

## Safe-Weigh® Process Weighing System

### FEATURES

- Patented synchronization techniques for digitized load cells
- Proactive diagnostics assure system performance
- Dynamic digital filtering
- 1 million count resolution per load cell
- **Optional features**
  - 8 process setpoints
  - Up to 4 analog current outputs
  - DeviceNet, A-B Remote I/O, Modbus Plus, or Profibus interface capability



### APPLICATIONS

- Quality critical batch and blend systems
- Reactor vessels
- High value ingredient/product processing
- Fault tolerant—no down time requirements



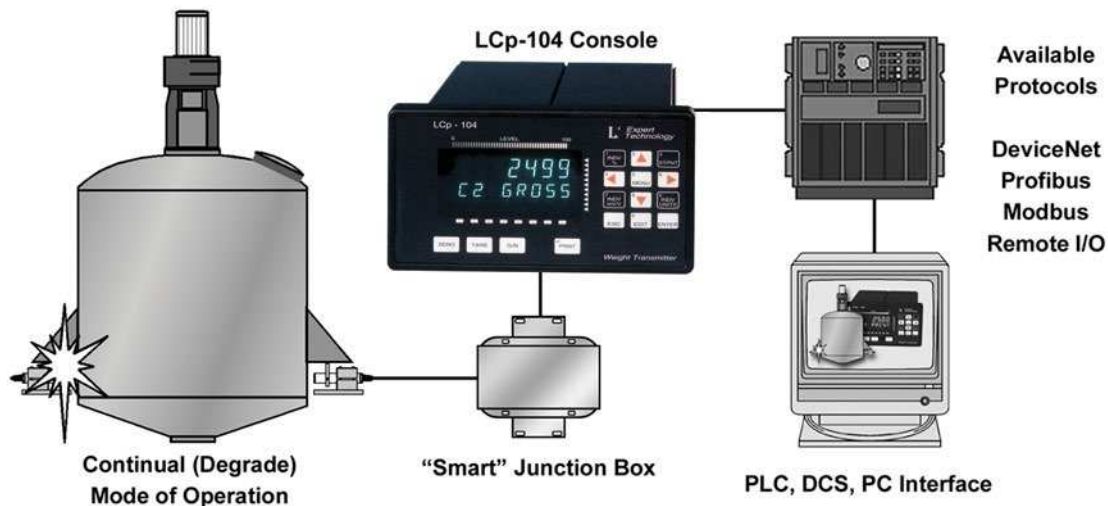
### DESCRIPTION

The LCp-104 System's patented synchronous digital measurement of multi-cell systems continues to be the benchmark in scale technology. True parallel data processing, with each update, guarantees real-time continuous weight measurement unheralded in process weighing. Until now, inherent load shifting during weighing cycles, mixing, or reactions have restricted performance of independent load cell measurement systems. With synchronous measurement, each system update is correctly summed and the benefits of individual measurement are retained. LCp-104 Process Weighing

Systems individually digitize each transducer in a multi-cell system and display the resultant weight signals, live, on the console display. Measuring each individual load cell provides greater system resolution and accuracy, while facilitating online dynamic diagnostics throughout the system process. Unique diagnostic "look-ahead" profiles alert operating personnel to potential system malfunctions, before they happen.

Dynamic digital filtering maximizes display stability and setpoint cutoff accuracy.

### CONFIGURATION

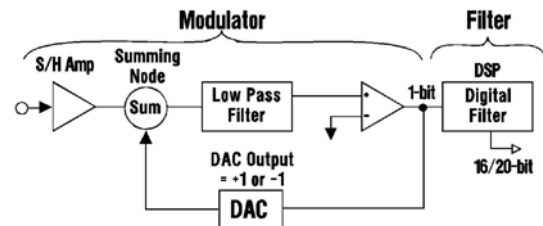


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**L<sup>4</sup> TECHNOLOGY BASED DIGITAL WEIGHT PROCESSING**

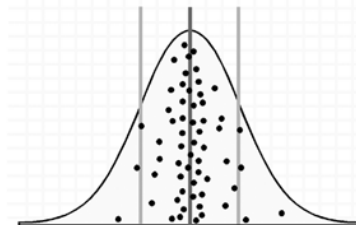
**Sigma Delta A-D Conversion**

Very high-resolution weight data is obtained by using an individual Sigma Delta A-D converter for each transducer input. This technology uses a high-speed integrator coupled with digital signal processing to produce a precision of up to one part in 1,000,000.



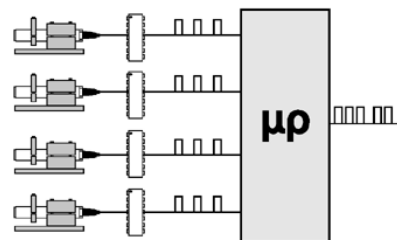
**Intuitive Digital Filter**

Combining A-D technology with multi-channel control produces extremely precise internal weight information. Resultant data is sampled and evaluated statistically to determine the sample mean and standard deviation. This vital information is then used to optimize filter averaging and filter cutoff bands to maximize both data stability and response to true weight changes.



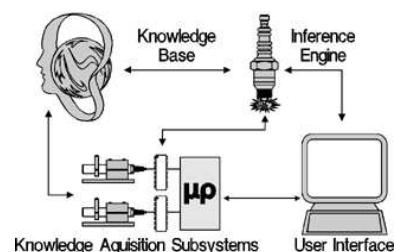
**Multi-Channel, Synchronous Signal Processing**

A patented method to control the timing of several dependent A-D converters with a single microprocessor allows for the use of individual transducer data without accumulated errors due to mass moving within a vessel. This capability makes it possible to individually digitize each transducer in a multi-cell system and achieve the benefits of additive resolution and system redundancy.



**Expert System Diagnostics**

The LCp-104 uses the expert system concept to compare various measurements against known standards of acceptable performance and uses that relative comparison to identify and diagnose both transducer and system performance problems. The BLH expert system identifies piping influences, structural problems, transducer drift, cell overload, and the location and characteristics of process noise.



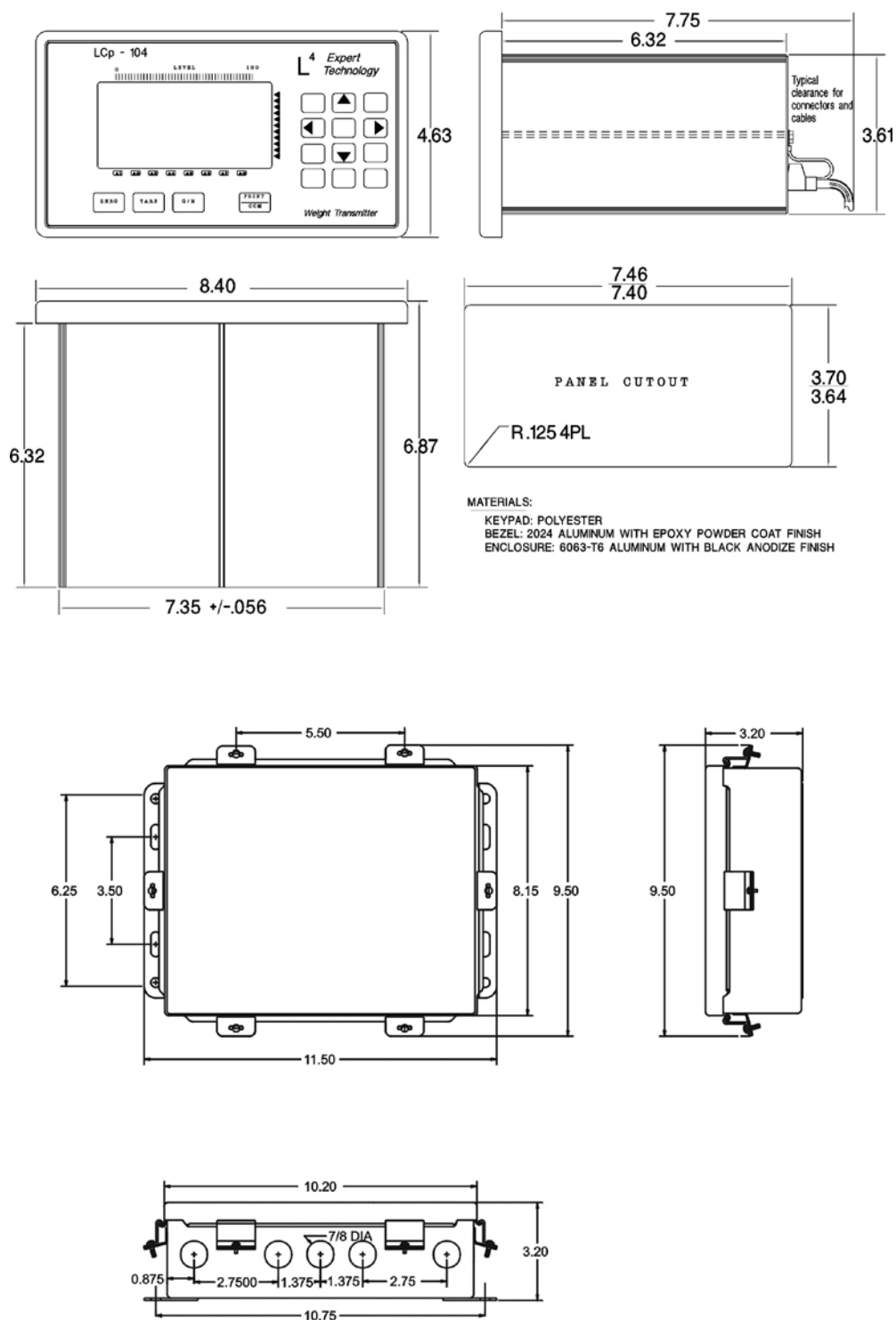
**Individual Load Cell 'LIVE' Displays**

Viewing individual load cells live, throughout the entire process, allows operating personnel to profile system trends or tendencies and adjust equipment for maximum performance. Although the total system may never overload, certain cells may experience overload or underload 'moments' which can affect cell integrity, longevity, and ultimately, product quality.



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**OUTLINE DIMENSIONS**



## Safe-Weigh® Process Weighing System

SPECIFICATIONS			
PARAMETER	VALUE	PARAMETER	VALUE
<b>PERFORMANCE</b>		<b>DC SETPOINT OUTPUTS – 8 (STANDARD)</b>	
Internal Resolution	4,194,304 total counts	Type	Open collector (current sinking)
Max. Display Resolution	3,000,000 total counts	Operating Voltage	5–35 VDC
Max. Res. Per Channel	1,000,000 counts	ON Voltage	12 VDC @ 40 mA 0.8 VDC @ 1 mA
Conversion Speed	33 msec (30 updates/sec)	OFF State Leakage	0.04 µA @ 40 VDC
Sensitivity (Noise)	0.001 1% full scale (maximum) (max ±16 counts w/o filter)	Power	External supply required
Full Scale Range	±35 mV/channel	<b>AC SETPOINT OUTPUTS – 8 (OPTIONAL)</b>	
Dead Load Range	100%	Type	Triac
Linearity	±0.0015% of full scale	Operating Voltage	12–240 VAC
Load Cell Excitation	10 V (65 mA/channel max)	AC Frequency	20–500 Hz
Software Filter (Std.)	50 to 10,000 msec	ON State Voltage Drop	1.2 V <sub>RMS</sub>
Temperature Effects		Min–Max Load Current	5 mA–1 A
Zero	±2 ppm/°C	Leakage Current	1 mA @ full rated load voltage
Span	±7 ppm/°C	Power	External supply required
Remote Sense	User configurable, each channel	<b>NETWORK SERIAL COMMUNICATION (STANDARD)</b>	
Calibration Repeatability	0.3 µV per count	Type	RS-485 Half Duplex (Multi-Drop)
<b>ENVIRONMENT</b>		Baud	9,600, 28,800, and 56,700
Operating Temperature	–10 to 55°C (12 to 131°F)	Data format	Proprietary
Storage Temperature	–20 to 85°C (–4 to 185°F)	<b>SIMPLEX DATA OUTPUT (STANDARD)</b>	
Humidity	5 to 90% RH, non-condensing	Type	RS-485 (Simplex)
<b>DISPLAY/OPERATOR INTERFACE</b>		Baud	1,200 or 9,600
Type	High intensity cobalt green vacuum fluorescent	Data Format (Selectable)	ASCII— 7 data bits, even parity, stop bit
Active Digits	7 digit alpha numeric 0.59 in high; for weight: 8 digit alphanumeric 0.39 in high for status	<b>TERMINAL / COMPUTER INTERFACE (OPTIONAL)</b>	
<b>ELECTRICAL</b>		Interface Type	RS-485 half duplex (standard)
Voltage	117/230 VAC +15% 50/60 Hz	Baud	1,200 or 9,600
Power	12 watts maximum	Protocol	Duplex command/response format ASCII— 7 data bits, even parity, stop bit
Input Impedance	10 MΩ, min. per channel	<b>SPECIAL PROTOCOLS (OPTIONAL)</b>	
Step Response	One conversion cycle	Modbus	RTU Protocol
Common Mode Rejection	100 dB at 60 Hz	<b>SPECIAL INTERFACE (OPTIONAL)</b>	
<b>ISOLATED ANALOG OUTPUT (4 MAX, OPTIONAL)</b>		Allen Bradley	Remote I/O – 1/4 logical rack
Type	16 bit digital to analog	Modbus Plus	Peer-to-peer (with global data)
Current	4–20 mA (600 Ω max load)	Profibus	Slave
<b>DIGITAL INPUTS</b>		DeviceNet	Slave
Logic "0" (Low)	>0.5 VDC, sink 3 mA (min)	<b>ENCLOSURE</b>	
Logic "1" (High)	10 to 28 VDC (TTL open collector)	Dimensions (HxWxD)	Console: 4.63 x 8.40 x 6.5 in. J-Box: 9.5 x 11.5 x 3.2 in.
Mechanical Relay "0"	Closed (one side = digital common, the other side = input)	Weight	Console: 5.4 lbs. J-Box: 5.6 lbs.
Mechanical Relay "1"	Open (input internally pulled up)	<b>APPROVALS</b>	
<b>NOTE:</b> PLC and Allen-Bradley are trademarks of Allen-Bradley Co., Inc. Modbus is a trademark of Schneider. DeviceNet is a trademark of ODVA. Profibus is a trademark of Siemens.		FM (Factory Mutual)	3611 (Class I, II, III; Div.1,2; Groups A-G)
BLH Nobel is continually seeking to improve product quality and performance. Specifications may change accordingly.		CSA	C22.2 (Class I, II, III; Div.1,2; Groups A-G)

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