

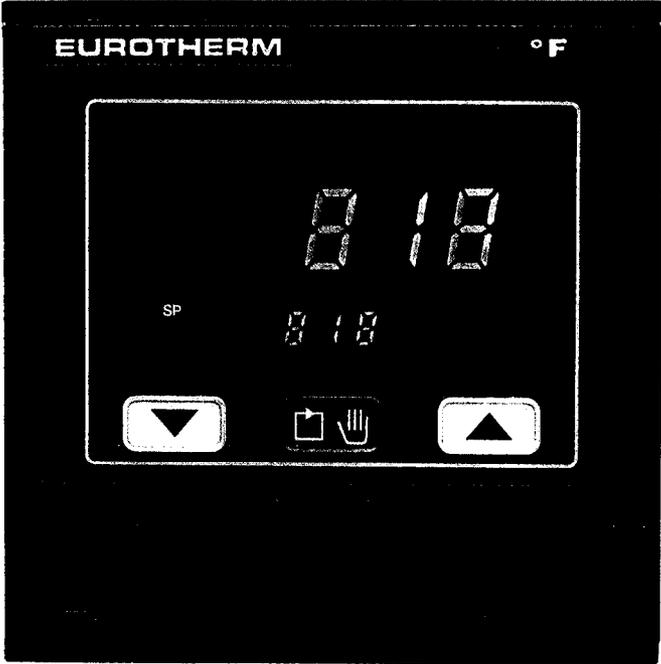


**EUROTHERM
CONTROLS**

**Models 818P, 818P4
and 818P15**

Digital controllers with setpoint programming



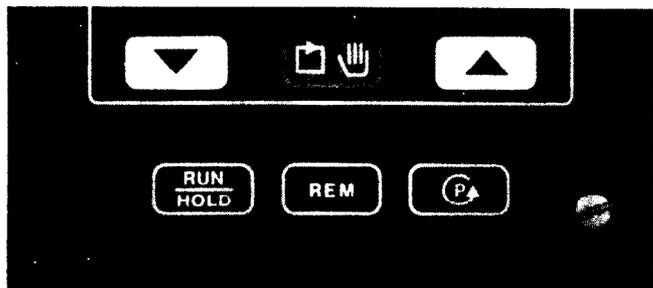
- Dual fluorescent 4 1/2-digit displays for simultaneous viewing of setpoint and measured value
 - 4 multi-purpose configurable output channels
 - Configurable as valve positioner with optional slidewire feedback
 - Non-volatile storage of up to 4 programs (818P4) or up to 15 programs (818P15)
 - 16-segments/program (8 ramp/dwell pairs)
 - Linking of programs to create programs longer than 16 segments
 - Up to 999 program repetitions or continuous run feature
 - Adjustable holdback for loads with propagation delays and lags
 - 3-way program control: front panel, rear terminals, and communications link
 - PID control with variable overshoot inhibition
 - Self tuning and adaptive tuning
 - Choice of 17 different thermocouples, RTD or process input
 - Operation in °F, °C or process units
 - Remote input for setpoint, trim or output power limit
 - Analog retransmission of measured value, setpoint, error or output level
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- Fully isolated bidirectional EIA-232-D or EIA-485 (EIA-422-A) digital communications standards with Eurotherm Bi-Synch, J-bus® and Modbus® protocols
 - Eurovis 3 supervisory system available
 - Easy-to-operate membrane front panel with user-selectable security levels
 - Linear and non-linear cooling algorithms
 - Instrument calibration stored in non-volatile memory eliminating the need for potentiometer adjustment
 - Dust-tight, splash-proof NEMA 3 (IP-64) front panel

The Models **818P**, **818P4**, and **818P15** are versatile microprocessor-based programmer/controllers designed for a variety of specialized and critical applications. The **818Ps** retain a simple operator interface despite their flexibility and exceptional performance. The user can reconfigure the programmer/controllers from the front panel or through the digital communications port. The modular hardware permits modification of a programmer/controller by exchanging plug-in units.

The **818Ps** have a low-level input analog-to-digital converter sampling the measured value at a speed of 8 updates per second—this permits rapid response to process variations. The controllers offer a high immunity to line-borne noise and thermal drift, and feature a calibration accuracy of 0.25% of span. All linearizations for the input sensors are digitally calculated resulting in a linearity error better than $\pm 0.1\%$ of the input span. The setpoint programmers enable the user to create and run 16-segment programs suitable for most applications where programming is needed. The **818P4** and the **818P15** can store up to 4 and 15 programs, respectively.

The digital communications link allows remote modification and interrogation of all controller and programmer parameters. Downloading of a single parameter, entire parameter schedules or a setpoint program from a central computer is possible, as well as monitoring controller parameters and the measured value for data logging.

The **818Ps** are covered by Eurotherm Controls' 2-year warranty.



Front-panel pushbuttons of the **818P** family.
Top row: DOWN, AUTO/MANUAL, and UP.
Behind opened door: RUN/HOLD, REMOTE/LOCAL and SCROLL.

Front panel

PUSHBUTTONS

The **818Ps** are fitted with 6 pushbuttons; the number that are operational depends on the instrument configuration.

The **AUTO/MANUAL** pushbutton provides bumpless transfer in both directions.

RUN/HOLD permits control of the setpoint program.

REMOTE/LOCAL permits selection of a second remote or internal setpoint or trim value.

DISPLAYS

4 1/2-digit displays

In normal operation the upper display indicates the measured value, and the lower, the setpoint. The lower display is also used to indicate the values of all other user-adjustable parameters and their mnemonics. When running a program, the lower display can also show the time remaining in the current program segment.

Dedicated indicators

On the same multicolored fluorescent indicator panel are annunciators that light up when the corresponding output or alarm is active: **OP1**, **OP2**, **AL1** and **AL2**. Other annunciators indicate the selection of certain functions: remote setpoint (**REM**), manual operation (**MAN**), ramp-to-setpoint operation (**RAMP**), and self- or adaptive tuning active (**A-T**). A light indicates when the **818P** is transmitting information through the digital communications port.

The current segment of the program in operation is indicated by a clear English annunciation: **DWELL 3**, for instance, indicates the dwell portion of the third program segment. After a program has ended, an **E** is displayed.

Operation

The scroll button is used to gain access to the list of parameters contained within the controller. The actual list of parameters available depends upon the instrument configuration.

The short scroll list feature allows the operator to view in the lower display the setpoint (annunciation **SP**), the output level (**OP**), and the time remaining in the ramp-to-setpoint segment (**TIME**). The operator can modify the setpoint while it is displayed with the **UP** or **DOWN** pushbuttons.

While in the short scroll list, holding down the scroll button momentarily reveals the first parameter of the main list. With the scroll button, the operator can then peruse the list of mnemonics (English abbreviations) representing the various controller parameters. When a mnemonic is visible in the display, its value can be modified with the **UP** or **DOWN** pushbuttons.

SECURITY

Several levels of security are available to prevent unauthorized operation of the 818P, enabling it to be customized for specific shop-floor situations. By means of a hardware switch inside the controller, various combinations of scroll list parameters can be enabled and disabled. The entire front panel can be disabled through a digital input or the communications interface.

SENSOR BREAK

A broken thermocouple or open input circuit is indicated by the display mnemonic Or. The **818P** then outputs the level selected at the sensor break power parameter (Sbr). This value is adjustable between 0 and 100% for instrument with only 1 output, and between –100 and +100% for instruments fitted with 2 outputs.

CALIBRATION

No recalibration of the instrument is necessary if the input sensor type or display units are changed. The calibration parameters reside permanently in non-volatile memory.

Configuration

The Model **818P** contains 4 multi-purpose configurable output channels.

Outputs 1 and 2 can be fitted with 4 different types of output hardware modules: relay, triac, logic or analog.

Outputs 1 and 2 are normally used for heat and cool outputs in reverse-acting temperature control, but direct-acting configurations are possible for cooling and process applications. If Output 2 is not required for control, it can be configured for analog retransmission or as a program segment output. If valve positioner operation is selected, Outputs 1 and 2 can be fitted with either relay or triac outputs.

Outputs 3 and 4 can be configured as alarm channels and as such, are normally fitted with relay modules. They can, however, alternately accommodate analog communications, the optional slidewire feedback for valve positioners, or serve as segment outputs for the programmer.

VALVE POSITIONER

As valve positioners, the **818Ps** operates in the velocity mode with PI control. Slidewire feedback is optional and not required; the slidewire is used only for position indication. Different values for open and close times can be set for control of asymmetric valves.

LINEAR PROCESS INPUTS

All common process signal ranges are catered to by the Model **818P**. For signal ranges exceeding 50mV, an input adapter is required and is supplied with the instrument according to the Product Code.

LOGIC INPUTS

Each of the 2 rear-terminal logic inputs can be assigned to one of several functions. These include program control, selection of second setpoint, self- or adaptive tuning enable, auto/manual selection, etc. See the Product Code for the complete list of possible functions. Pushbuttons, selector switches or relay contacts can be connected to these terminals to interface to the unit.

ALARMS

Up to 2 alarm output relays are available; they can be individually configured to act on any one of 5 alarm conditions—deviation band, deviation low, deviation high, full-scale low and full-scale high. Non-latching failsafe (de-energized in alarm) operation is available, as well as non-latching non-failsafe (energized in alarm) operation.

Alarms can be set in configuration without any relay modules being installed in Channels 3 or 4 (soft alarms). These alarms activate the legends on the display and can be interrogated through the digital communications link.

Communications

Analog and digital communications can be simultaneously implemented on the Model **818P**.

DIGITAL

The digital communications interface is contained on a separate optional board; it is hardware-configurable for the EIA-232-D or EIA-485 (EIA-422-A) transmission standards. The protocol adheres to ANSI X 3.28 (1976) 2.5.B1, and the transmission speed can be set during configuration to standard values between 300 and 9600 baud.

The **818P** family can communicate with supervisory systems enabling inspection and modification of every controller parameter value and downloading of problems. Programs developed in the plant at the controller can be retrieved by the supervisory system and archived in recipes. If the applications requires, special PID parameters for each program segment can be downloaded for the most demanding control applications.

ANALOG

Analog communications can be configured in 2 different ways. If digital communications is not required, a bi-directional analog communications board input can be fitted. This board comprises an isolated remote input and an isolated retransmission output.

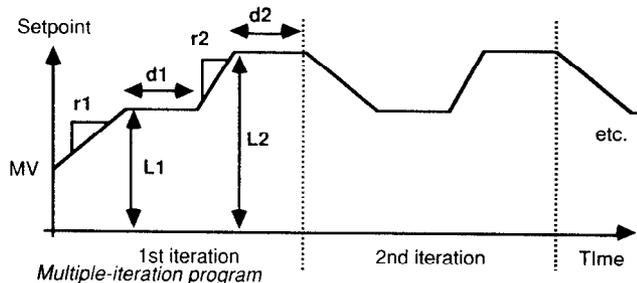
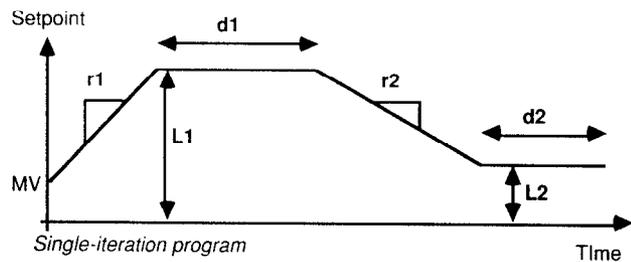
The input can be configured to be a remote setpoint, remote trim on a local setpoint, local trim on a remote setpoint, or maximum output level limit. A voltage source is provided for connecting a potentiometer as a manual adjustment input.

The analog output can be user-selected to represent the measured value, setpoint, output level or error.

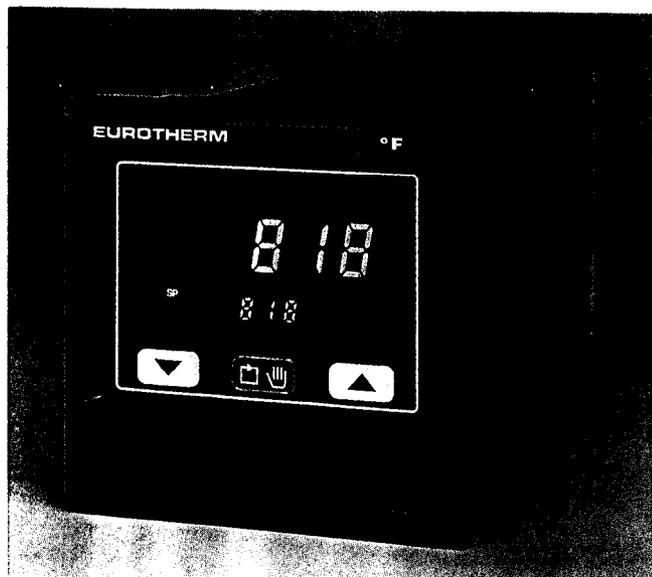
It is possible to have simultaneous analog and digital communications. Additional analog communications functions separate from the analog communications board are available on Outputs 3 and 4. If these outputs are not required for alarms or segment outputs, then one can be configured for analog retransmission and the other as a remote input. This allows the retransmission of the measured value to slave controllers not equipped with the setpoint programming feature.

Setpoint programming

The Models **818P**, **818P4** and **818P15** contain an independent firmware setpoint generator in addition to the controller function. The setpoint generator, or *programmer*, outputs a maximum of 16 straight-line segments (8 ramp/dwell pairs) that are adjustable in duration and slope. Elaborate program profiles for many applications can be developed from these segments. By using the loop counter feature, the programmer can be set to cycle the program up to 999 times or continuously. Programs are entered and edited either from the front panel or through the digital communications link.



For the multi-program **818P4** and **818P15**, each of the 4 or 15 possible programs is assigned an identification number. Longer programs can be created on the **818P4** and the **818P15** by linking programs together: 64 segments maximum (32 ramp/dwell pairs) for the **818P4**, and 240 segments (120 ramp/dwell pairs) for the **818P15**.



PROGRAMMER STATES

The 818P programmers can be in one of 4 states: RESET, RUN, HOLD, or END.

With the programmer in RESET or END, the instrument behaves like a normal controller; the setpoint comes from the front panel.

Placing the programmer in RUN launches the program. After completion, the programmer returns to END.

If HOLD is selected during a program, the time base is stopped and the setpoint remains unchanged until the HOLD is released.

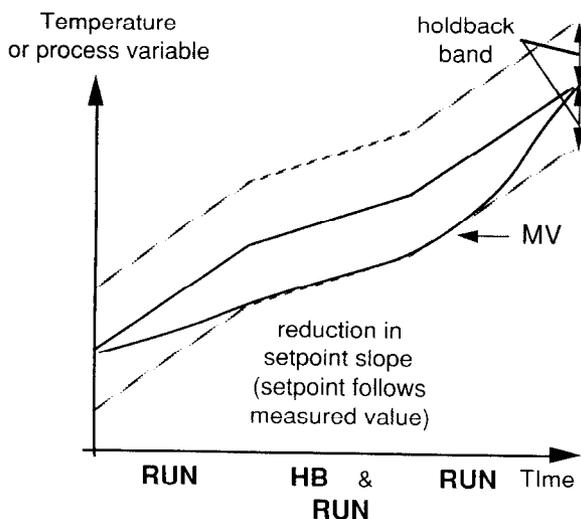
HOLDBACK

The holdback function automatically places the programmer into HOLD if the measured value deviates more than a specified amount from the programmer setpoint (the holdback band). When the measured value re-enters the holdback band, the timing for the segment resumes.

Three different kinds of holdback operation can be configured: deviation band holdback, deviation high, and deviation low.

Holdback is recommended for those systems with appreciable propagation delays and exponential lags. During a ramp segment, holdback can have the effect of flattening out the slope of the ramp. During a dwell segment holdback guarantees a minimum soak time by stopping the clock if the measured value deviates outside the holdback band.

The width of the holdback band can be chosen to optimize system performance between 2 extremes: strict program timing (wide band), and minimum difference between the measured value and the setpoint (narrow band).



SEGMENT CHARACTERISTICS

Depending on the configuration, the units of ramping segment can be entered in 2 different fashions: ramp rate, or time to target. The ramp rate units can be configured to be in either process units per minute, or process units per hour. An extended precision ramp rate is available which allows expressing the ramping rate with one decimal place of precision more than the measured value. If the ramp segment units are configured for time to target, the units can range from 0.2 to 6000 minutes or hours. Dwell times can be set within the range of 0.1 to 999.9 minutes or hours.

RUNNING AND CONTROLLING PROGRAMS

While the program is running, the present segment is clearly announced on the front panel: RAMP 1, DWELL 1, RAMP2, DWELL2, etc.

Programs can be controlled from 3 different sources: from the front panel, with the 2 digital inputs, or through the digital communications link.

From the front panel, one button (RUN/HOLD) is all that is required to run a selected program, or to place a running program into HOLD.

The 2 digital inputs can be configured to handle several program control functions: RUN/RESET, skip to next segment, RUN/HOLD, and step to next program. Other ancillary functions frequently used with programmer/controllers can be assigned to the digital inputs: self-tune enable, adaptive-tune enable, and second set of PID parameters.

Through the digital communications link each and every parameter pertinent to programming is accessible.

No matter what program control method is used, the measured value can be handled in one of two ways when initiating a program. Programs can start ramping from the measured value (*servo start*), or from a definite temperature if the first ramp segment is set to STEP (*level start*).

PROGRAM SEGMENT OUTPUTS

The 2 alarm output channels can take on the alternate function as program control logic outputs for the setpoint programmer. They can be made to be energized or de-energized on a segment-by-segment basis. If Output 2 is not required for control, it too can be configured as a segment output.

Self tuning and adaptive tuning

The **818P** family of programmer/controllers incorporate as standard self-tuning and adaptive tuning algorithms which automatically determine values for the PID and other control parameters. The two algorithms can be initiated either individually or together to suit a variety of process requirements.

Self tuning and adaptive tuning can both be launched 3 different ways:

- From the front panel.
- Through the digital inputs (appropriately configured).
- Through the communications port.

SELF TUNING

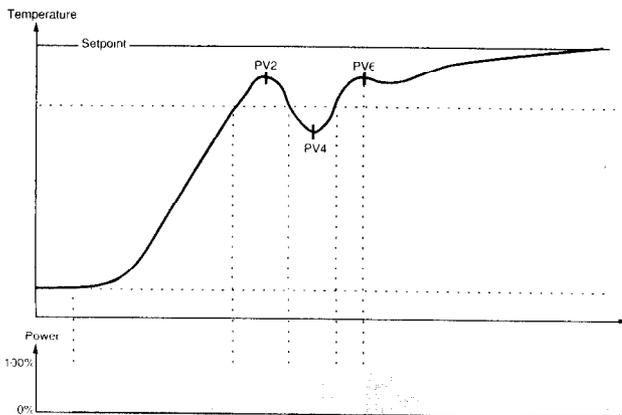
Self tuning offers several advantages:

- Fast, simultaneous adjustment of several loops in a multi-zone system saves time.
- Inexperienced personnel can perform the one push-button procedure.
- No elaborate equipment (such as chart recorders or memory oscilloscopes) is required.
- The consistent approach of the tuning algorithm produces repeatable results.

The self-tuning algorithm can perform 2 types of tuning procedures: tune from ambient and tune from setpoint. Both are operable on heat-only, cool-only, and heat/cool systems encompassing endothermic or exothermic processes (negative feedback systems only).

In addition to the PID terms, a tune from ambient calculates the cutback levels. With time proportioning outputs, the cycle times are determined; and with cooling, the relative cool gain. It is also possible to tune PI and PD loops.

This example illustrates the heat-up case for a start-up tune from ambient. The outputs from the controller are turned OFF for 1 minute. Heat is then applied and the start-up process reaction curve is evaluated. Once the temperature has reached the switch-off point, CP, power is set to 0%. Oscillations through PV4 and PV6 are forced as shown.



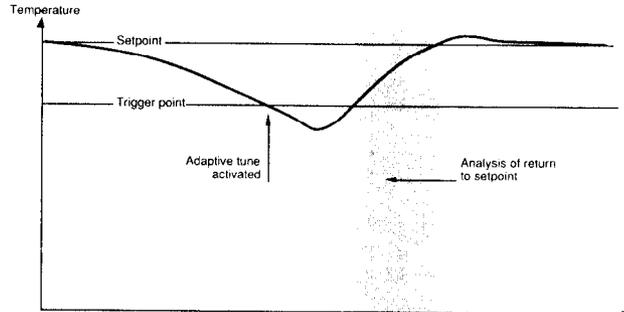
ADAPTIVE TUNE

The adaptive tuning algorithm continuously monitors the error signal and analyzes the loop response during process disturbances. The technique, called Disturbance Response Analysis (DRA), evaluates both load disturbances and setpoint changes.

Adaptive tuning is indicated in the following cases:

- For processes that require frequent parameter variations as a result of load, setpoint, or other changing conditions.
- For processes that cannot tolerate the ON/OFF sequence required for self-tuning.

If the measured value crosses a user-adjustable threshold, the adaptive tune algorithm is activated. If the algorithm recognizes an oscillatory or under-damped response it then recalculates the PID terms from the measured closed-loop response. If a good response is measured then the DRA algorithm does not change the PID values.



Specifications

1. INPUTS

All inputs

Calibration accuracy	0.25% of recommended span
Sampling frequency	8Hz
Maximum sensor break reaction time	30s
Sensor break output level adjustment range	-100 to 100.0%
Maximum common-mode voltage @ 50/60Hz	264V _{ac rms} (with respect to neutral)
Common mode rejection @ 50/60 Hz	≥134dB
Series mode rejection @ 50/60 Hz	≥60dB
Resolution	Input <20mV, 0.67μV; input >20mV, 1.67μV

Thermocouples

Number of thermocouple types	17 (see Product Code for types)
Thermocouple linearization accuracy	±0.2°C
Cold junction compensation rejection ratio	20:1 (with internal detector)
Differential thermocouple input range	-8 to +8mV

Resistance temperature detector

Device	100Ω Pt (DIN 43760/BS 1904), 3-wire connection
Resistance at 0°C	100Ω
Resistance at 100°C	138.5Ω
Linearization accuracy	±0.2°C

Linear inputs

Linearity	0.1% of span
Resolution (without input adapter)	1.67μV
Base range	-10 to +50mV
Other ranges (requiring an input adapter)	0-20mA, 4-20mA, 0-5V, 1-5V and 0-10V

2. OUTPUT DEVICES

Triac module (isolated from all other circuits)

Maximum load current (resistive load)	1A _{rms}
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Logic module (isolated from all other circuits)

Output	20mA (15V _{dc} compliance)
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Relay module (isolated from all other circuits)

Output contacts	Form C, isolated
Maximum load voltage	264V _{ac}
Maximum load current (resistive load)	2A _{rms}
Minimum load voltage	30V _{rms} or 30V _{peak}

DC module (isolated from all other circuits)

Current output ranges	0-10mA, 0-20mA and 4-20mA (12V _{dc} compliance)
Voltage output ranges	0-5V, 1-5V and 0-10V (20mA _{dc} max.)
Resolution	<0.024%
Linearity	0.5%

3. CONTROL CHARACTERISTICS

General

Automatic operation

Control mode	ON/OFF, or PID with or without ramp-to-setpoint feature
Proportional band range (hysteresis for ON/OFF control)	1 to span, or 0.1 to 999.9% of display max. – display min.
Integral time constant range	“OFF”, 1-9999s, or 1 to 150 min.
Derivative time constant range	“OFF”, 0.1 to 999.9s, or 1-15 min.
Manual reset range (if integral time constant = OFF)	-100 to +100% of output level
Overshoot suppression	Adjustable high and low “cutback” points
Ramping speed	0.001 to 19999 units/min or units/hour

Manual operation

Auto/manual selection	Bumpless changeover
Power level adjustment range	-100.0 to 100.0%

Output 1 (heat)

Signal type	Time proportioned or continuously variable
Cycle time range (time proportioned)	0.3-100s

Output 2 (cool)

Signal type	Time proportioned or continuously variable
Cycle time range	0.3-100s

Cool gain multiplier (relative to heat channel) (relative hysteresis band for ON/OFF control)
Modes (specialized algorithms)

0.1-20.0

Linear (fan, non-evaporative water and oil cooling)
Non-linear (evaporative water cooling only)

Valve positioner configuration

Control mode
Travel time up, travel time down
Minimum ON time
Output recalculation update interval

Velocity, with optional 100 to 1k Ω slidewire feedback
5.0 to 999.9s
0.1s to 10% of travel time
0.1s to greatest of Td/4, Ti/16, or travel time setting

4. ALARMS

Number of independent alarm output channels
Number of independent alarm input functions

2: AL1 (on channel 3) and AL2 (on channel 4)
5: "Full-scale" high, "Full-scale" low, deviation high, deviation low, and deviation band each with its own setpoint
None: non-latching operation.
0.1 to 10.0% of display max. – display min.
Failsafe (alarm state affirmed by de-energized output), or non-failsafe (alarm state affirmed by energized output)
1

Annunciation memory
Hysteresis adjustment range
Alarm action

Number of alarm functions assignable to each output channel

5. COMMUNICATIONS

Digital

Protocols

Eurotherm Bi-Synch (ANSI X 3.28 (1976) 2.5.B1), J-bus®, or Modbus®
EIA-232-D, EIA-485 or EIA-422-A
300, 600, 1200, 2400, 3600, 4800, or 9600 baud

Transmission standard
Transmission rate selection
Format

Start bit, 7 data bits, even parity bit, stop bit
Start bit, 8 data bits, stop bit

Eurotherm Bi-sync
Modbus and J-bus

Analog

Remote input

Possible remote input sites (only 1 permitted)

Configuration
Voltage input range
Voltage input impedance
Current input ranges
Current input impedance

Channel 4 (AL2) or analog communications board
Remote setpoint, remote trim or output power limit
10V span max. between -5 and 10V
>75k Ω
0 to 10mA, 0 to 20mA, 4 to 20mA
500 Ω mounted on rear terminals
0.024%
0.5%
1.3Hz

Resolution

Accuracy

Sampling frequency

Retransmission

Possible retransmission sites (only 1 permitted)

Output 2 or channel 3 (AL1) or analog communications board

Configuration
Voltage output range
Voltage output impedance
Current output ranges
Current output compliance

Setpoint, measured value, error or output power
10V span max. between -5 and 10V
<0.1 Ω , 500 Ω min. load impedance
0 to 10mA, 0 to 20mA, 4 to 20mA
12V_{dc}
0.024%
0.5%

Resolution

Linearity accuracy

Logic inputs (2) (not isolated from MV input circuit or each other)

Drive

Input voltage levels

Active state: pulled down through impedance <100 Ω
Active state: <0.7V, inactive state: >4.0V
See Product Code for possibilities

Configuration

6. GENERAL

Overall dimensions

3.78" x 3.78" x 9.09" deep (96 x 96 x 231 mm)

Power supply

Operating voltage ranges

100-240V_{ac rms} (-15/+10%), 48-62Hz

17-40V_{ac rms}, 48-62Hz; 20-40V_{dc}

8.5W

Power dissipation

Environmental considerations

Operating temperature range

0-55°C

Storage temperature range

-10-70°C

Ambient temperature coefficient

±50ppm/°C (typ.—not including CJC on T/C inputs)

Relative humidity

5-95%, non-condensing

Fascia seal rating

NEMA 3 (IP-64) with gasket

7. PROGRAMMER

Program size and format

Number of segments/program

16

Program format

8 ramp/dwell pairs

Number of programs in memory

818P

1

818P4

4

818P15

15

Maximum number of program repetitions

999 (with possibility of continuous program repetition)

Ramp rates

Normal range range

1 to max display units/minute or hour

High resolution rate range

0.1 to max. display units/minute or hour

Time to target

0.1 to 999.9 minutes or hours

Dwell time adjustment range

0 to 999.9 minutes or hours

Program control

Control means

Front panel pushbuttons, logic input, or communications port

Number of programmer states

4 (RESET, RUN, HOLD, END)

Holdback band

"OFF", 1 to display range

Starting method

Servo start from measured value or level start

Ending method

Return to front-panel (base) setpoint

8. SELF AND ADAPTIVE TUNING

Parameters determined

Self tuning

PID terms, high and low cutback levels, heat and cool cycle times, and relative cool gain

Adaptive tune

PID terms only

Product code

Coding:

Model

818P	Programmer/controller
818P4	Programmer/controller with 4-program storage
818P15	Programmer/controller with 15-program storage

input types [1]

TC	Thermocouple
RTD	3-wire RTD
PYR	Pyrometer
0mA20	0-20mA
4mA20	4-20mA
0V5	0-5V
1V5	1-5V
0V10	0-10V
M0,8	0-8mV
M0,20	0-20mV
M0,50	0-50mV
M1.6,8	1.6-8mV
M4,20	4-20mV
M10,50	10-50mV
8mV8	-8mV to +8mV

outputs [2]

output 1: PREFIX

D...	Direct acting control
R...	Reverse acting control [3]

output 2: PREFIX

C...	Control (opp. action to O/P1)
M...	Ana. retrans. of MV [4,5]
S...	Ana. retrans. of setpoint [4,5]
E...	Ana. retrans. of error [4,5]
W...	Ana. retrans. of output level [4,5]

output 1 and output 2: CODE SYMBOL [6]

...RLY	Relay, linear
...RLYF	Relay, ON/OFF
...RLYN	Relay, non-linear
...LGC	Logic, linear
...LGCN	Logic, non-linear
...LGCF	Logic, ON/OFF
...TRI	Triac, linear
...TRIN	Triac, non-linear
...TRIF	Triac, ON/OFF
...0V5	0-5V isolated
...0V10	0-10V isolated
...1V5	1-5V isolated
...0mA10	0-10mA isolated
...0mA20	0-20mA isolated
...4mA20	4-20mA isolated
...VPT	Valve positioner (2 triacs) [7]
...VPR	Valve positioner (2 relays) [7]
PROG	Programmer segment O/P [8]
NONE	No output fitted [9]

NOTES:

- "Input type" code must correspond to the curve specified in "input" field.
- Output 1 and Output 2 code fields normally contain a PREFIX followed by the CODE SYMBOL. The Output 2 code field does not contain a prefix for valve positioners or when used for a program segment output (PROG).
- Specify R (reverse acting control) for heat-only or heat/cool temperature control.
- Among Output 2, Alarm 1 and the communications output, only one can be configured

alarms [10]

alarm 1 and alarm 2: CODE SYMBOL

NONE	Not fitted
DB...	Deviation band
DH...	Deviation high
DL...	Deviation low
FH...	Full-scale high
FL...	Full-scale low

alarm 1 and alarm 2: SUFFIX

...E	Energized in alarm (non-failsafe)
...D	De-energized in alarm (failsafe)

alarms (analog comms. funct.) [4,10]

alarm 1 (retransmission): PREFIX

M...	Measured value
S...	Setpoint
E...	Error
W...	Output level

alarm 2 (remote input): PREFIX

X...	Remote setpoint
T...	Remote trim
L...	Remote setpoint, local trim
W...	Maximum output power

alarm 1 and alarm 2: CODE SYMBOL

...0V5	0-5V isolated
...0V10	0-10V isolated
...1V5	1-5V isolated
...2V10	2-10V isolated
...0mA20	0-20mA isolated
...4mA20	4-20mA isolated

alarms (programmer outputs) [10]

alarm 1 and alarm 2: CODE SYMBOL

PROG	Programmer segment outputs
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for analog retransmission.

- Must specify a DC output.
- Selection of ON/OFF control on output 1 restricts Output 2 to ON/OFF control, retransmission or NONE. Non-linear outputs available only on Output 2.
- For Output 1, specify ...VPT or ...VPR. For Output 2 specify NONE (no slidewire) or FB (with slidewire). Slidewire feedback connects to Alarm 2 terminals, leaving only Alarm 1 channel for alarm or retransmission functions. Specify NONE for Alarm 2 when slidewire feedback is selected.
- Output 2 only. No prefix required. Not available with ON/OFF control.
- No prefix required.

communications—digital [11]

type (standard & protocol)

232	EIA-232-D, E1 Bi Synch
485	EIA-485, E1 Bi Synch [12]
J32	EIA-232-D, J-Bus®
J85	EIA-485, J-Bus® [12]
M32	EIA-232-D, Modbus®
M85	EIA-485, Modbus® [12]

function (baud rate)

96	9600 baud
48	4800 baud
36	3600 baud
24	2400 baud
12	1200 baud
06	600 baud
03	300 baud

communications—analog [11,13]

type (analog input): PREFIX

X...	Remote setpoint
T...	Remote trim with local setpoint
L...	Remote setpoint with local trim
W...	Maximum output level

type (analog input): CODE SYMBOL

...0mA20	0-20mA
...4mA20	4-20mA
...0V5	0-5V
...0V10	0-10V

function (analog retrans.): PREFIX

M...	Measured value
S...	Setpoint
E...	Error
W...	Output level

function (analog retrans.): CODE SYMBOL

...0mA20	0-20mA
...4mA20	4-20mA
...0V5	0-5V
...0V10	0-10V
...1V5	1-5V
...2V10	2-10V
...5V5	-5+5V

communications—none

type and function

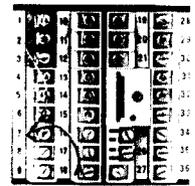
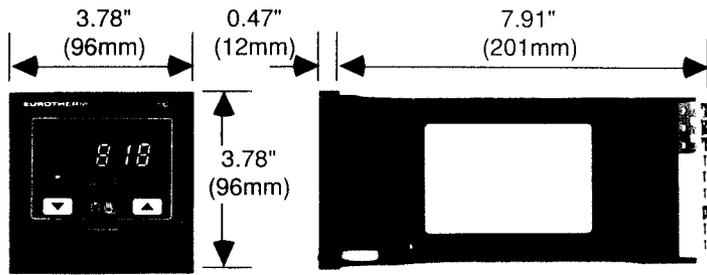
NONE	not fitted
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terminals/options [14]

FN	Faston, normal power supply
SN	Screw, normal power supply
FN24	Faston, 24V ac/dc supply
SN24	Screw, 24V ac/dc supply

- Alarm outputs may take on alternate functions as analog communications ports (Alarm 1 = retransmission, Alarm 2 = remote input) or program segment outputs (Alarm 1 and Alarm 2).
- Either digital or analog communications may be selected, not both.
- Specify 485 for use with the EIA-422-A standard.
- When specifying analog communications, the "Communications type" field represents the input type and signal range. The "Communications function" field represents the retransmission type and signal range. Both fields must contain a PREFIX followed by the CODE SYMBOL.

Dimensions

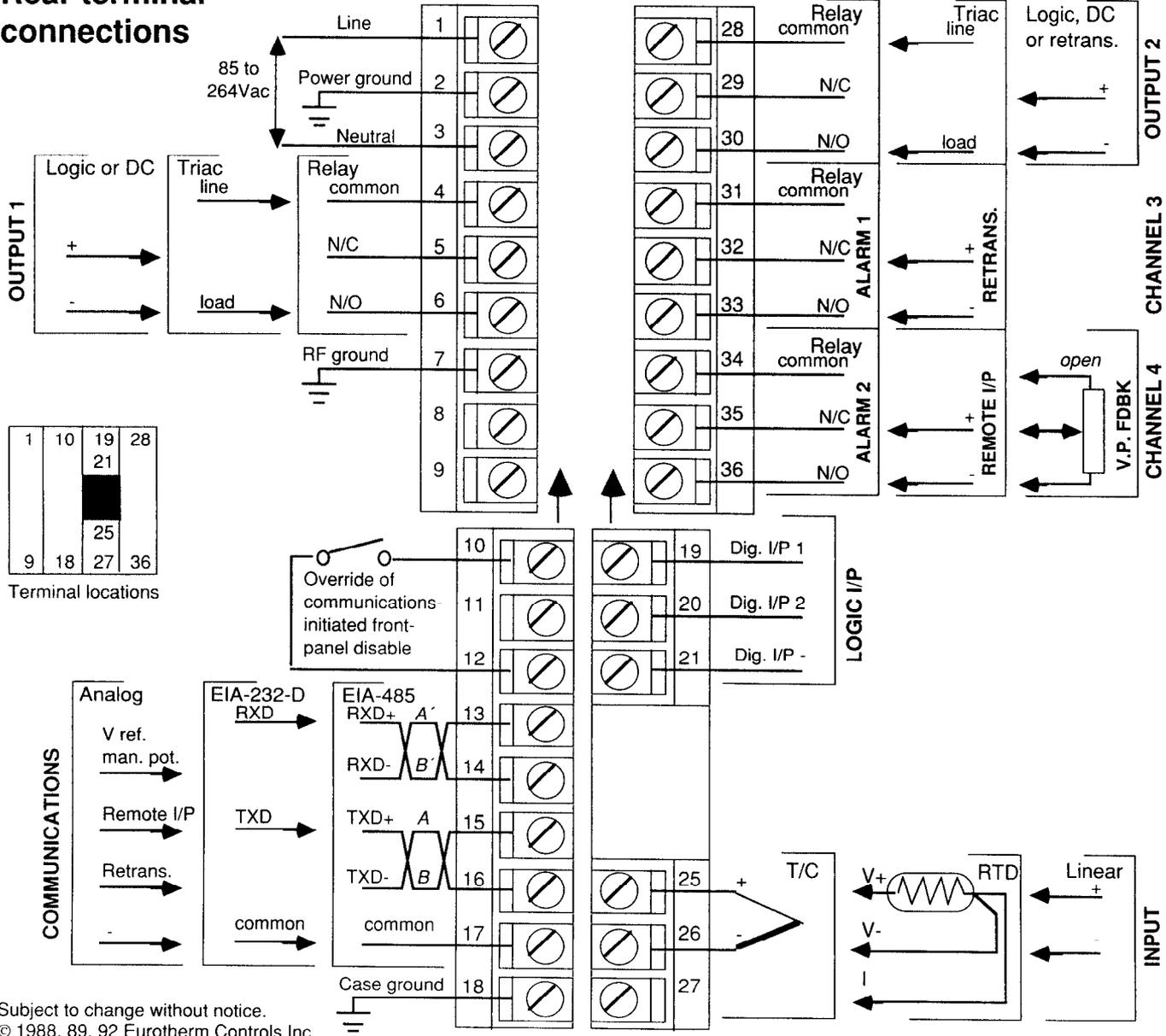


3.63x	+0.03	Max. panel thickness: 0.35" (9mm)
3.63"	-0.00	
92x	+0.8	
92mm	-0.0	

Panel depth: with rear terminal cover: 8.62" (219mm)
 with gasket fitted: less 0.060" (1.5mm)

Panel Cutout

Rear terminal connections



Subject to change without notice.
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