



Dimensions 96 × 96 × 80 mm (1/4 DIN)

Main features

- **Operator interface with large LCD Display, customizable, with choice of colors**
- **Scrolling diagnostics messages, configurable, in the selected language**
- **Easy, guided configuration, copy/paste parameters even with power off**
- **Preventive maintenance with energy counters (kWh) and load switching**
- **16 function block applications**
- **Timer, setpoint and algorithm programmer for controlling motorized valves**
- **Advanced tuning of control parameters**
- **Different password levels**
- **Universal input configurable for thermocouples, resistance thermometers, linear inputs**
- **Remote setpoint input**
- **Relay, logic, isolated analog outputs**
- **Up to two CT inputs for interrupted load diagnostics**
- **RS485 serial communication in Modbus RTU**
- **Removable faceplate for immediate replacement**
- **Sampling time 60 ms**

PROFILE

Operator interface

Large LCD display with customization of colors assigned to PV, SV and F display, of color of plastic faceplate, and of logo. Graphic display of power, output current or valve position. Scrolling alphanumeric display of 25 messages (32 letters each), completely configurable and savable, in three languages. Thanks to language selection and clear scrolling messages for diagnostics, alarms, and process state, the controller speaks the user's language.

Easy Configuration

Guided configuration for manual-free programming, with a few essential parameters and on-line help messages.

Ability to clone configuration among controllers, even with power off and in the field, thanks to a mini portable configurator with Zapper battery.

Extended configuration, creation of work recipes, and firmware updates via PC and GF_eXpress software, even without powering the controllers.

Thanks to the Smart Configurator function, you obtain the required parameter recipe by answering a few simple questions.

Local configuration and operation with only four keys assigned to LEDs that serve as feedback for the pressed key and as guide to specify appropriate steps.

The initial parameters can always be reset, both from the keypad and from the GF_eXpress Software tool.

Diagnostics, Preventive Maintenance, and Energy Monitor

Complete diagnostics for broken or incorrectly connected probe, total or partial load break, out of range variables, and control loop faults.

Thanks to the switching count and to the settable alarm thresholds, you can program preventive maintenance to replace worn actuators.

An internal energy counter with alarm for abnormal variations totalizes energy consumptions and costs for constant control

Function block applications

Sixteen AND, OR, Timer Function Blocks let you create customizable logic sequences for complete and flexible machine control.

The controller's hardware resources are exploited completely, without any need for external devices such as timers and small PLCs

Tuning

Advanced tuning algorithms ensure stable and accurate control even with critical or very rapid thermal systems, engaging automatically when necessary.

Timer

Three types of timers let you set delay times before activating the control, hold times on the setpoint value, and timed changes of programmed setpoints.

Setpoint Programmer

Models with twelve ramp and hold steps, groupable in four programs, with enable inputs and event outputs, are available for applications with setpoint profiles.

The operator interface provides two additional display dedicated to the permanent display for: Nr. of step and Nr. program.

On-board configuration and graphic configuration with GF_eXpress.

Valve Positioner

Models to control motorized valves, without feedback.

Valve position is calculated and shown on the display.

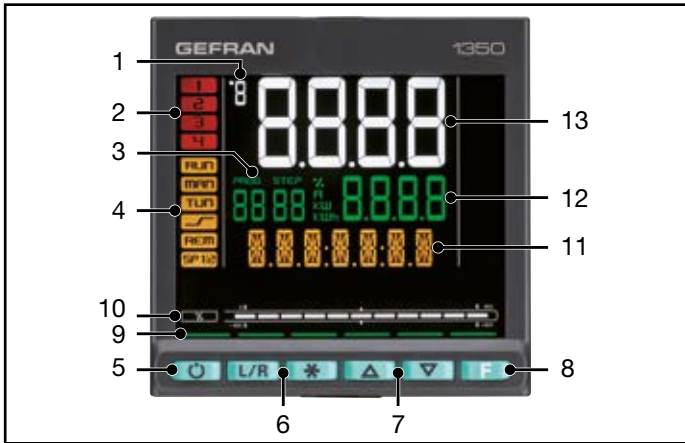
General characteristics

The controller is completely software configurable without accessing the internal electronics.

The universal main input accepts thermocouple sensors, resistance thermometers, and linears.

The controller can be replaced at any time simply by removing the faceplate, without any additional procedures.

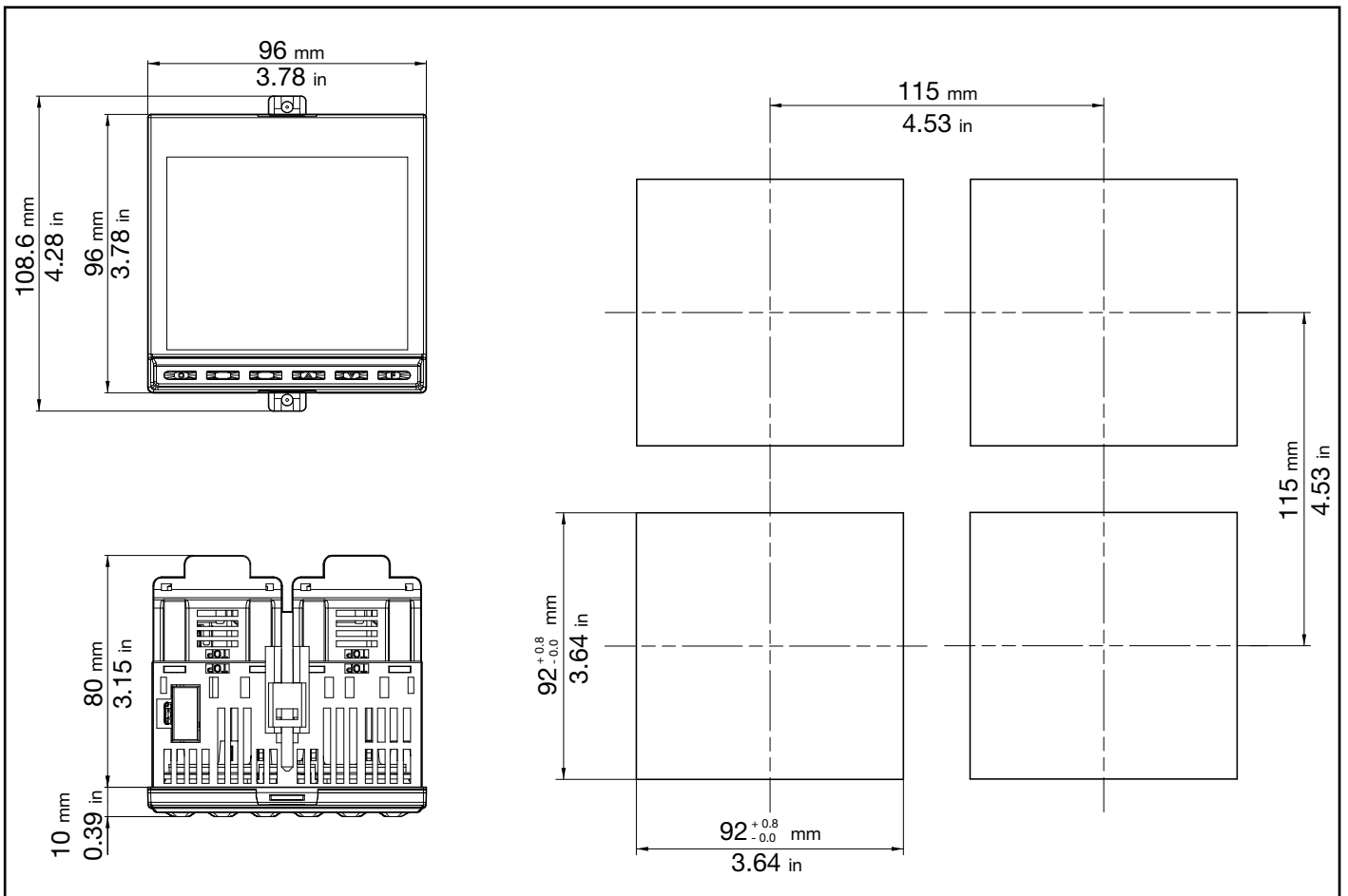
DISPLAY AND KEYS



1. Temperature unit of measurement or number of program running.
2. State of outputs OUT1, OU2, OUT3, OUT4.
3. Displays program number, step number, unit of measurement (% , A, kW, kWh).
4. Controller function states:
 - RUN = setpoint programmer active;
 - $_/-$ = setpoint ramp active;
 - TUN = PID parameters tuning active;
 - MAN = manual/automatic (off = automatic control, on = manual control);
 - REM = remote setpoint enabled;
 - SP1/2 = setpoint active (off = setpoint 1, on = setpoint 2).

5. Work mode key (manual/automatic) in standard mode. A function can be assigned via parameter but1. The key is active only when the display shows the process variable.
6. Key function configurable with parameters but2 and but3. The keys are active only when the display shows the process variable.
7. Up/down keys: raise/lower the value of the parameter displayed on the SV or PV display.
8. F key: lets you navigate among controller menus and parameters. Confirms the parameter value and selects the next parameter.
9. Key pressed signals.
10. Displays percentage of power or current, configurable with parameter bARG.
11. Display F: parameters, diagnostics and alarm messages. Configurable with parameter dS.F (default = setpoint).
12. SV display: parameter values. Configurable with parameter dS.SP (default = setpoint).
13. PV display: process variable.

DIMENSIONS AND DRILLING TEMPLATE



TECHNICAL DATA

| OPERATOR INTERFACE | | |
|----------------------------------|--|--|
| DISPLAY | Type | LCD black background |
| | Screen area (L x H) | 83 × 68 mm |
| | Lighting | Backlit with LEDs, life > 40,000 hours @ 25°C |
| | PV display | Number of digits: 4 to 7 segments, with decimal point Digit height: 23 mm Color: white or "custom" |
| | SV display | Number of digits: 4 to 7 segments, with decimal point Digit height: 11 mm Color: green or "custom" |
| | F display | Number of digits: 7 to 14 segments, with decimal point Digit height: 9 mm Color: amber or "custom" |
| | Unit of measurement | Selectable, °C, °F or custom 1 Color: same as PV display |
| | Controller state signals | Number: 6 (RUN, MAN, _/-, REM, SP1/2) Color: amber |
| | Output state signals | Number: 4 (1, 2, 3, 4) Color: red |
| Bargraph indicator, configurable | Type: graphic bargraph, 11 segments Power indication: 0...100% or -100...100% Current indication: 0...100% f.s. Valve position indication: 0...100% | |
| KEYPAD | | Keys number: 6, silicone (Man/Auto, INC,DEC,F) Type: mechanical |
| INPUTS | | |
| MAIN INPUT | Sensor type | TC, RTD (PT100, JPT100), IR ES1B, DC linear sensor |
| | Accuracy | TC inputs: Calibration accuracy: < +/- (0,25% of reading value in °C +0,1°C) Linearization accuracy: 0,1% of reading value Cold junction accuracy: < +/- 1,5°C a 25°C room temperature) Cold junction compensation: > 30:1 rejection to the change of the room temperature RTD input: Calibration accuracy: < +/- (0,15% of reading value in °C +1°C) Temperature drift: < +/- (0,005% of reading value in °C +0,015°C)/°C from 25°C room temperature Linearization accuracy: 0,1% of reading value Linear inputs: Calibration accuracy:< 0,1% full scale Temperature drift: < +/- 0,005% full scale /°C at 25°C room temperature |
| | Sampling time | 60 ms / 120 ms, selectable |
| | Digital filter | 0,0...20,0 s |
| | Temperature unit of measurement | Degrees C / F, selectable from keypad |
| | Signal interval | Type: linear Scale: -1999...9999, settable decimal point |
| | TC (thermocouple) input | Thermocouple: J, K, R, S, T, C, D Linearization: ITS90 or custom |
| | RTD (resistance thermometer) input | Resistance thermometer: PT100, JPT100 Input impedance (Ri): ≥ 30 kΩ Linearization: DIN 43760 or custom Max. line resistance: 20 Ω |
| | DC linear input | 0...60 mV input impedance (Ri): > 70 kΩ 0...1 V input impedance (Ri): > 15 kΩ 0...5 V / 0...10 V input impedance (Ri): > 30 kΩ 0/4...20 mA input impedance (Ri): 50 Ω Linearization: linear or custom |
| AUXILIARY INPUT | Remote setpoint | 0...1 V, 0...10 V, 0/4...20 mA |
| | Scale | 0...1 V input impedance (Ri): > 15 kΩ 0...10 V input impedance (Ri): > 30 kΩ 0/4...20 mA input impedance (Ri): 50 Ω |
| | Accuracy | 0,1% f.s. ±1 digit @25 °C |

| | | |
|----------------------------|-------------------------------------|---|
| CT (ammeter) input | Type | Isolated via external transformer |
| | | Number: 2 max Max. capacity: x / 50 mA AC Line frequency: 50/60 Hz Input impedance (Ri): 10 Ω |
| | Accuracy | ±2% f.s. ±1 digit @25 °C |
| DIGITAL INPUTS | Type | voltage-free contact, or NPN 24 V - 4,5 mA, or PNP 12/24 V - max 3,6 mA <i>(for detail see electrical connections)</i> |
| | Isolation | 500 V |
| | Number | 5 max |
| OUTPUTS | | |
| | Relay (R) | Number: 4 max Type of relay contact: NO Max. current: 5 A, 250 VAC / 30 VDC, $\cos\phi = 1$ Minimum load: 5 V, 10 mA Life cycle: > 100.000 operations Double isolation |
| | Logic (D) | Number: 2 max Type: for solid-state relays Voltage: 24 V ±10% (min 10 V @20 mA) Isolated from main input |
| | Triac (long life relè) (T) | Number: 1 max Load: resistive Voltage: 75...264 VAC; Current max: 1 A Isolation 3 kV circuito snubber integrato zero crossing switching |
| | Continuous (C) | Number: 1 max Current: 4...20mA $R_{out} < 500 \Omega$ Resolution: 12 bit Isolated from main input |
| | Analog retransmission (A1) | Number: 1 max 0...10 V, max 20 mA, $R_{out} > 500 \Omega$ 0...20 mA, 4...20 mA, $R_{out} < 500 \Omega$ Resolution: 12 bit Isolated from main input |
| ALARMS | Number of alarm functions | 4 max, assignable to an output |
| | Possible configurations | Maximum, minimum, symmetric, absolute/relative, exclusion at firing, memory, reset from keypad and/or contact, LBA, HB HBB Hold Back Band if enabled with Programmer function |
| CONTROL FUNCTIONS | | |
| CONTROL | Type | Single loop |
| | Control | PID, ON/OFF, single action heat or cool, double action heat/cool |
| | Control output | Continuous or ON/OFF Cycle time: constant or optimized (BF) |
| | Control output for motorized valves | OPEN/CLOSE for floating motorized valve on Relay, Solid-state, Triac outputs |
| SETPOINT PROGRAMMER | Number of programs | Max 4 Start / Stop / Reset / Skip via digital inputs and/or outputs from logic operations Output state: Run /Hold / Ready / End |
| | Number of steps | Max 12, each with own setpoint, ramp time and hold time Times settable in HH:MM or MM:SS Max 4 consents, configurable for ramp and for hold Max 4 events, configurable in ramp and in hold |
| MULTIPLE SETPOINTS | Number of setpoints | Max 4, selectable from digital input Each setpoint change is subject to set ramp, different for up and down ramp |

1) Programming is done with the GF_eXpress configuration program.

| | | |
|---------------------------|-----------------------|--|
| LOGIC 1 OPERATIONS | Function blocks | Max 16, with 4 input variables per block. The result can act on the state of the controller, of the programmer on alarms and outputs. Each function contains an incorporated timer block timer. |
| TIMER FUNCTION | Modes | START / STOP STABILIZATION (timer is on when PV enters a band set around setpoint; at end of count you can activate an output, shut down SW or change SP1/SP2) FIRING (timed activation of control after power on) |
| ENERGY COUNTER | | Calculation done on nominal line voltage and nominal load power or on rms current measured on load via CT |
| DIAGNOSTIC | | Short circuit or open circuit (LBA alarm) Interrupted or partially interrupted load (HB alarm) Short circuit of control output (SSR alarm) |
| RETENTIVE MEMORY | Type | EEPROM |
| | Max. number of writes | 1.000.000 |
| SERIAL INTERFACE | | |
| | Type | RS485 |
| | Baudrate | 1200, 2400, 4800, 9600, 19.200, 38.400, 57.600, 115.200 bit/s |
| | Protocoll | MODBUS RTU |
| | | Isolated from main input |

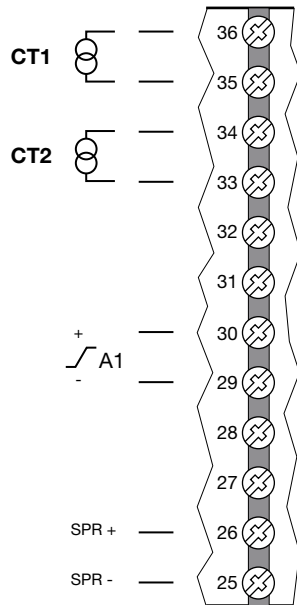
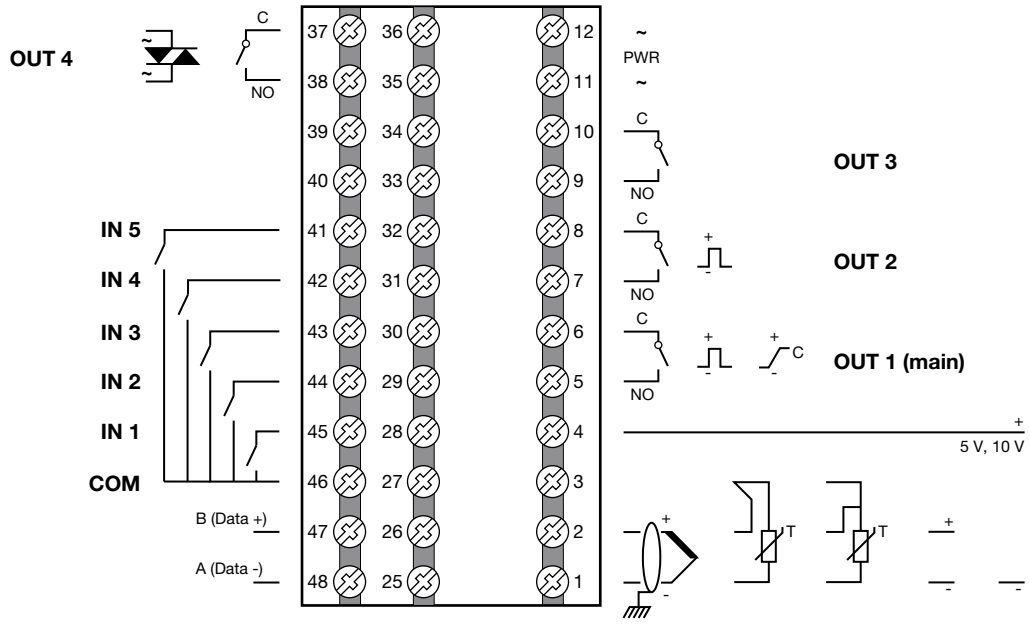
GENERAL DATA

| | | |
|---------------------------|--|--|
| POWER SUPPLY | Operating voltage | 100...240 VAC/VDC \pm 10%, 50/60 Hz (on request 20...27 VAC/VDC \pm 10%) |
| | Power dissipation | 10 W max |
| | Protections | Overvoltage 300 V / 35 V |
| | Connection | Screw terminals and crimp connector, max. wire section 1 mm ² |
| CONNECTIONS | Serial configuration port (for USB connection) | Connector: microUSB |
| | Inputs and outputs | Screw terminals and crimp connector, max. wire section 2,5 mm ² |
| AMBIENT CONDITIONS | Use | Indoor |
| | Altitudine | 2000 m max |
| | Operating temperature | -10 ... +55 °C (as per IEC 68-2-14) |
| | Storage temperature | -20 ... +70 °C (as per IEC 68-2-14) |
| | Relative humidity | 20...85% RH non-condensing (as per IEC 68-2-3) |
| PROTECTION LEVEL | | IP 65 on front panel (as per IEC 68-2-3) |
| ASSEMBLY | Positioning | On panel, removable faceplate |
| | Installation regulations | Installation category: II; Pollution degree: 2 Isolation: double |
| DIMENSIONS | | 96 X 96 mm (1/4 DIN) Depth: 80 mm |
| WEIGHT | | 0,24 kg |
| CE STANDARDS | EMC (electromagnetic compatibility) | Conforms to directiv 2014/30/EU with reference to standard EN 61326-1 emission in industrial environment class A |
| | Safety: LVD | Conforms to directiv 2014/35/EU with reference to standard EN61010-1 |

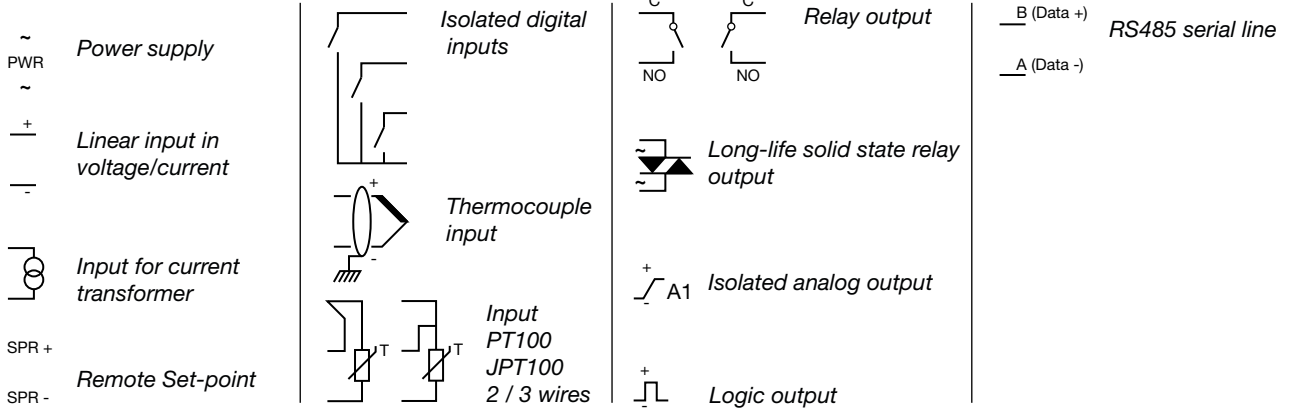
ACCESSORIES

| Code | Description |
|----------------|---|
| F060800 | Cable for programming with PC, USB-TTL 3 V with USB – microUSB connectors, length 1.8 m |
| F043958 | “GF_eXpress” software CD |
| F060909 | Configuration kit for new instruments GF_eXK-3-0-0 |
| F060908 | Portable configurator, complete with cable and Zapper |
| 51970 | Rubber gasket 96×96 front box |
| 51069 | Rubber gasket 99×96 box-panel |
| 49030 | Fastening box to panel |
| 51328 | Protection of contacts at box bottom |
| 51738 | 36 contacts at box bottom |
| 330200 | Current transformer (CT) 50/0.05 A |
| 330201 | Current transformer (CT) 25/0.05 A |

CONNECTION DIAGRAM



LEGEND



ATTENTION: For correct installation, read the warnings in the instruction manual.

ORDER METHODS

Ordering code **1350** X-X-X X X-X-X X X X-X-X X X

| Model | |
|------------|---|
| Controller | - |
| Programmer | P |
| Valve | V |

| Output 1 | |
|-----------------|---|
| Relay | R |
| Static | D |
| Analog 4...20mA | C |

| Output 2 - 3 - 4 | |
|--|-------|
| 1 Relay (5A) | R-0-0 |
| 1 Static | D-0-0 |
| 2 Relay (5A) | R-R-0 |
| 1 Static + 1 relay (5A) | D-R-0 |
| 2 Relay (5A) + 1 Long Life relay | R-R-T |
| 1 Static + 1 relè (5A)+ 1Long Life relay | D-R-T |
| 1 Static + 2 relay (5A) | D-R-R |
| 3 Relay (5A) | R-R-R |

| Remote Set Point | |
|-------------------------|---|
| Absent | 0 |
| SPR 0/4...20mA / 0...10 | 1 |

| W retransmission | |
|------------------------|---|
| Absent | 0 |
| W 0/4...20mA / 0...10V | 1 |

| CT inputs | |
|-----------|---|
| Absent | 0 |
| CT1 | 1 |
| CT1+CT2 | 2 |

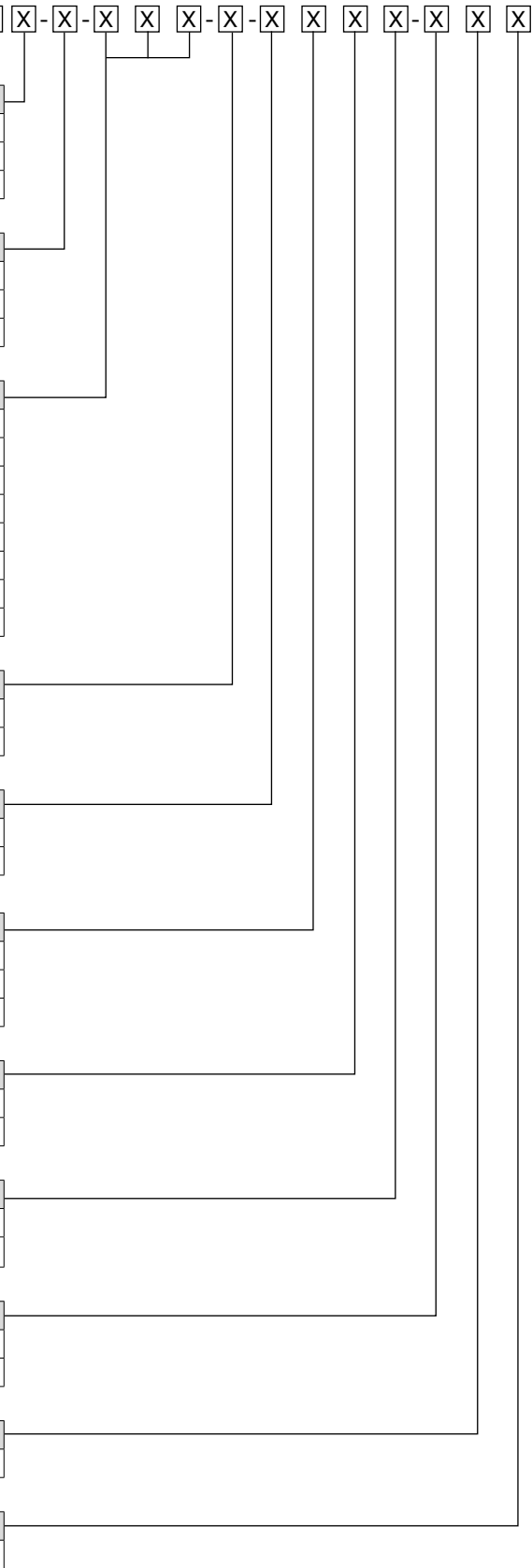
| Digital inputs | |
|----------------|---|
| Absent | 0 |
| 5 DI | 5 |

| Serial communication | |
|----------------------|---|
| Absent | 0 |
| RS485 | 1 |

| Supply | |
|-------------|---|
| 20-27Vac/dc | 0 |
| 100-240Vac | 1 |

| Functions | |
|--------------------|----|
| Logical operations | LF |

| Display | |
|----------------|---|
| Green setpoint | G |






Power supply 100...240 VAC/VDC

| Code F | Model | Valves | Programmer | Inputs | | | Outputs | | | | | RS485 | Logic functions | Total Number of Outputs |
|---------|------------------------|--------|------------|---------|----|-----|---------|-------|-------|----------|------------|-------|-----------------|-------------------------|
| | | | | Digital | CT | SPR | Relay | Triac | Logic | Analog I | Analog V/I | | | |
| F061830 | 1350-D-R00-00000-1-G | | | | | | 1 | | 1 | | | | | 2 outputs |
| F061831 | 1350-R-R00-00000-1-G | | | | | | 2 | | | | | | | |
| F061832 | 1350-D-R00-00150-1-G | | | 5 | 1 | | 1 | | 1 | | | | | |
| F061833 | 1350-D-RR0-00000-1-G | | | | | | 2 | | 1 | | | | | 3 outputs |
| F061834 | 1350-R-RR0-00000-1-G | | | | | | 3 | | | | | | | |
| F061835 | 1350-D-RR0-00050-1-G | | | 5 | | | 2 | | 1 | | | | | |
| F061836 | 1350-D-RR0-00200-1-G | | | | 2 | | 2 | | 1 | | | | | |
| F061837 | 1350-C-RR0-00000-1-G | | | | | | 2 | | | 1 | | | | |
| F061838 | 1350-D-R00-01050-1-G | | | 5 | | | 1 | | 1 | | 1 | | | |
| F061839 | 1350-R-R00-01050-1-G | | | 5 | | | 2 | | | | 1 | | | |
| F061840 | 1350-R-RR0-00101-1-G | | | | 1 | | 3 | | | | | • | | 4 outputs |
| F061841 | 1350-D-RRR-00000-1-G | | | | | | 3 | | 1 | | | | | |
| F061842 | 1350-R-RRR-00000-1-G | | | | | | 4 | | | | | | | |
| F061843 | 1350-R-RRT-00000-1-G | | | | | | 3 | 1 | | | | | | |
| F061844 | 1350-D-RRR-00250-1LFG | | | 5 | 2 | | 3 | | 1 | | | | • | |
| F061845 | 1350-D-RRR-00051-1LFG | | | 5 | | | 3 | | 1 | | | • | • | |
| F061846 | 1350-C-DRR-00051-1LFG | | | 5 | | | 2 | | 1 | 1 | | • | • | |
| F061847 | 1350-D-RRR-00201-1LFG | | | | 2 | | 3 | | 1 | | | • | • | |
| F061848 | 1350-C-RRR-10050-1LFG | | | 5 | | 1 | 3 | | | 1 | | | • | |
| F061849 | 1350V-R-RRR-00000-1-G | • | | | | | 4 | | | | | | | |
| F061850 | 1350V-R-RRR-00050-1-G | • | | 5 | | | 4 | | | | | | | |
| F061851 | 1350P-D-RRR-00000-1-G | | • | | | | 3 | | 1 | | | | | |
| F061852 | 1350P-D-RRR-00050-1LFG | | • | 5 | | | 3 | | 1 | | | | • | |
| F061853 | 1350-D-RRR-01050-1LFG | | | 5 | | | 3 | | 1 | | 1 | | • | 5 outputs |

Power supply 20...27 VAC/VDC

| Code F | Model | Valves | Programmer | Inputs | | | Outputs | | | | | RS485 | Logic functions | Total Number of Outputs |
|---------|------------------------|--------|------------|---------|----|-----|---------|-------|-------|----------|------------|-------|-----------------|-------------------------|
| | | | | Digital | CT | SPR | Relay | Triac | Logic | Analog I | Analog V/I | | | |
| F061854 | 1350-D-R00-00000-0-G | | | | | | 1 | | 1 | | | | | 2 outputs |
| F061855 | 1350-R-R00-00000-0-G | | | | | | 2 | | | | | | | |
| F061856 | 1350-D-R00-00150-0-G | | | 5 | 1 | | 1 | | 1 | | | | | |
| F061857 | 1350-D-RR0-00000-0-G | | | | | | 2 | | 1 | | | | | 3 outputs |
| F061858 | 1350-R-RR0-00000-0-G | | | | | | 3 | | | | | | | |
| F061859 | 1350-D-RR0-00050-0-G | | | 5 | | | 2 | | 1 | | | | | |
| F061860 | 1350-D-RR0-00200-0-G | | | | 2 | | 2 | | 1 | | | | | |
| F061861 | 1350-C-RR0-00000-0-G | | | | | | 2 | | | 1 | | | | |
| F061862 | 1350-D-R00-01050-0-G | | | 5 | | | 1 | | 1 | | 1 | | | |
| F061863 | 1350-R-R00-01050-0-G | | | 5 | | | 2 | | | | 1 | | | |
| F061864 | 1350-R-RR0-00101-0-G | | | | 1 | | 3 | | | | | • | | 4 outputs |
| F061865 | 1350-D-RRR-00000-0-G | | | | | | 3 | | 1 | | | | | |
| F061866 | 1350-R-RRR-00000-0-G | | | | | | 4 | | | | | | | |
| F061867 | 1350-R-RRT-00000-0-G | | | | | | 3 | 1 | | | | | | |
| F061868 | 1350-D-RRR-00250-0LFG | | | 5 | 2 | | 3 | | 1 | | | | • | |
| F061869 | 1350-D-RRR-00051-0LFG | | | 5 | | | 3 | | 1 | | | • | • | |
| F061870 | 1350-C-DRR-00051-0LFG | | | 5 | | | 2 | | 1 | 1 | | • | • | |
| F061871 | 1350-D-RRR-00201-0LFG | | | | 2 | | 3 | | 1 | | | • | • | |
| F061872 | 1350-C-RRR-10050-0LFG | | | 5 | | 1 | 3 | | | 1 | | | • | |
| F061873 | 1350V-R-RRR-00000-0-G | • | | | | | 4 | | | | | | | |
| F061874 | 1350V-R-RRR-00050-0-G | • | | 5 | | | 4 | | | | | | | |
| F061875 | 1350P-D-RRR-00000-0-G | | • | | | | 3 | | 1 | | | | | |
| F061876 | 1350P-D-RRR-00050-0LFG | | • | 5 | | | 3 | | 1 | | | | • | |
| F061877 | 1350-D-RRR-01050-0LFG | | | 5 | | | 3 | | 1 | | 1 | | • | 5 outputs |

Please contact GEFTRAN for information on available codes.

| | |
|---|--|
|  | Conformity TC N° РУД-ИТ.АЛ32.б.01762 |
|  | Conformity C/UL/US File no. E216851 |
|  | EMC (electromagnetic compatibility): conforms to directive 2014/30/EU with reference to standard EN 61326-1 emission in industrial environment class A Safety LVD: conforms to directive 2014/35/EU with reference to standard EN61010-1 |