEDS switch off.

COOLING-FAN CONTROL

The T-154 unit, if suitably programmed, can control the ON-OFF for the transformer fans on the ground of the established temperatures.

The fans of the machine can be controlled in two different ways:

- using the temperatures surveyed by the sensors on the three columns
CHF 1.2.3
 ALARM and TRIP LED CH1.2.3 switched on
 (ex. ON at 80°C - OFF at 70°C)
- by an additional sensor (**CH4/YES**) for the ambient temperature in the box of the transformer.
CHF 4
 ALARM e TRIP LED Ch4 switched on
 (ex. ON at 40°C - OFF at 30°C)

You can select it by UP and DOWN push-buttons..

FAN TEST

By programming (**hxx**) you can establish to have the fans set for 5 minutes every "xx" hours, independently on columns or ambient temperatures values.

This function has the purpose to verify periodically the fans working, when they are not utilized.

Establishing **h00** this functions is excluded.

DISPLAY MODE

Pressing on DISPLAY MODE you establish the visualization ways of the display:

- **AUTO** : the unit visualizes automatically the hottest channel
- **MAN** : manual reading of the channels temperature by UP and DOWN push-buttons
- **T.MAX** : the unit visualizes the max. temperature reached by the sensors and the eventual alarms starting from last reset.

WORKING PROGRAM CONTROL

In order to control the programmed temperature values, you have to push shortly on PRG. Pushing PRG repeatedly the values established precedently appear on the display in sequence.

In order to end the visualization you have to push ENT.

LAMP TEST

It is advisable to carry out regularly the LED test of the unit. For this operation you have to push TEST.

If one of the LED does not work, please send us the unit in order to be repaired.

ALARM RELAYS TEST

This function allows to test the relays working without any additional instrument.

To carry out the test you have to push TEST for 5 seconds: all the LED will switch on and on the display will appear **tSt** lightening.

Release it when the RELAY TEST LED will be alight.

The first relay to test will be indicated by the display and the respective LED will be alight.

The relays to test will be indicated on the display by:

- **"Fan"** :cooling relay
- **"Fit"** :Pt100 fault relay
- **"Alr"** :alarm relay
- **"trP"** :trip relay

Select the relay to test by UP and DOWN push-buttons. Energize it pushing SET and de-energize it pushing RESET.

In order to stop this procedure, you have to push again TEST and all the relays will be restored to the starting configuration.

After 5 minutes of inactivity of the keyboard, the TEST RELAY procedure will be automatically interrupted.

ALARM RELAY EXCLUSION

If you want to exclude the alarm signal, you have to push RESET: the relay de-energizes and the respective LED, which was alight, starts to lighten. If the transformer temperatures is still rising, the ALARM relay will energize again until to have a temperature value of 5°C less than TRIP threshold. In this moment the user can exclude again the ALARM, but in this case, it will not appear any other indication as regards ALARM relay.

The exclusion system will be automatically disconnected when the temperature falls down the ALARM threshold.

IMPORTANT NOTICE

Before making the insulation test on the electrical panel on which the unit is installed, you must take it off from the power supply in order to keep it out of damage.