



Main applications

- Injection presses
- Thermoforming machines
- Extrusion
- Packaging machines
- Textile machines
- Hot runners

Main characteristics

Multi-loop units for independent control of four control loops

- 4 universal process inputs
- 4 independent hot/cold PIDs
- 4 main outputs
- 4 auxiliary analog inputs
- 4 configurable outputs: relay / logic / TRIAC / continuous
- 2 configurable relay
- 2 digital inputs
- Standard communication port: Modbus RTU
- Optional port for Fieldbus: Profibus DP, CANopen, DeviceNet, Modbus RTU, Ethernet Modbus TCP, Ethernet IP, EtherCAT, ProfiNET
- Installs on DIN rod and panel

PROFILE

GFXTERMO4 is a multi-loop control system that controls four process loops in a completely independent manner. Configuration of I/O resources is very rapid and flexible thanks to a programming tool that guides the user in the selection of parameters.

Each control loop has:

- Process input
- Input for external CTs or CT / linear input
- Control output
- Cooling output

Other auxiliary I/Os:

- Two digital inputs
- Two relay outputs

The use of two independent serial ports provides efficient communication ability.

The two serials are defined as follows:

- "local bus" to create a GFXTERMO4 network and connect it to an operator panel or industrial PC.

Uses Modbus RTU protocol and reaches a speed of 57,6 Kbps.

- "field bus" to integrate with architectures that already use industrial field

buses such as: Profibus DP, CANopen, DeviceNet, Modbus RTU, Ethernet Modbus TCP, Ethernet IP, EtherCAT, ProfiNET.

The presence of "intelligence" directly on the board lets the user create fully independent and reliable controls.

The device installs on the DIN rod or with two M4 screws.

MODELS

GFXTERMO4

A single model is available for the control of four control loops.

INPUTS

Analog process inputs

The four process inputs are universal and can connect various signal types:

- thermocouples,
- resistance thermometers,
- linear in voltage and current.

The inputs are configurable via software. Not external adapter shunts are required.

Digital inputs

There are two digital inputs.

These inputs can be used to select one of the two presettable setpoints, or to select

Manual-Automatic operation, or to reset the alarms latch. The operation of both inputs is configurable.

External/ auxiliary analog CTs (option)

An additional four inputs to read external CTs for simultaneous check of currents delivered to each zone, with consequent control of alarms (HB...). As an alternative, you can order the inputs to read four temperatures (CT) or linear inputs.

OUTPUTS

The functions are configurable via software.

Heating control

Each zone has a digital output configured for heating for direct control of solid state power units (SSR).

Cooling control (option)

Each zone has a digital output configured for cooling. Four output types are available: relay, logic, triac, continuous.

Alarm

Each unit has two relay outputs configured as minimum and maximum alarm.

SIGNAL LEDs

Eight signal LEDs provide immediate diagnostics of operating state.

- RN RUN state of CPU
- ER error
- DI1 state of digital input DI1
- DI2 state of digital input DI2
- O1 state of output 1
- O2 state of output 2
- O3 state of output 3
- O4 state of output 4

A meaning other than default can be assigned.

CONFIGURATION

The unit is configured by setting simple parameters.

No knowledge of programming language is needed.

The following can be used for configuration:

- GFX-OP accessory
- Winstrum software tool
- Operator terminal, industrial PC or PLC.

FUNCTIONS

Control

Advanced control algorithms provide excellent control of process variables.

Several types of control are available: ON/OFF, P, PI, PID (heat or cool alone as well as double-action heat+cool).

Cooling can be set by specifying the cooling fluid used: air, oil, water.

Calculation of the best process parameters is extremely quick and effective thanks to the use of sophisticated automatic tuning.

The use of advanced tuning lets the user check the most correct PID parameters under all conditions.

Alarms

8 alarm limits are available, freely assignable to each channel or to all channels (in AND / OR logic) and configurable as absolute, deviation, direct, reverse, window, latching or not, disabled at power-up.

Diagnostics

In addition to generic alarms, efficient diagnosis of the control loop lets the user prevent breakdowns and take timely action, for example in case of broken probe or load.

The LBA alarm provides precise control of the control loop.

With the optional current transformer, you can directly monitor the load and activate the HN alarm in case of power failure or short circuit of the solid state power unit. Software can be used to define the state of the alarm outputs or a preset power value to be supplied in case of broken probe, thereby assuring the unit's continuity of service.

Tuning

- Self-tuning: calculation of PID parameters at system power-up.
- Continuous auto-tuning: continuous optimization of PID values
- One shot auto-tuning: modulation of output and automatic recalculation of PID parameters from event

Special functions

- Soft-start: slices power based on a set time

- Software off: disables control with consequent deactivation of outputs
- Input/output control: activation of outputs and control of inputs can be disengaged from internal firmware
- Simulation of four independent Geflex units (without cutting power).

COMMUNICATION PORTS

The unit is supplied with one communication port [PORT 1] that is used as a local bus for the connection of multiple GFXtermo objects connected to an operator panel or to an industrial PC.

In addition to this port, the current range of Geflex products can be connected via the 10-pin connector.

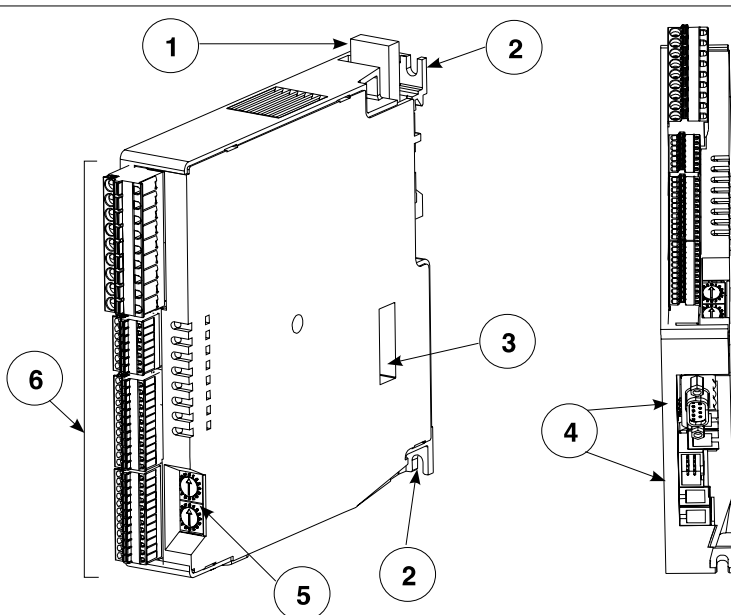
A second communication port [PORT 2] is available on request, configurable with the most popular industrial protocols:

- CANopen,
- DeviceNet,
- Profibus DP,
- Modbus RTU
- Ethernet Modbus TCP,
- Ethernet IP,
- EtherCAT,
- ProfiNET.

Network addresses

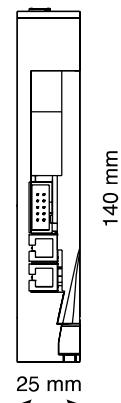
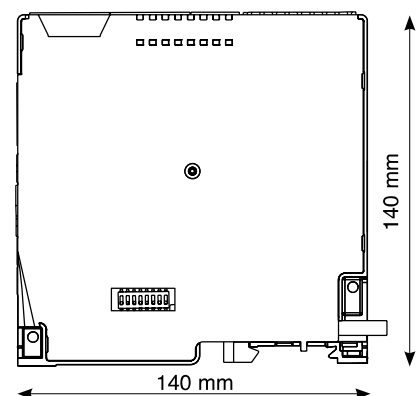
The network node address is assigned in a positive manner with two rotary selectors.

GENERAL DESCRIPTION



- 1 cursor for insertion/removal of DIN bar attachment
- 2 access for screwdriver to power connector screws
- 3 dip switches for function configuration
- 4 connectors for communication ports (Port1, Port2)
- 5 rotary switches for setting node address or number
- 6 signal and power supply connectors (J1, J2, J3, J4)

DIMENSIONS



TECHNICAL DATA

INPUTS

IN1...IN4 [analog process inputs]
Connector: J4

Function

Process variable default (configurable)

Sampling time

120msec all four inputs

Accuracy

0,2% FS ± 1 scale points at 25°C.
(16000 points)

Thermal drift

0,005% FS/°C

Input filter

0...20,0sec

Zero offset

Adjustable in range -999...+999 scale points

Type

• *ITS90 thermocouples:*

J, K, R, S, T, custom (IEC584-1, CEI EN 60584-1, 60584-2).

Cold junction compensation: internal, with automatic compensation.

Temperature scale: °C/°F

• *Resistance thermometer:* Pt100 DIN 43760

Max. line resistance 20Ω

Temperature scale: °C/°F

• *Voltage: range* 0/12...60mV,

Ri > 1MΩ 0/0,2...1V, Ri > 1MΩ

custom 60mV at 32 segments

• *Current: range* 0/4...20mA, Ri = 50Ω
custom 20mA at 32 segments

IN5...IN8 [auxiliary analog inputs]

Connector J3

Note:

Alternatives to external CT inputs IN9...
IN12

Function

Analog inputs read default

Sampling time

480msec

Accuracy

1% FS ± 1 scale points at 25°C.

Type

• *ITS90 thermocouples:*

J, K, R, S, T, custom (IEC584-1, CEI EN 60584-1, 60584-2).

Cold junction compensation: internal, with automatic compensation.

• *Voltage: range* 0/12...60mV, Ri > 1MΩ

IN9...IN12 [external CT inputs]

Connector: J3

Note:

in alternative to auxiliary analog inputs
IN5...IN8

Function

External CT read default

Sampling time

60msec

Accuracy

1% FS ± 1 scale points at 25°C.

Type

• External CT 50mAac; 50/60Hz, Ri = 10Ω

DI1, DI2 [digital inputs]

Connector: J2

Function

Defaults disabled (configurable)

Type

PNP, 24Vdc, 8mA (isol. 3500V)

OUTPUTS

OUT 1...4 [heating control]

Connector: J3a/J3

Function

Heating control default (configurable)

Type

• *Logic:* 24Vdc, 35mA

Led (yellow)

• *Signals output state*

OUT 5...8 [cooling control]

Connector: J1

Function

Cooling control default (configurable)

Type

• *Relay:* NO, max 3A, 250V/30Vdc, $\cos\phi = 1$
resistive load

• *Logic:* 24Vdc, 35mA

• *Continuous:* - voltage: 0/2...10V, $\pm 10V$,
max 25mA protected against short circuit
- current: 0/4...20mA su 500Ω max
- isolation: 1500V

• *Triac:* 230V/4Amp AC51

(1A for four)

(4A for two)

OUT 9...10 [alarms]

Connector: J1a/J1

Function

Alarms default (configurable)

Type

Relé: contact NO, max 5A, /30Vdc, $\cos\phi = 1$

LEDs

RN RUN state of CPU

ER.....error

DI1state of digital input DI1

DI2state of digital input DI2

O1state of main output Out.1

O2state of main output Out.2

O3state of main output Out.3

O4state of main output Out.4

COMMUNICATION PORTS

SERIAL 1 [local bus] Connectors: S1/S2/S3

Function

Local bus

Protocol

Modbus RTU

Baud Rate

19,2Kbps (default)

settable 1,2...57,6 Kbps

Node address

Settable with double rotary selector

Connector S1 / S2

2xRJ10 telephone type 4-4, RS485

2-wires isol. 1500V

Connector S3

10 pins for flat cable

SERIAL 2 [fieldbus]

Connectors: S4 / S5

Function

External fieldbuses

Protocol

Modbus RTU _____ 57,6 Kbps

CANopen _____ 10K...1Mbps

Profibus DP _____ 9,6...12Mbps

DeviceNet _____ 125K...500Kbps

Ethernet Modbus TCP,

Ethernet IP 10/100Mbps

EtherCAT 100Mbps

ProfiNET 100Mbps

See accessories

MICROSWITCHES

8 dip switches are available to select
wiring mode and different functionalities.

GENERAL CHARACTERISTICS

Power supply: 24Vdc $\pm 25\%$, max 9VA

Protection level: IP20

Working temperature: 0...50°C

Storage temperature: -20...+70°C

Relative Humidity: 20...85% UR non-
condensing

Installation: EN50022 DIN rod or on panel
with screw

Dimensions:

Depth 140mm

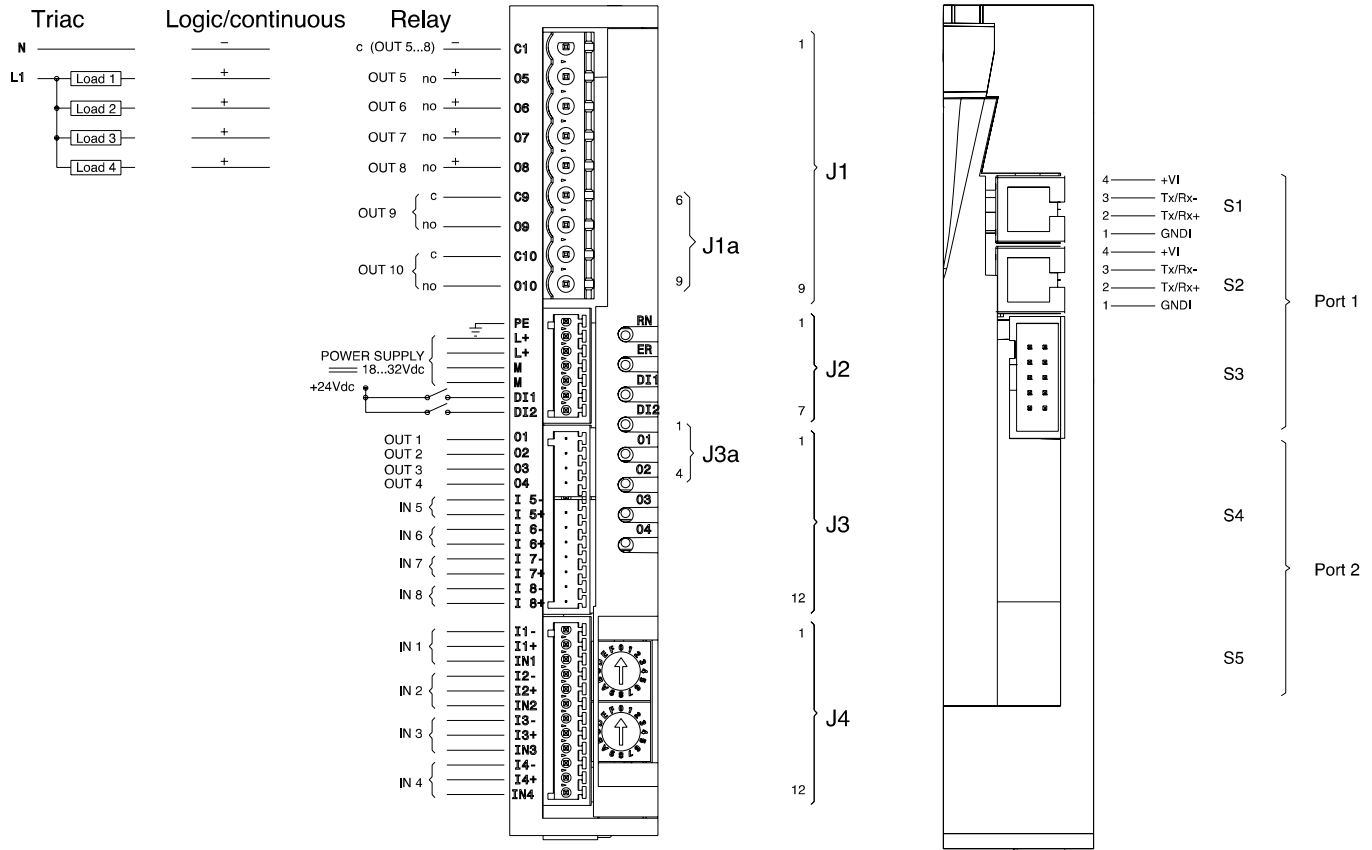
Width 25mm

Height 140mm

Weight: 320g.

ELECTRICAL CONNECTIONS

logic / communication



ORDER CODE

GFXTERMO4

| Auxiliary Outputs | |
|-------------------|---|
| Absent | 0 |
| Relay | R |
| Logic | D |
| Continuous | C |
| Triac | T |

| Auxiliary Inputs | |
|------------------------|---|
| Absent | 0 |
| 4 Current transformers | 1 |
| 4 Linear inputs (**) | 2 |

| Fieldbus | |
|----------|--------------------------|
| 0 | Absent |
| M | Modbus RTU |
| P | Profibus DP |
| C | CANopen |
| C1 | Euromap 66 |
| D | DeviceNet |
| E | Ethernet Modbus TCP |
| E1 | Ethernet IP (***) |
| E2 | EtherCAT |
| E4 | ProfiNET |
| E5 | Real Time Ethernet (***) |
| E8 | Ethernet IP (***) |

(**) Option NOT available with Fieldbus E1 or E2 or E4 or E5 or E8.

(***) To check the compatibility between the different product releases please look at the specific technical documentation on the web site www.gefran.com.

GEFRAN spa reserves the right to make aesthetic or functional changes at any time and without notice.



Conformity C/UL/US File no. E216851



The instrument conforms to the European Directives 2014/30/EU and 2014/35/EU with reference to the generic standards: **EN 61000-6-2** (immunity in industrial ambient) **EN 61000-6-3** (emission in residential ambient) **EN 61010-1** (safety)

GEFRAN

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