

1/2 DIN Programmable Recorders

Series 1200 1/2 DIN Programmable Recorders

The Thermo Series 1200 Digital Recorder is ideally suited for direct replacement of aging 1/2 DIN or 3" x 6" recorders previously manufactured by Bailey, Fischer and Porter, Foxboro, Leeds and Northrup, Taylor, Westinghouse Veritak, and other manufacturers. In virtually all applications, no panel modifications are required to upgrade to the Series 1200.

The Series 1200 combines the readability of an analog recorder with the flexibility, features and power of a 32-bit microprocessor-based instrument. It meets the 1/2 DIN standard panel cutout of 68 mm x 138 mm (2.68" x 5.43"). State-of-the-art microprocessor-based design and modular construction have resulted in a rugged instrument that is easy to install, simple to operate, and requires minimal maintenance. The Series 1200 will measure and process up to nine channels, including three direct inputs consisting of mV, V, and mA inputs, and a wide variety of thermocouples and RTDs. Inputs can be scaled linear, square root and/or logarithmic. Up to six additional external, conditional or calculated points can be programmed.

The Series 1200 is available in one-pen, two-pen, and three-pen configurations. Disposable fibertip pens can be quickly removed and replaced, keeping downtime to a minimum. The front panel of the recorder allows data to be simultaneously displayed on a 10-character digital display and three color bargraphs.

There are two models of the Series 1200, the 1200A and the 1200B. The 1200B is a direct replacement for the Bailey 771, and is compatible with existing Bailey shelf units.



Features

- Three direct inputs
- Nine total points, including calculated points
- 32-bit microprocessor
- Color bargraphs (Optional)
- Three contact outputs (Optional)
- Two-wire transmitter power supply (Optional)
- RS485 MODBUS™ communication
- Nuclear qualifications (Optional)
- Special Bailey® connector (1200B)

Designed with the technician in mind

It will change your mind about 3" x 6" recorders.

Traditionally, 3" x 6" recorders have left a lot to be desired in the real world of industrial data gathering and recording applications. Thermo was able to draw on more than 50 years of industrial recording experience to develop a new generation of miniature recorders of unequalled reliability.

Design goals

Our design goals were simple. We wanted to design a recorder incorporating:

32-bit microprocessor: The microprocessor-based design offers high-speed operation, unequalled accuracy and programming flexibility.

Reliable operation: Surface-mount technology is used extensively in modular construction.

Large displays: 3-color LED bargraphs and a 1/4" tall, 10-character LED alphanumeric display make the Series 1200 easy to read.

3-color trending: Red, green and blue trend lines provide easy readability on the chart.

Communications: RS485 is optional on the rear panel, with selectable MODBUS ASCII or RTU protocol.

Measurement and math capabilities

The Series 1200 recorder measures 3 analog inputs (and 3 optional digital inputs) to drive 1, 2 or 3 pens. Six calculated or conditional points and 15 constants can be configured to perform peak monitoring, differentials, and averages. Gated timers, totalization, and conditional (Boolean logic) functions are available along with logarithmic calculations. A 40-operand equation is also possible by using only one calculated point. These math capabilities allow you to compensate flows for pressure and temperature, calculate total vessel volume from level measurement, totalize the time an event is in alarm, determine flow through weirs and flumes, and many other applications. F_0 computations are standard.

Trending

Disposable fibertip pens trend up to 3 variables in 3 colors while the thermal printer annotates the chart (see page 3.) The optional bargraph displays pen position as well as alarm setpoints and alarm conditions. Point assignments to pens and bargraphs are programmable, and calculated points can be trended. The optional serial port on the rear panel supports RS485 MODBUS communications.

Remote Package

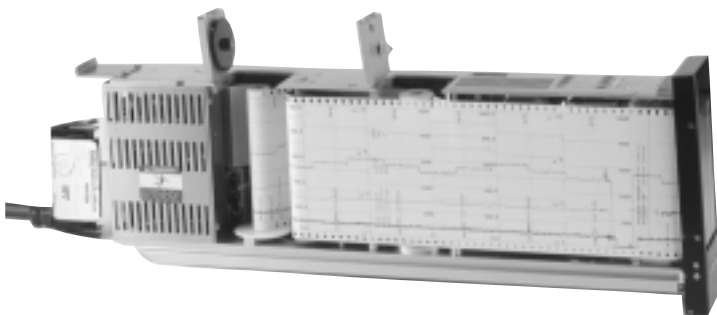
The Remote Package provides 3 contact inputs for alarm acknowledge, changing scale sets, turning chart on/off or switching chart high/low speeds. Calculated points can be reset through these contacts or used as even inputs. A 24-volt, 2-wire transmitter power supply is also available.

Alarms

Three alarm relay outputs are available. Points are programmed with 5 alarms of up to 8 different types (Hi, Lo, rate, abnormal, open, close, true or false). Each setting can be programmed to activate a relay and multiple settings can activate a specific relay.

Easy service and troubleshooting

Removing the recorder chassis from the panel is fast and simple. All printed circuit cards utilize high-reliability surface mount components. Stepper motor servo drives position pens with geared tooth belts. Extensive diagnostic software is menu-driven and pens are disposable fibertip.



Model 1200B

The Model 1200B is a direct retrofit for the Bailey® 771, and is compatible with existing Bailey shelf units. The design makes loading and unloading of chart rolls fast and easy. The special Bailey connector at the rear of the unit allows for easy replacement of existing Bailey shelf units.

Chart Printout

The Series 1200 chart printout is a comprehensive and easy-to-read record of all data recorded by the instrument. The Print Menu allows you to select a log of all points, with header, point number, legend, data, engineering units, and alarm status. Interval logs can also be programmed to start at a specified time and at specified time intervals.

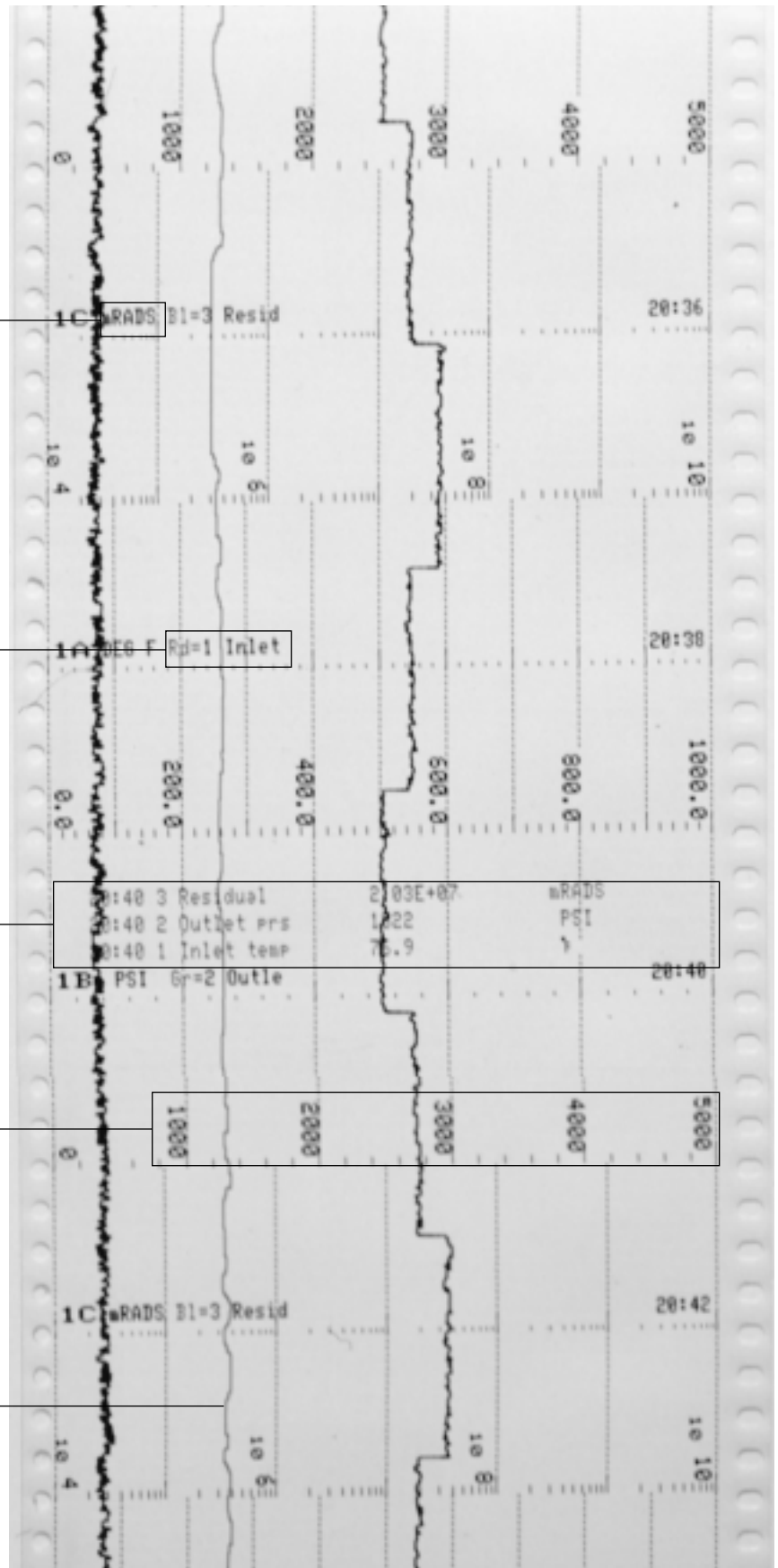
Programmable engineering units

Pen assignment and point number with tag legend

Interval logs can be programmed to start at a specified time and at specified time intervals. They are printed at chart speed so as not to disturb time axis.

Fully-programmable scales

The programmable filter can smooth out noisy or erratic signals.



(Chart is shown actual size. The recording area between the guide holes is 100 mm.)

Designed with the operator in mind

Select any one of four menu levels of operation.

Display Menu

The Display Menu can display any programmed point or points, any current alarm or series of alarms, time and date, previous data before a reset, current chart speed, unit faults, and version of operating software.

Function Menu

The Function Menu allows the user to activate, bypass, and/or reset a point. This menu also allows changing between high and low chart speed, turning alarm check on or off, and choosing a scale set. It also activates the "Change Pins" feature.

Program Menu

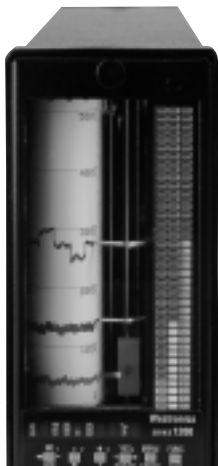
The Program Menu allows you to define the system operating parameters. Menu-driven prompts, answered by YES, NO, or by entering the desired value, enable you to customize the instrument to meet your application requirements. Program Menu and Function Menu items may be passcode-protected to prevent unauthorized entry.

Print Menu

The Print Menu allows printing of a complete list of current data and status of programmed points (Log Points), a profile of system status parameters (Log Profile), a listing of point program setup parameters for each point (Log Program), pre-programmed event messages (Trend Message), or the current time and date (Trend Time) can be printed on the chart.

Control/Information Panel

The front control panel is designed to provide convenient accessibility to all frequently-used control keys required for operation and programming. An easy-to-read 10-character display provides complete point and programming information, prompts, time, and date. The optional 3-color bargraph display provides fast and convenient monitoring of critical points.



Model 1200A

The Series 1200 combines the readability of an analog recorder with the flexibility, features and power of a 32-bit micro-processor-based instrument. The front panel of the Model 1200A allows data to be simultaneously displayed on a 10-character digital display and on three color bargraphs.



Front Panel Keys

There are 6 keyboard panel keys, each with multiple capabilities:



ACK (Acknowledge) / 1 ← NO / (Left Arrow)

ACK - At the Command or Display prompt, this acknowledges alarms.

1 - The "1" is used to program/enter the passcode.

NO - In a programming menu, this key is used for "NO" when a "YES" or "NO" is required.

← (Left Arrow) - When in a programming menu item requiring alphanumeric entries, this key moves the blinking cursor to the left.



↓ (Down Arrow) / 2

↓ (Down Arrow) - Used to scroll backward through menus and menu items to select letters, symbols or numbers. At the Command or Display prompt, it can be used to scroll to view point data.

2 - The "2" is used to program/enter the passcode.



↑ (Up Arrow) / 3 / Autojog

↑ (Up Arrow) - Used to scroll up through menus, prompts, and alphanumeric characters. At the Command or Display prompt, it can be used to scroll to view point data.

3 - The "3" is used to program/enter the passcode.

Autojog - At the Command or Display prompt, holding this key down for 1 second or more engages Autojog. Press again to disengage.



YES / → (Right Arrow) / 4 / FD (Feed) / STP (Stop)

YES - In a programming menu, this key is used for "YES".

→ (Right Arrow) - When in a programming menu end item requiring alphanumeric entries, this key moves the blinking cursor to the right.

4 - The "4" is used to program/enter the passcode.

FD (Feed) - At the Command or Display prompt, pressing and holding this key will cause the chart paper to advance at a fast rate.

STP (Stop) - At the Command or Display prompt, with the pens and thermal printhead recording, pressing the key will toggle the chart and pens on/off.



MENU / ENTER

MENU - Pressing the key once will invoke the Display - Print - Program Menu.

ENTER - This key will also accept new programming, characters or values programmed at a prompt; it will also accept the current programming and advance to the next prompt.

FUNC (Function) / EXIT

FUNC (Function) - At the Command prompt, pressing this key will invoke the Function Menu.

EXIT - When pressed in a menu, this key will move the program menu function back up to the next higher menu.

How To Order

In order to determine the model configuration needed, choose one item from each group (A through H) of the Model Selection Chart and write the selected number on the appropriate line in the Model

Number Summary below. However, it is recommended that you contact the Thermo Sales Office for specific order information before placing an order.

Series 1200A Model Selection Chart

A	Model
1	One-pen instrument
2	Two-pen instrument
3	Three-pen instrument
B	Signal Inputs
0	mV, V, T/C
1	mV, V, T/C, mA (50 Ω shunt)
2	mV, V, T/C, RTD
3	mV, V, T/C, RTD, mA (50 Ω shunt)
C	Main Power Input Calibration
0	60 Hz
1	50 Hz
D	Option Group 1
0	Non-isolated RS485
1	3 contact outputs, 3 event markers, 24 VDC transmitter power supply and isolated RS485
E	Option Group 2
0	Chart illumination
1	Bargraph display with chart illumination
F	Option Group 3
0	None
1	Stainless steel tag (RTP)
2	Power cord (117 VAC only, 8' long)
3	Stainless steel tag (RTP) and power cord (117 VAC only, 8' long)
G	Option Group 4
0	None (CE Mark)
1	Seismic (IEEE 344) and EMI/RFI
2	Software V & V (IEEE 7-4.3.2-1993), Seismic and EMI/RFI
H	Option Group 5
0	None
1	Future OEM
X	Special

Model Number Summary

12__ 0A - __ - __ - __ - __
 A B C D E F G H

Series 1200B Model Selection Chart

A	Model
1	One-pen instrument
2	Two-pen instrument
3	Three-pen instrument
B	Signal Inputs
0	None
C	Main Power Input Calibration
0	60 Hz
1	50 Hz
D	Option Group 1
0	None
1	3 contact outputs
2	2 contact outputs and isolated RS485
E	Option Group 2
0	Chart illumination
1	Bargraph display with chart illumination
F	Option Group 3
0	None
G	Option Group 4
0	None (CE Mark)
1	Seismic (IEEE 344) and EMI/RFI
2	Software V & V (IEEE 7-4.3.2-1993), Seismic and EMI/RFI
H	Option Group 5
0	None
1	Future OEM
X	Special

Model Number Summary

12__ 0B - 0__ - __ - __ - __
 A B C D E F G H

Note: Model 1200B is a direct replacement for the Bailey 771 and fits existing Bailey shelf units.

Specifications

Points

Capacity	3 direct analog input channels, 9 total points (including analog inputs and calculated and external channels)
Measurement Rate	1 analog point: all 9 points scanned 12 times per second 2 analog points: all 9 points scanned 6 times per second 3 analog points: all 9 points scanned 4 times per second

Analog Input Points

Standard Types	DC Voltage: Linear and square root programmable to 10 V (100 mV, 1 V, and 10 V ranges) DC Current: Linear, square root, and log programmable to 4 - 20 mA, 10 - 50 mA Dry Contact Thermocouple: J, K, T, E, R, S, B, C, Nicrosil Nisil, and Nickel/Nickel Moly
Optional Types	RTD: 10 Ω Cu, 100 Ω Pt 385, 100 Ω Pt 392, 200 Ω Pt 392, and 120 Ω Ni
Accuracy	Voltage: \pm 0.05% of programmed range Current: \pm 0.1% including shunt resistance Thermocouple: \pm 1° C for J, K, T, E, Nicrosil-Nisil and Nickel/Nickel Moly; \pm 3° C for R, S and C; \pm 4° C for B RTD: \pm 0.5° C
Resolution	0.003% of full scale
Impedance	>10M Ω 100 mV and 1 V ranges, 30K Ω for 10 V range
Common Mode Voltage	300 VAC p-p
Common Mode Noise Rejection	>120 dB at 50/60 Hz
Normal Mode Noise Rejection	>60 dB at 50/60 Hz

Calculated Points

Standard Types	Equation: parenthetical algebraic entry (add, subtract, multiply, divide, square root, X ^y , Ln, Lg, e ^x), unlimited nesting, 40 operators max. Hi Peak, Lo Peak, HILO Difference, Time Average, Moving Average, Gated Timer, Logarithmic, Flow Totalization, Sterilization (F ₀ , F _t)
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Printing

Method	9-dot moving thermal printhead
Chart Annotation	Chart grids, alarm annotations, channel ID, logs, chart scales and engineering units
Chart Scales	2 sets of 6 scales, bottom, top, or center origin, scale compression and expansion

Trending

Medium	Disposable fibertip pens; writing length 3500 feet
Model 1200A:	Pen 1 - Red; Pen 2 - Green; Pen 3 - Blue
Model 1200B:	Pen 1 - Red; Pen 2 - Blue; Pen 3 - Green

Trended

Accuracy	\pm 0.3% of chart scale, pen positioning by optical sensor feedback Pen Offset Compensation for time axis alignment of pens on chart
Pen Response	1 second (10% to 90% of scale)

Chart Paper Thermal roll, 4 in (100 mm) x 65 ft (20 m)

Paper Out Detection Print and trend automatically stopped

Chart Speeds

Standard Metric Programmable: 0.5 in/hr min; 60 in/hr max
Programmable: 10 mm/hr min; 1500 mm/hr max

Display

Alphanumeric Bargraphs 10 character, 5 x 5 LED display, update rate programmable 1 to 60 seconds
Optional. Three 41-element bargraphs - red, green, blue LED display

Front Panel

Keyboard Tactile-feedback keys support unit configuration, alarm acknowledge, and paper feed

Serial Channel (Non-isolated) RS485, selectable MODBUS ASCII or RTU protocol, selectable from 300 to 19200 baud
Support for up to 31 instruments in a multi-drop environment

Serial Channel Isolation Optional

Alarm Contact Outputs Optional. 3 dry Form "C" contacts, rated 1A at 117 VAC and 26 VDC, 0.5A at 230 VAC (resistive). Assignable to any point(s) alarm and/or abnormal conditions.

External Digital Inputs Optional. 3 inputs assignable as Chart On/Off, Alarm Acknowledge, Event Marker, or Active Chart Scale Set Select

Power

Main Requirements 1200A: 90 to 264 VAC, 47 to 63 Hz
1200B: 24 VDC at approx. 35 VA

Failure Protection Programmed parameters stored in EEPROM memory. Clock circuit sustained for minimum of 72 hours with power removed.

Sensor Power 24 VDC. Two-wire transmitter power

Environmental

Operating Temperature 0° to 45° C

Operating Humidity 30% to 85% RH non-condensing

Electromagnetic Compatibility Optional. Compliance with European Union EMC Directive 89/336/EEC (CE Mark); Compliance with EPRI Report TR-102323

Product Safety Standards Optional. Compliance with European Low Voltage Directive 73/23/EEC (CE Mark)

Seismic IEEE 344-1987

Dimensions

(1200A)
Unit 5.59" H x 2.83" W x 20.19" D (142 mm x 72 mm x 513 mm)
Panel Cutout 5.43" H x 2.68" W (138 mm x 68 mm)
Bezel 1.57" (40 mm)

Note: Model 1200B is a direct replacement for the Bailey 771 and fits existing Bailey shelf units.