SLC RetroPAK Controllers

- **Replaces aging, obsolete Bailey SLC and CLC controllers**

- **Highly reliable, high-visibility display**

- **Peer-to-peer and Modbus RS-485 communications**

- **Data Quality detection on all inputs, outputs and internal parameters**

- **Same I/O complement and panel dimensions**

- **Library of Bailey Function Codes reduces re-engineering and startup time**

- **2 Year Warranty**

The Logical Migration

The SLC/CLC RetroPAK is a strategy to help Loop Command users migrate to current technology, and includes the features that made these controllers so popular, especially for steam and power generation. In addition it offers a host of other powerful features and up-to-date communication strategies that make RetroPAK the logical choice for replacing aging SLC and CLC controllers.

The SLC RetroPAK is based on state-of-the-art surface mount technology. Like the SLC and CLC, the basic hardware platform includes the carrier board, CPU, display assembly, and terminations. The instrument uses 64K bytes of non-volatile RAM not only to store the configured database, but to back up all current process and operating parameters.

The RetroPAK controller fits into the same panel cutout as the CLC and SLC controllers. The actual housing of the RetroPAK controller requires less panel depth. Field wiring is simplified by removable termination blocks.

The display assembly is well suited to the environment of boiler control, pulp & paper mills and other harsh applications, and can withstand power dips and recovery surges. It is also less susceptible to temperature rise than older technologies.

The RetroPAK controller provides the same I/O complement as the CLC and SLC controllers:

- 4 analog inputs (two universal and two current 4-20mA) each with independent, isolated transmitter power supply

- 2 milliamp outputs

- 3 digital inputs (2.5 - 28Vdc)

- 4 digital outputs (5 - 60V dc)

Two of the standard analog inputs are universal, so low-level inputs such as thermocouple and RTD can be accommodated without ordering extra options.

Serial communication and Peer-to-Peer capability are standard features of every controller. The RetroPAK controller includes a peer-to-peer Instrument Communication Network (ICN) and Modbus RTU over RS-485, on two separate communication ports. This separates control data from information and operational data being sent to a PC or console.

HIGH RELIABILITY, HIGH VISIBILITY DISPLAY

The pixel-based vacuum fluorescent display is highly visible and extremely robust. It provides a choice of up to six fonts and seven levels of brightness for ease of operation.

Standard Loop Display
Provides familiarity and reduces operator retraining

Alarm Displays
Any number of alarms can be configured for any signal. The alarm displays make it easy to identify, review and acknowledge process and diagnostic alarms.

Tuning Displays
Password-protected entry of tuning parameters, XY table values, recipe data and other information

Application-Specific Displays
User screens can be configured for sequence and batch operations, discrete device operation, recipe selection, and more. All keys are user programmable.
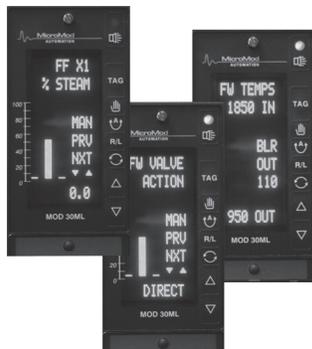
Maintenance & Troubleshooting
View raw input values for commissioning and startup, detailed diagnostic information before and during normal operation and Event Queue of up to 1024 entries

FLEXIBLE COMMUNICATIONS

The Instrument Communication Network (ICN) provides peer-to-peer communication with other RetroPAK, SteamPAK, or MOD 30ML controllers. It uses a token-passing ring protocol which guarantees every instrument access to the bus within a determinate amount of time (nominally 250ms). If an instrument on the bus should cease to communicate, its peers generate diagnostic alarms but continue to operate with the last good data received.

A second serial network provides RS-485 Modbus RTU open protocol communication. This network is independent of the ICN. Direct connection to a PC using RS-485 eliminates the need for an intermediate device such as the CIC01. For systems that include a LAN-90 console, MicroMod's Micro-PWC software is a logical upgrade path to the Windows environment.

Many CLC and SLC controllers are part of a Bailey Infi90 or Net90 control system. Although the RetroPAK controllers do not use the Bailey Modulebus communications protocol, they can be integrated with the system using either the Field Device Interface , or an OPC Server communicating with the Conductor NT software. An optional Ethernet gateway is available to bring the data from the RetroPAK controllers onto the plant Ethernet network.
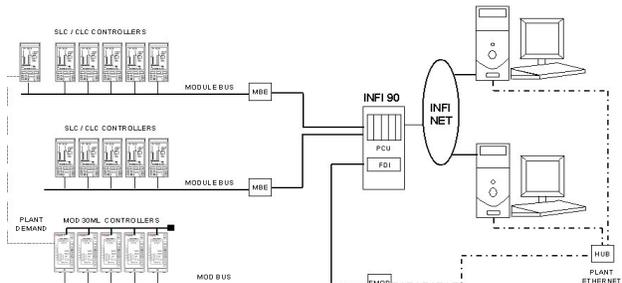
OUTPUT BYPASS

The optional Output Holder mounts in series with the controller, and during normal operation the controller's output is passed through to the valve. Should the controller's CPU or output fail, the Output Holder automatically maintains the output signal. Visual indication and up/down arrow keys allow direct manipulation of the output, <u>even when the controller is removed from service.</u>   Direct output control does not depend on having a powered controller in place.

CONFIGURATION

The configuration software for the RetroPAK controllers, Visual Application Designer, provides the standard factory templates used in the CLC and SLC. These ready-to-use templates are easily downloaded to the controller from a PC or laptop. Final ranges and tuning parameters are entered from the front panel. In addition, the Bailey Function Code blocks are included in the software library. Very little knowledge of the Visual Application Designer package is required to create the same types of control strategies used in the SLC and CLC.

All the Function Codes and native controller function blocks are re-useable. The RetroPAK controller has four times as much configuration space, accommodating even the most complex applications including burner management.
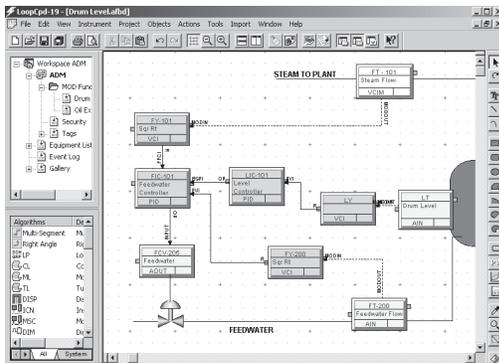
The Visual Application Designer software provides a Windows-based environment for creating, editing, downloading, documenting and debugging controller databases. It provides automatic, on-screen documentation of the configuration, including signal source and destination. On-line, context sensitive help is available for each block. Live debug and runtime facilities allow on-line verification of the database and process logic, and trend windows simplify loop tuning at commissioning time. There is also a set of drawing tools that can be used to construct runtime displays or place dynamic process symbols next to the algorithm blocks in the configuration for easier debugging, without using a separate HMI package.   Automatic report generation includes tabular reports containing all blocks in the system, their internal parameters, and all connections, as well as graphical reports showing the database diagram exactly as it is drawn.

SAFETY AND SECURITY

The RetroPAK goes over and above the features provided by the SLC and CLC controllers for protecting the process and ensuring continued safety and operation.

Signal Quality Detection - All inputs and outputs have quality detection and an associated alarm bit.

Power fail/recovery settings - available for every parameter, so that outputs, steps, control modes and setpoint values assume a known good value, either 'previous' or user-configured, after a power outage. Warm- and cold-start options allow different settings depending on a user-specified time period before power is restored.

Failsafe output settings - the option to select failsafe values, either 'previous' or a user-determined value, on all outputs should the controller I/O lose communication with the CPU.

Single-point isolation & short-circuit protection - Inputs, outputs and built-in communications are individually isolated, channel-to-channel and channel-to-ground. Each I/O point includes short-circuit and cut-wire detection with associated diagnostics

Database & tuning parameter backup - The Portable Memory Module option contains a backup copy of the controller's configured database. When installed on an operating instrument, it is updated every 50ms with current process parameters including PID and sequence output values and status, tuning values, current sequence step, calculation results etc. Continuous checksums ensure against corruption of Memory Module data.

BEYOND THE SLC

The SLC RetroPAK has the power to take your control system beyond the original SLC or CLC installation and optimize your application for today's control requirements. A wide selection of digital and analog single-point I/O modules, together with additional PID control capability, sequence and logic functions, math calculations and more allow many strategies to be implemented in a fewer number of controllers, saving money and space. For example, MicroMod's standard package for fully-metered combustion controls uses just three MOD 30ML controllers and provides added safety features.

Feature/Function Comparison

SPECIFICATION	CLC	SLC	RETROPAK
Analog Inputs			
Number available	4	4	4
Stated accuarcy	+/- 0.2%	+/- 0.2%	+/- 0.2%
Signal range	1 - 5Vdc / 4-20mA	1 - 5VDdc / 4-20mA	0-20mA (two universal)
Isolation	No	Yes	Yes - 250V rms
24Vdc Power for transmitters	Yes	Yes	Yes
Short circuit protection	Yes	Yes	Yes
Direct Temperature Inputs			
Number available	0	2	2
Isolation	-	Yes	Yes
Digital Inputs			
Number available	3	3	3
Maximum current	4.7mA	4.7mA	45mA
Minimum on/off time	500 ms	500ms	1.5 ms
Frequency/Pulse Inputs	0	1	0
Analog Outputs			
Number available	2	2	2
Stated accuracy	+/- 0.2%	+/- 0.2%	+/- 0.2%
Isolation	No	No	Yes
Max. load resistance (current)	700 ohms	700 ohms	1000 ohms
Digital Outputs			
Number available	4	4	4
Rated (resistive load)	24Vdc@80mA	24Vdc@80mA	5 - 60Vdc @ 1A
Power Supply Options			
120Vac / 240Vac	90-130Vac or 180-260Vac 50/60 Hz	90-130Vac or 180-260Vac 50/60 Hz	85-250Vac and 50-350Vdc 50/60Hz
24Vdc	24Vdc +/- 10%	24Vdc +/- 10%	24Vdc +/- 10%
Physical Characteristics			
Faceplate dimension	72x144mm	72x144mm	72x144mm
Depth	456mm (17.95 in.)	425mm (16.75 in.)	400mm (15.75 in.)
Weight	9 lbs	8 lbs	6 lbs
Display functionality	3-bar	Graphic	3 bar programmable
Display technology	Gas plasma	Vacuum fluorescent	Vacuum fluorescent
Engineering units	Yes	Yes	Yes
Functional Characteristics			
Configuration Space	2K bytes	16K bytes	64M bytes
Serial link/data link	Bailey Module bus	Bailey Module bus	Modbus RTU RS-485
Peer-to-peer network	Yes	Yes	Yes
Max. # of networked units	32	32	16
Control Functionality			
Number of PID loops	2 (cascade)	2 (cascade)	6 independent or 4 cascade
Math calculation	Yes	Yes	Yes
Sequence	No	No	Yes
Logic	Yes	Yes	Yes
Totalizer	Yes	Yes	Yes
Timer	Yes	Yes	Yes
Data Quality	Yes	Yes	Yes

GENERAL SPECIFICATIONS

Execution Time
   Built-in I/O: 100mSec.
   Analog Module I/O: 150mSec. nominal
   Digital I/O: 50mSec.

Operating Range: 85-250V rms, 50-400Hz

Fuse: 2.5 Amps (ac), 4.0 Amps (dc)

Power Consumption (120V rms, 60Hz, Full load)
   50W maximum

Data Retention: Typically 10 years with instrument unpowered

Operating temperature: 0 to +50°C

Storage Temperature: -40 to +75°C

Humidity: 5 to 95% RH, noncondensing

Fault Output:
   Built-in outputs - last value or 0%
   Module outputs - user defined between 0 and 100%

PHYSICAL SPECIFICATIONS

Height
   Bezel - 5.69" (144.5 mm)
   Panel cutout - 5.47" (138.9 mm)

Width
   Bezel - 2.87" (72.9 mm)
   Panel Cutout - 2.69" (68.3mm)

Safety Approvals
   FM Approved and CSA Certified Class I, Division 2,
   Groups A, B, C, D

Depth
   Behind the panel - 15.75" (400 mm)
   Front of panel - 1.13" (28.7 mm)

Weight
   6.0 lbs.

PERFORMANCE SPECIFICATIONS

Built-In Analog Inputs & Outputs

Analog Inputs (2)

Transmitter Power	24V dc, isolated (each input)				
Range / Span	Configured as:	Min	Max.	Span Min.	Impedance
	Millivolts	-10	120	10	10MΩ min.
	Volts	0	6,0	0,1	10MΩ min.
	Milliamps	0	22	1,0	100Ω nominal
	Resistance	500 ohms (20 Ω min. con resistor de 3,9KΩ cum.)			

Input Temperature Linearization
          Thermocouple – per standard NBS 125 y IEC 584
          RTD – per standard IEC751 y DIN43760

Measurement Range Limits – Thermocouple or RTD	°F Low	°F High	°C Low	°C High
Type B	392	3308	200	1820
Type E	-328	1832	-200	1000
Type J	-346	1400	-210	760
Type K	-328	2501	-200	1372
Type N	32	2372	0	1300
Type R&S	32	3214	0	1768
Type T	-430	752	-257	400
RTD	-328	1562	-200	850

Note: performance accuracy of Type B thermocouple cannot be guaranteed below 752°F (400°C).
RTD – 3-wire platinum, 100 ohms per DIN 43760 (IEC751), range 0-430 ohms (normal) or 0-55 ohms (low)

Common mode rejection	45Vdc
Isolation	Complete galvanic isolation using transformers and opto-isolators

Analog Outputs (2)

Range	0 to 22mA, non-isolated, with user-adjustable span (1 mA mín.)
Load	22mA at 1000 ohms maximum

Modular Inputs & Outputs

Refer to Specification Sheet S-MOD-MODULES for complete specifications and additional I/O options

Current Input with 24Vdc transmitter power (2)

Range	4 a 20mA
Low limit	0 mA
High limit	27.5 mA

Isolated Digital Inputs (3)

Input Voltage Range	2.5-28V dc
Low logic input	1V
Maximum input current	30mA

Isolated Digitl Outputs (4)

Output voltage range	5-60V dc
Maximum output current	1A

ORDERING INFORMATION

1. RetroPAK is a licensed package. The following end-user information must be supplied with each order:

      End-user company name
      Complete address
      Telephone and fax number
      Contact name
      Email address (if available)

2. If Custom Configuration services are selected, provide original database documentation or file for SLC or CLC controller

3. ViZapp software is required to configure RetroPAK controllers (not required if Custom Configuration services are selected)

	SLCRETRO	__	__
	01 - 08	04	05
SLC RetroPAK Controller			
Base controller	SLCRETRO		
Power Supply			
24V dc		0	
85 to 265V ac		1	
Custom Configuration Services			
None (requires Configuration Development Software)			000
Duplicate existing CLC Controller configuration (Note 1)			CLC
Duplicate existing SLC Controller configuration (Note 1)			SLC
Load duplicate RetroPAK database (Note 2)			DUP

Note 1: Database documentation and/or configuration file for existing controller must be provided

Note 2: When ordering multiple RetroPAK controllers with identical databases

|	VIZAPP	SLC	DEV	__	__
	01 - 06	04	05	06	07
Configuration Development Software					
Visual Application Designer	VIZAPP				
Configuration Library					
Bailey Function Code		SLC			
Functionality					
Development			DEV		
Copy Protection Key					
Parallel				PAR	
USB				USB	
Extended Support Services					
None					000
One Year Technical Support & Version Updates					ESS
Design Level					
Design Level					

ACCESSORIES

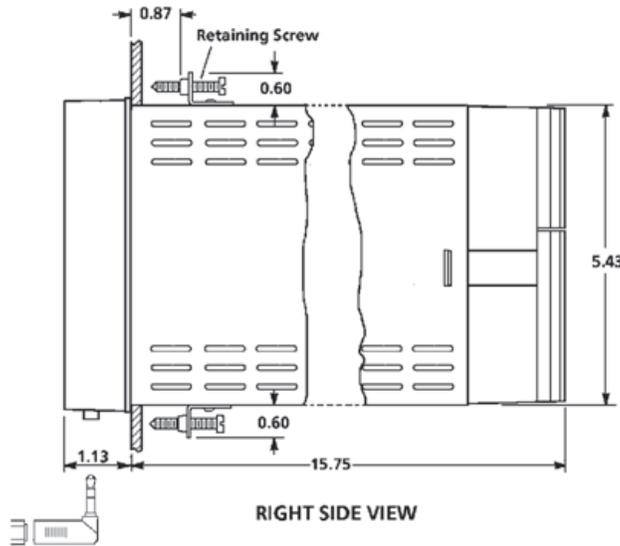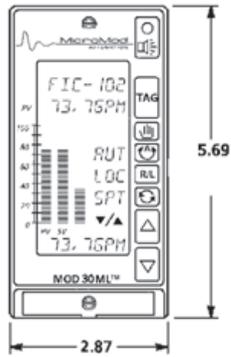|	
ICN Termination Assembly (1 per ICN network)	2030FZ00001A
Portable Memory Module (optional)	2010PZ10000A
Output Holder / Manual Loader (see S-MOD-1750N)	1750NZ10001A

MOUNTING DIMENSIONS
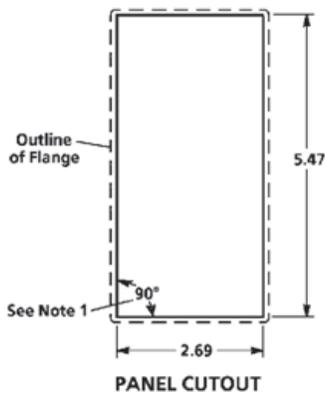
DISTANCE BETWEEN CENTERS
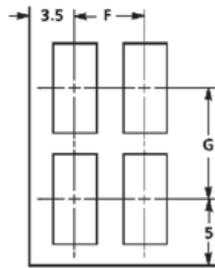
Distance between centers when mounting multiple controllers (inches)

	F	G
Recommended	4.0	8.0
Minimum	3.5	7.0

Notes:
1. When mounting housings in a panel or in a rack with a bezel turn the retaining screws until the point touches the back of the panel or rack. Excessive tightening of retaining screws can distort the housing. The housing must be square after adjusting retaining screws.
2. All dimensions in inches (mm)

PANEL CUTOUT

Outline of Flange

See Note 1

90°

5.47

2.69

FRONT VIEW

FIC-102
73.75PM

PV
150
80
60
40
20
0

RUT
LOC
SPT
▼/▲

PV SE
73.75PM

MOD 30ML™

TAG

R/L

△

▽

5.69

2.87

RIGHT SIDE VIEW

0.87

Retaining Screw

0.60

0.60

5.43

1.13

15.75

inches	mm	inches	mm
0.6	15.2	5.43	137.9
0.87	22.1	5.47	138.9
1.13	28.7	5.69	144.5
2.69	68.3	7	177.8
2.87	72.9	8	203.2
3.5	88.9	15.75	400
4	101.6		

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