500 / 501

CONFIGURABLE CONTROLLERS

Main applications

- *Plastics extrusion lines and injection moulding machines*
- *Polymerisation plant for synthetic fibre production*
- *Climatic chambers and test benches*
- *Chemical and pharmaceutical industries*
- *Food processing*
- *Packaging machinery*
- *Wood working machines*
- *Polyuretan machines*
- *Mould cooling units*
- *Industrial ovens*
- *Presses for rubber*

Main features

- *Inputs for thermocouples and resistance thermometers completely configurable from the faceplate*
- *Settable Offset function for input signal*
- *Relay, logic or continuous control output*
- *Loop Break Alarm for open circuit load or shortcircuit probe*
- *Alarm with configurable PD action for cooling*
- *Self tuning, Auto tuning, Soft-start, bumpless Man/Auto function*

GENERAL

Microprocessor controller in 48x48 (1/16 DIN) format manufactured with SMT.
The instruments have an operator interface made up of 3 keys, a double 3-digit (500) or 4-digit (501) display and 3 indicator LED's, protected by a Lexan membrane to IP54.
The input section for the measured variable offers the choice of different sensor types:
• Thermocouples type J, K, N, S, R, T
• Resistance Thermometer Pt100 (3-wire)
• Linear inputs:
0-50mV, 10-50mV faceplate configurable 2-10V, 0-10V, 0-20mA, 4-20mA with external shunt.
The instruments have two relay outputs (5A, 250Vac with cosφ = 1) or static PNP (24Vdc, 20mA).
The first output is changeover and is dedicated to the control output.
The second is a programmable alarm.
In alternative to the relay control output, it is possible to have an analogue output 0-20mA, 4-20mA or 0-10V, 2-10V.
The programming of the instrument has increasing levels of complexity and the various parameters are grouped in three different layers.
With increasing value of the programmable protection code, it is possible to place lower limits on the access of the operator to modify the configuration parameters.
A hardware jumper removes the possibility to enter into the configuration.

TECHNICAL DATA

INPUTS

Accuracy 0,5% f.s. ±1digit.
Sampling time 120msec.

TC - Thermocouple

for **500** instrument
J (Fe-CuNi) 0...800°C / 32...999°F
K (NiCr-Ni) 0...999°C / 32...999°F
N (NiCrSi-NiSi) 0...999°C / 32...999°F
S (Pt10Rh-Pt) 0...999°C / 32...999°F
R (Pt13Rh-Pt) 0...999°C/32...999°F
T (Cu-CuNi) -100...400°C / -148...752°F

for **501** instrument
J (Fe-CuNi) 0...800°C / 32...1472°F
K (NiCr-Ni) 0...1300°C / 32...1999°F
N (NiCrSi-NiSi) 0...1300°C / 32...1999°F
S (Pt10Rh-Pt) 0...1600°C / 32...1999°F
R (Pt13Rh-Pt) 0...1600°C/32...1999°F
T (Cu-CuNi) -100...400°C / -148...752°F

Configured from the faceplate.
The error on the ambient temperature compensation is 0,05°C for every °C variation.
Over and under range, erroneous connection and open circuit probe messages.

RTD 2/3-wires

for **500** instrument
Pt100 -19.9...99,9°C / -19,9...99,9°F
Pt100 -199...400°C / -199...752°F

for **501** instrument
Pt100 -199,9...199,9°C / -199,9...199,9°F
Pt100 -200...400°C/ -328...752°F

DC - Linear

0...50mV, 10...50mV
Input impedance >1MΩ.
To be used only with external shunt on the controller for 0...10V, 0/4...20mA signals.

OUTPUTS

Main output (MAIN) with direct action (heating) / inverse action (cooling).

Relay

Rated at: 5A/250Vac a cosφ=1
(3,5A a cosφ=0,4).
Spark suppression on the NO contact (order code: R0)

Logic

22Vdc, Rout=470Ω (20mA, max 12V)
Protected against inverse polarity and shortcircuit.
(order code D2)

Continuous

0...20mA or 4...20mA on a maximum resistance of 500Ω configurable as 0...10V with 500Ω load impedance.
Load resistance ≥ 47kΩ.

POWER SUPPLY

Standard: 100...240Vac/dc ±10%
on request: 11...27Vac/dc ±10%
50/60Hz, max. 6VA
Protection by internal fuse not serviceable by the user.

AMBIENT CONDITIONS

Working temperature: 0...50°C
Storage temperature: -20...70°C
Humidity: 20...85%Ur non condensing

CONTROL

On/Off, P, PD, PID either for heating or cooling, with parameters configurable from the faceplate:
- Proportional band 0,0...99,9% f.s.
- Integral time 0,0...99,9 min
- Derivative time 0,0...9,99 min (0,0...19,99 min)
- Reset power (proportional band position) 0...100%
- Hysteresis (only for On/Off control) -199...999 (-999...1999) digit.
- Soft-start (gradual increase of main output power over a predetermined time on switch on) 0...99,9 min
- Manual reset (correction of the offset after setting) -199...999 digit (-999...1999)
- Offset (setting a difference between the actual measurement of the input probe and the value read by the controller) -199...300 (-300...300) digit.
- Automatic/Manual function with Bumpless transfer between manual and automatic. Manual power stored.
- Automatic power ON and power OFF to disactivated the instrument.

ALARMS

• 1 alarm, settable as absolute, deviation or symmetrical deviation alarm with respect to the control setpoint with configurable mode (Hi or Lo).
• The alarm point may be set anywhere within the configured scale.
• Alarm (AL) with PD action with configurable parameters:
- Proportional band is set for the hysteresis -199...999 (-999...1999) digit.
- Derivative time 0,0...9,99 (0,0...19,99) min.
- Cycle time 1...200sec (0 for On/Off alarm).
• Alarm output can be associated to LBA function for open circuit load or shortcircuit probe.
• LBA (Loop Break Alarm) function alarm.
• Intervention time and power output in the alarm condition are configurable from the faceplate.
• Hysteresis for the alarm setpoints is configurable from the faceplate in the range:
-199...999 (-999...1999) digit

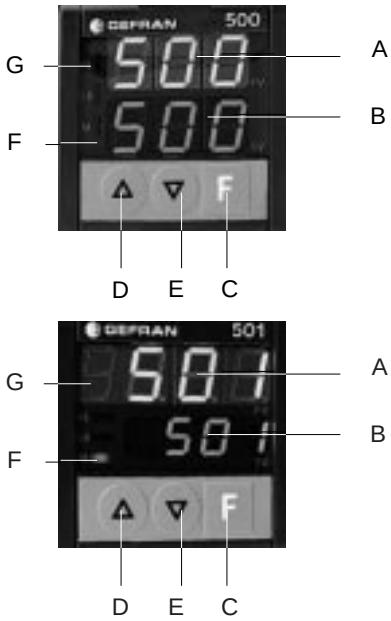
WEIGHT

250g

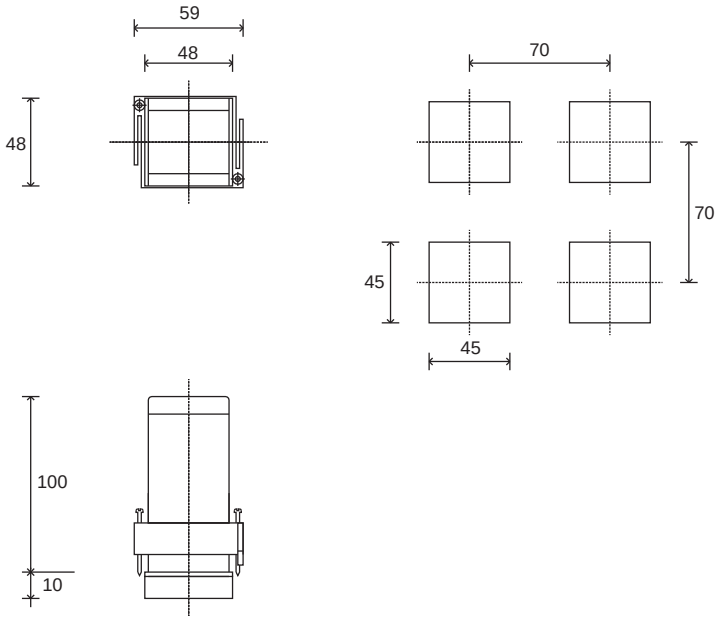
FACEPLATE DESCRIPTION

A - Input variable display,
3 digit (500), 4 digit (501), green digits h. 10mm
B - Display of entered data
3 digit (500), 4 digit (501), green digits h. 10mm (500), 8mm (501)
C - “Function” key
D - “Raise” key
E - “Lower” key
F - Main output indication, green led
G - Alarm output indication, red led

IP54 faceplate protection

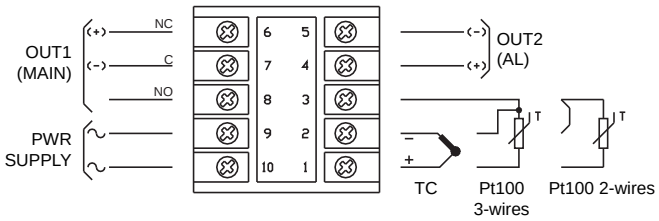


DIMENSIONS AND CUT-OUT



Dimensions: 48x48mm depth 100mm

CONNECTION DIAGRAM



Apply user's manual warnings for a correct installation

ORDER CODE

MODEL	
500	500
501	501

OUTPUT	
Relay	R0*
Logic	D2
DC voltage	V
DC current	I

ALARMS	
1 relay alarm	R0*
1 logic alarm	D2

POWER SUPPLY	
11...27Vac/dc	0
100...240Vac/dc	1*

(*) Standard model

STANDARD CONFIGURATION HW and SW

- With Hw/Sw configuration protection

Setpoint = 400
AL = 100
Pb = 1,0%
rSt = 0
Ct = 20sec
PSt = 0%
S.tu = 0
Lb.t = 0min
Lb.P = 25%
It = 4,0min
dt = 1,0min
SOF = 0
Hy1 = 1
Pro = 19
AL = 11 (=1)
Out = 0
Typ = 0
Ct.a = 20 sec
dt.A = 1,00 min
oFt = 0
LO.S = 0
HI.S = 800
brd = 4 (mod. 500);
6 (mod. 501)

GEFRAN spa reserves the right to make any kind of design or functional modification at any moment without prior notice

In conformity to ECC 89/336/CEE and 73/23/CEE with reference to standards:
- EN 50082-2 (immunity in industrial environment) - **EN 50081-1** (emission in residential environment) - **EN 61010-1** (safety)

GEFRAN

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